The practical medicine of to-day : two addresses delivered before the British Medical Association, and the Epidemiological Society / by Sir William Jenner.

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TWO ADDRESSES DELIVERED BEFORE THE BRITISH MEDICAL ASSOCIATION, AND THE EPIDEMIOLOGICAL SOCIETY.

BY

SIR WILLIAM JENNER, Bart., M.D., D.C.L., F.R.S.

PHYSICIAN TO THE QUEEN;
PROFESSOR OF CLINICAL MEDICINE IN UNIVERSITY COLLEGE AND SENIOR PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

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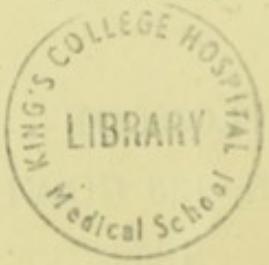


An Address

DELIVERED BEFORE THE

BRITISH MEDICAL ASSOCIATION

AT

LEEDS, JULY 28th, 1869.

Mr. President and Gentlemen,—There are special occasions when it is well for a man to review his mental progress—points in his life at which he does well, nay, is bound to look back over the road he has travelled—to count his gains, the difficulties he has overcome, the advances he has made; and so be cheered in his present labours, stimulated to new efforts,—gathering from the retrospect good hope for the years to come.

The same is true of a profession. Its members should from time to time look back to their earlier days, scan the advances their profession has made, compare what it is now with what it was then, weighing with unprejudiced eye the worth of its reputed progress.

Advances in practical sciences are not mere changes in ideas or in the modes of expression, which may, as in regard of religion, indicate greater enlightenment of mind, but they are advances in knowledge—the addition to the science of new facts—the elimination of supposed facts—the more correct appreciation of the bearing of old facts, and the application of this new knowledge to the advancement of the practical objects of the science.

There are special reasons why the members of our profession—practitioners of medicine—should from time to time sum up the gains Medicine has made as a practical art. For, in the daily practice of our profession, so much is necessarily met to damp our spirits, so many cases in which diagnosis in the present state of our art is altogether impossible, or at the best doubtful; so many in which the practical difficulties in the way of diagnosis, though the art be perfect, are insuperable; so many in which, the diagnosis being clear, we know that we are impotent to cure; so many in regard of which our apparently well founded expectations of effecting a cure prove vain, that even the most hopefully minded must now and then be tempted to doubt if Medicine be really advancing as a practical art.

Again, the spirits of many have been damped by the idea that modern advances in the science of Medicine have led to scepticism in regard of the remedial powers of medicine as an art; and especially as to the remedial power of drugs.

"I trust you will not cast doubts on the efficacy of medicines"—said a distinguished member of our profession speaking to me of this address. "They do not believe much in the worth of drugs at this Hospital," wrote a a reporter to one of the Medical Journals.

Now, for myself, I desire to repudiate absolutely, scepticism in regard of Medicine. I believe as confidently in the power of physicians to treat disease successfully as I did when clinical clerk to one of the first practical phy-

sicians of my youth. Extended knowledge and accumulated experience have only increased my confidence in the remedial powers of our art. Nor do I believe that others on whom the imputation of scepticism has been cast are less firm believers than myself in the value of treatment.

How has this charge of scepticism originated?

Modern research has shown that a large number of acute diseases occurring in previously sound persons have a tendency to terminate in the restoration of health, even though no drug be given. This is fact, knowledge, not scepticism.

Again, modern observation has proved that certain acute diseases formerly supposed of indefinite duration, run a definite course, *i.e.* end spontaneously at a certain date from their outset, and therefore that conclusions as to the efficacy of drugs to cut short these diseases, conclusions drawn before their definite duration was known, were founded on false premises, and consequently are not trustworthy. All this is surely fact, knowledge, not scepticism.

Again, advances in knowledge have frequently been attended by a more correct appreciation of the mode of action of drugs; and the expression of this has, not unfrequently, though most erroneously, been taken as evidence of scepticism. Thus, if I believe that saline aperients do not act as formerly I supposed they did, viz. by increasing the escape of watery matter from the radicles of the portal vein, I am not in the least shaken in my belief that the symptoms which I attribute to over-distension of the portal vein are relieved by their action, or that their action

is followed by the disappearance of watery fluid from the peritoneal cavity and from the cellular tissue.

Again, if it should be considered as proved by experiment on dogs, that mercurials do not produce increased secretion of bile in man, it would not in the least throw doubt on the established facts in regard of the great flow of a yellow and green colored fluid from the bowel after the administration of a mercurial to man, and the relief to many distressing symptoms which follows. A man's bilious headache, as it is termed, would be none the less certainly cured by a mercurial, even though it should be shown to the satisfaction of the whole profession that mercury does not increase the secreting power of the liver. Our modes of explaining certain facts in curative medicine would be changed, but not the facts themselves. My conviction then is, that, although with regard to the virtues of this or of that particular drug, and to the mode of action of this or of that particular class of remedies, there is, and always will be differences of opinion—the evidence that satisfies A being insufficient from the constitution of his mind to satisfy B—with regard to the value of drugs in the abstract, with regard to the value of treatment, there is really little difference of opinion among physicians equally well informed as to the present state of medical knowledge, and equally experienced in practice.

I say among men equally well informed. Let me illustrate my meaning. I was one of three who met in consultation concerning a case of apoplexy. In the opinion of one of my colleagues and myself, the only treatment

to be adopted was as follows :—to place the patient in the recumbent position with head and shoulders raised, to enforce absolute rest, to keep the bowels so far loose as to prevent excitement and straining; to apply cooling substances to the head in the event of any heat of the part occurring; to support the patient with light nutritive food, having regard to his habits. The third gentleman protested against the modern system of doing nothing, he was anxious to bleed, to purge, to blister; and, when opposed, was not sparing of the term sceptic &c.

Now the difference of opinion in this case was not due to scepticism on the one side and justifiable faith, *i.e.* faith justified by knowledge, on the other, but to knowledge on the one side, and absence of knowledge on the other.

The case was one of degenerative change, retrograde metamorphosis, of the arteries: one had become so rotten that its wall had given way, its contents had escaped, a clot had formed, and by its mechanical effects had given rise to the symptoms. The heart shared in the degenerative changes, the bleeding had ceased. To those who understood the real nature of the case, the lesions present, and the mode in which they had been produced—in short the pathology of the case—belief in the efficacy of so called active treatment appeared to be not merely unjustifiable faith, foundationless faith, faith without knowledge, but to be faith in opposition to knowledge, which in Medicine is the worst form of scepticism, inasmuch as it is doubt of truth and belief in error—doubt which may prevent the saving of life, and belief which, embodied in practice, may kill.

The present appears to me to be one of those special occasions to which I have referred, when with advantage to ourselves we may look back and survey the progress which Medicine has made as a practical art in our own time, I mean during the time a large proportion of those here present have been engaged in the study and practice of their profession.

The time allotted to this address will not permit me even to enumerate the advances Medicine has made during the past twenty-five years. I shall therefore limit myself to pointing out certain great divisions into which some at least of the great practical advances of Medicine may be grouped, and to giving, as briefly as possible, such illustrations of its advances in each of these divisions as seem to me to be sufficient to justify this assertion, viz. that having regard to the attainment of its practical aims and objects *as an art*, NO science has advanced more, during the period in question, than has the science of Medicine. As an art, I say; for, while Medicine is universally admitted to have advanced as a science, its progress as a practical art is frequently regarded as trifling, and often even denied.

As I do not propose to enumerate all the advances of Medicine, so neither is it my intention to refer by name to those by whose labours the great advances in Medicine have been made. And with regard to all the illustrations I shall give in confirmation of the position I have taken, in fact to all advances in Medicine as a practical science, it must be remembered that it is rarely—very rarely, if ever—that any great discovery, any great step forward has been

the direct result of the labours of a single man. All but invariably it has resulted from the successive labours of many men. And again, it must not be overlooked that, in regard of the advances of Medicine as a practical art, the silent workers render most efficient aid; the results of their unspoken experience confirming or refuting the published assertions of the few. It is to the experience of the mass of the profession that we look for the final establishment of doctrine and of rules of practice.

In the selection I am about to make, in confirmation of the statement that our science, in its advance as a practical art, stands second to none, I am conscious that I shall pass by some facts which others will think of greater value than those I have chosen as illustrations; and that others would prefer to illustrate the truth of the position I have taken by reference to more general and abstract principles. But I have been guided in my choice, first, by a desire to avoid disputed facts and theories; and secondly, by a consideration of those things which have aided me the most frequently and effectually at the bed-side when asking myself those two great questions which are hourly presenting themselves to the mind of the practitioner—What is the illness of the patient?—What will do him good?

Those points have been to me of the greatest practical service when teaching the student at the bed-side. It is clinical teaching that brings most closely home to a physician the importance of every advance in our practical knowledge.

By thus limiting myself, I feel that, while this ad-

dress will more and more directly attain its object, it will be deficient in novelty and scientific interest; and so as an address be unworthy of its predecessors. For that I crave your pardon.

Among the really great advances in Medicine may be placed the separation of chronic degenerations from diseases. By degenerations I mean—

1. Retrograde metamorphoses; passive changes as distinct from living processes; and especially granular disintegration, fatty degeneration and calcification, rotting and petrifaction, changes which may and do occur in tissues and structures removed from the body, in the bottle of the museum.

2. That change accompanied by thickening and diminution of elasticity which occurs in certain tissues in advancing life. The general diffusion of those degenerations is the characteristic of advancing age. It is in fact old age; so much so, that, if a means of preventing these changes should be discovered, that means would be the long-sought elixir of life.

Rotting, petrifaction, and the special change in nutrition to which I have referred, although they occur as, so to say, natural changes in advancing life, may occur in the structures of the young, if those structures be damaged by active disease.

As illustration of the clinical importance of these advances in our knowledge, I may refer to the modifications in our opinions and in our practice that have resulted from

the application of this general knowledge to the changes that occur in special organs. Thus our clinical knowledge in regard to heart-disease experienced advance with every step in our recognition of these degenerative changes.

First, we became acquainted with the fatty metamorphosis of its muscular tissue, *i.e.* the real conversion, by interchange of chemical elementary constituents, of the sarcous element of the muscle into olein &c., not atrophy proper, anymore than is the resolution of a drop of water into hydrogen and oxygen atrophy of the water, but a real decomposition, a decomposition proper to advancing age.

Then we learned the relation between this decomposition, rotting or fatty metamorphosis, and impediment to the flow of blood to the textures of the heart; and we saw that the impediment in many cases was caused by calcification or petrifaction of the coats of the arteries. Subsequently, we learned that whatever pathological condition interfered with the muscular tissue, favoured to the same degree this retrograde metamorphosis—re-arrangement of chemical constituents—decomposition or rotting, which we call fatty degeneration. So we saw that mechanically-induced congestion of the heart was followed, first by increase in muscular tissue and power, and then by such damage to the nutrition of the old and of the newly-formed muscular tissue as to be followed by rotting, *i. e.* granular disintegration and fatty degeneration. And thus we learned why the hypertrophied heart so often fails after a time to afford its proper physical signs, and to be followed by its consequences.

Again, learning that degeneration of special structures and tissues occurred simultaneously in particular individuals at about the same time of life, we came to the knowledge of fatty heart and rotten vessels being commonly concomitants; and our general stock knowledge reached the level of his, whose statement, when I heard it made at an early meeting of the Pathological Society, was received with shouts of laughter; viz. that fatty heart is often a preservative lesion. It is so. For the life of an aged person is in greater danger if the walls of his arteries are decayed while his heart retains its full power, than it is if the muscular tissue of the heart is suffering decay in proportion to the loss of resisting power of the arterial walls.

Continuing the illustrations from the heart,—these advances in pathologico-anatomical knowledge have enabled us clinically to distinguish valvular lesions consequent on endocarditis from those degenerative changes proper to advancing age, and to attach their true significance to those secondary changes which occur in the valves of the heart of the young the structure of which is damaged by acute inflammation.

We have thus attained to this practical conclusion; viz, that, regarded from a clinical point of view, structural changes in the valves of the heart are referrible to one of three classes,—imperfection in development; acute endocarditis; degenerative changes.

And yet farther advance of clinical knowledge has shown that non-fatal acute endocarditis is almost limited to acute rheumatism; and that degenerative changes sufficient in

degree to interfere with function do not occur in the valves of the heart till middle life, and rarely till advancing middle life.

The importance of these facts in enabling us to estimate the clinical value of special valvular murmurs is evident.

The influence the acquisition of this knowledge has exerted on practice is well illustrated by reference to a paper in the 6th volume of the *Transactions* of this Society. In having regard to their clinical significance, the active inflammatory nature of these degenerative lesions of the valves of the heart is regarded as indisputable, and special treatment in accordance with that opinion is advocated.

Again, the knowledge we have gained of these degenerative changes has enabled us to appreciate at their real worth, to attach their true pathological significance—and so to influence diagnosis, prognosis and treatment—to those changes in cerebral textures which follow on degeneration of the coats of the arteries and capillaries; to appreciate clinically the importance and signs of those changes in the coats of the larger arteries which, when circumscribed and considerable, by the diminution of elasticity and of contractility they necessitate, lead to local dilitations *i.e.* aneurisms; and to comprehend why aneurisms of the arteries of the trunk and extremities do not occur spontaneously in childhood or youth, why they are so often the concomitants of early though advancing age, and so rarely commence in old age.

A second great advance in Medicine has resulted from the knowledge that elevation of the temperature of the

body generally, is the only evidence of the existence of pyrexia—of fever in the abstract; that if there be no elevation of temperature there is no fever; that the only mode of practically determining the existence of elevation of temperature, and if estimating its degree, is by the use of the thermometer.

Although great elevation of temperature may be determined by the hand of the observer, yet there may be very decided elevation of temperature without the hand detecting it. And certainly the hand of the ordinary observer gives no correct idea of the degree of elevation. The indexed thermometer ranks in importance with the stethoscope.

I will illustrate the value to us as practitioners of this advance in our knowledge in regard of diagnosis, by reference to its value in the diagnosis of three common diseases.

There is a form of typhoid fever with which we are all familiar, that has been termed latent typhoid fever—a form in which the patient is from the commencement to the termination of the disease able to walk about, and even to follow his ordinary occupations. This is a form of the disease in which the patient not very infrequently dies from perforation of his bowel, or from intestinal hæmorrhage, even though, as is usual, the evidences of bowel-irritation have been trifling. The diagnosis of this practically-important variety of typhoid fever is often all but impossible without the use of the thermometer; with its aid it is comparatively, and it may be absolutely, easy.

The thermometer, in this case, enables the practitioner not only to satisfy himself, but also to satisfy the patient and his friends that he is really ill, that he is the subject of fever, not merely out of sorts—poorly. Accuracy in our diagnosis in this class of cases is all-important; for by it we are led to avoid the treatment which some of the symptoms may seem to demand—treatment which perchance might lead, as it often has led, to a fatal result; while, by the ocular demonstration of the existence of the fever which we can give to the patient, we can induce him to take those hygienic precautions so important for his safe passage through the ailment. How often have we all known in times past a drastic purge administered by the physician to remove the disordered secretions, and injudicious diet taken by the patient to remove the weakness—lead to death.

A second illustration of the value of the thermometer as an aid in diagnosis is afforded by cases of acute deposit of tubercle. This is a disease the diagnosis of which before the use of the thermometer was often impossible. Now, by a consideration of the continuous elevation of temperature, the degree of elevation, and the alternations in the degree of elevation, the diagnosis can be made with comparative facility.

A third illustration is afforded by the aid the thermometer gives in the differential diagnosis of pneumonia and tubercular pneumonia.

So much in illustration of its value in diagnosis; but the thermometer also affords more valuable aid in progno-

sis—for example, in typhus fever, typhoid fever, pneumonia, and acute rheumatism—and it gives valuable aid in determining the propriety of the treatment pursued in special cases.

A third great advance in our practical knowledge has resulted from the appreciation of the influence of various mechanical consequences of primary diseases.

I may illustrate our advances in this kind of knowledge by the following. When speaking of the distinction which modern clinical Medicine draws between imflammatory and degenerative changes in the valves of the heart, I might have referred to the fact that both have a common effect, viz. roughening of the margin of the valves. By this roughened surface fibrin is mechanically separated from the circulating blood, whipped out of it; and to the presence of this fibrin on the valve the greater part of the *post-mortem* visible abnormity is due. Formerly all this fibrin mechanically whipped on to the valve was supposed to be directly exuded as the result of endocarditis. Again, portions of this fibrin are frequently detached mechanically, *i.e.* carried away by the blood current, and arrested here and there in the substance of organs or in the larger vessels leading to organs or to parts of organs. The rheumatic nephritis figured in Rayer's great work is now known to be capillary embolism; while cases of paralysis which were not long since altogether inexplicable are now matters of every-day knowledge to the student; and their relation to embolism to portions of fibrin washed from the valves of the heart and their arrest in arteries of

the brain, is matter of demonstration. Late observations have even rendered it probable that, in a certain proportion of cases at least, that remarkable combination of symptoms to which we give the name aphasia is due to this variety of embolism.

Again, compare our knowledge at the present time with regard to the formation of a clot in a vein, and the results, local and general, of the presence of the clots, with what it was a few years since. Thus with regard to the formation of thrombosis we have acquired real, practical knowledge—the knowledge of the relation of states of blood, and of force of circulation, to the formation of the clots, and the secondary origin, in these cases, of the inflammation of the vein. As to consequences, the relation between capillary hæmorrhage, for example, into the substance of the brain, the so-called capillary apoplexy and the presence of this form of mechanical impediment to the return of blood from the part. These capillary cerebral hæmorrhages were enigmas in past times.

Another illustration of our advance in practical knowledge in this direction, *i.e.* of the mechanical origin and consequences of special diseased states, is afforded by a consideration of a cause of death after tracheotomy in diphtheria. The patient, after the opening of the trachea, frequently, as is well known, suffers from disseminated lobular pneumonia, while the trachea may be opened in other conditions without any such result. The lobular pneumonia, under the conditions referred to, is due to inhalation into the capillary bronchi and air-cells of disintegrated diph-

theritic exudation from the larynx, and the mechanical difficulty to its expulsion resulting from the opening into the trachea, and thus mechanically are established numerous centres of diseased action. This knowledge modifies practice most materially, and tends much to the saving of life.

Another illustration is afforded us by chronic pulmonary vesicular emphysema. The first change is degenerative—loss of elasticity: from this follows mechanically over-distension of the air-cells. As direct consequence of the dilatation of the air-cells there is physical impediment to the flow of blood through the capillaries of their walls, as direct mechanical consequence of this damming back of blood in the right side of the heart, and in the capillaries of the heart, liver, kidneys &c., this mechanically is first followed by enlargement of these organs, and subsequently by granular atrophy, in part at least the direct result of the mechanically over-distended venules.

A knowledge of several of these consequences, so important for the correct appreciation of the progress and for the treatment of emphysema, is due to quite recent research.

Another class of diseases, in the practical acquaintance with which we have made great progress during the past few years, is that due to fluid blood-poisons—pyæmia, septicæmia, ichorrhæmia, and the allied conditions.

In illustration, I may refer to three common diseases respecting which our advance in knowledge in this direction has exerted a marked influence, not only in enabling us to give

an explanation of common secondary affections, but also in regulating treatment.

It is now part of our daily clinical knowledge, that a very large proportion of the fatal cases of typhoid fever are fatal, not from the severity of the original disease, not from the direct secondary consequences of the original disease, but from the effects of absorption of decayed matter from the ulcerated surface of the intestine, and the blood-condition, septicæmia, resulting. From this follow secondary pneumonia, nephritis, hepatitis, &c. The practical conclusion is that one great point in treatment is to prevent this absorption by the use of remedies calculated to destroy the fœtid condition of the intestinal contents.

Again, in determining a fatal result in scarlatina, septicæmia often plays a most important part. Absorption from the ulcerated surface of the throat leads to great enlargement of the lymphatic glands about the angle of the jaw, and then to general infection. The same is true in regard of diphtheria. The practical conclusion here is that one object in treatment is to destroy the absorbing surface, (often quite practicable in scarlet fever,) and to destroy fœtid matters by the use of antiseptics to the pharynx.

Among our advances in the same direction, that is of the effects of the fluid blood-poisons and their consequences, should perhaps be classed those great strides forward in practical knowledge which have followed on our study of Bright's disease, its relation to local inflammations, to cerebral hæmorrhage, and to hypertrophy of the

left ventricle of the heart. This last addition to our knowledge has advanced cardiac pathology, not only by its direct addition to our stock of knowledge, but also by bringing under general laws some of the apparently most exceptional cases of hypertrophy of the heart.

Another decided advance of modern Practical Medicine has followed from the greater accuracy and minuteness with which the signs and symptoms of special cases of special diseases have been observed and described, the care with which collections of such cases have been analysed, and the greater precision with which special diseases have, in consequence, been defined.

Advances of knowledge which have followed are manifested—

1. By the more correct appreciation, in regard of well known diseases, of the relation between the objective signs and the lesions found after death. Thus we have attained to a degree of accuracy in the diagnosis of diseases of the heart, lung, brain, spinal cord, &c., which a few years ago would have been regarded as impossible.

2. By the separation of diseases previously confounded as one: *e. g.* Bright's disease has been proved to include several distinct renal diseases, each requiring its special treatment, and all entitled to the common name of Bright's disease only because they have, as common consequences, lesions resulting from the retention in the blood of urinary elements. To two of these special diseases of the kidney I may refer in illustration, viz. the gouty and the syphilitic kidney. Again, in recent time we have attained

solid grounds for distinguishing pulmonary collapse from pneumonia, gout from rheumatism, and also for separating febricula, relapsing, typhus, and typhoid fevers. The advance in our knowledge in regard of the diagnostic symptoms of the last-named of these diseases, conjoined to our *now* knowledge of the symptoms of general acute tuberculization, and of the origin of the febrile disturbances generally of childhood, has enabled us to separate into its proper constituents the most dissimilar pathological conditions grouped in times lately past under the head, "infantile remittent fever," and to discard the very name, unless we use it to the public as a cloak for diagnostic ignorance.

3. By the discovery of the existence of diseases formerly unknown. Need I mention Addison's disease, leukæmia, locomotor ataxy, trichinosis, cerebro-spinal meningitis, and albuminoid disease of the various organs?

The accurate definition of a new disease is not only a gain in itself, but it enables us to define, much more clearly, allied diseases. Thus the knowledge of the parasitic nature of a considerable number of the diseases of the skin not only established the existence of several well-defined genera on a firm basis, but enabled other genera to be more easily and clearly defined: *e. g.* the precise characters by which tinea tonsurans can be defined, makes tinea decalvans, eczema, and herpes circinnatus, more easily and clearly definable.

The more accurate definition of special diseases has led to a more accurate knowledge of the course of special dis-

eases—their natural history, if I may say so;—a knowledge the importance of which cannot be over-estimated. Acute sthenic pneumonia has been shown to have a course almost as definite as the acute specific diseases; and to have an almost certainly favourable termination in youth.

The auscultatory signs of tubercular pneumonia are not to be distinguished from those of ordinary pneumonia; but the former as rarely spares the young as the latter kills them. The diagnosis between these two affections may be made absolutely by their course. The knowledge of the duration and course of diphtheria—the period at which the larynx is likely to become involved, albuminuria to occur, and the nervous phenomena to supervene, has given us great advantages in its treatment.

I may illustrate the folly of attempting to estimate the value of special treatment of a disease before the natural history of the disease is known, by the following facts.

In 1817—19 an epidemic of fever prevailed in Edinburgh. This epidemic met with a singularly able historician in Dr. Welche. His object was not to write a history of the epidemic, but to prove the great value of blood-letting in fever. Dr. Welche shows that the mortality from fever in Edinburgh before the employment of venesection was very great, the percentage of fatal cases was very considerable; and he proves indisputably that, after the introduction of free blood-letting, the mortality was comparatively, nay absolutely, trifling. So frequently did the fever cease after the blood-letting, so quickly did the cessation of the fever follow on the venesection, that to the

man who employed the lancet boldly in the treatment of fever Dr. Welche thought it might be said "O homo! jugulasti febrem."

Now the investigations of the physicians of the past twenty-five years have proved that the disease which Dr. Welche supposed he had killed by blood-letting was a disease which runs a short and definite course, ends spontaneously on or about the date at which he thought he killed it by blood-letting, and terminates almost always in health under all treatment and without treatment. It is wonderful to observe how few died, though in the hope of killing the fever 120 to 130 ounces of blood were taken from the arm in a few days in several cases.

Another great advance in practical Medicine is the recognition of the frequent relation of local lesions to chronic constitutional states. No practitioner would now think of treating a local disease till the diagnosis of the constitutional state had been made.

For example, in bronchitis in a child both the prognosis and the treatment will be greatly modified by the fact that the little one is the subject of tuberculosis, of strumosis, of rickets, or of constitutional syphilis. In Bright's disease both prognosis and treatment will be modified by the fact of the patient being the subject of constitutional gout, of tuberculosis, or of syphilis.

So in regard of intracranial diseases, I may instance meningitis, tumour, disease of arteries, interfering with nutrition as local diseases, for the successful treatment of which it is now admitted that a knowledge of the constitu-

tional state is in every case essential. Surely this is a great stride in practical medicine.

The increased accuracy of late attained in the definition of special diseases and of their course has been greatly assisted by the use of special instruments for the detection of physical changes previously imperfectly recognisable. Without the microscope the existence of leukæmia could not have been established; to its aid is due the knowledge of the parasitic characters of tinea tonsurans, tinea favosa, chloasma, and thrush; it has yielded indisputable evidence of progressing destruction of lung-tissue; to it we are indebted for the separation of hydatid cysts from the various forms of simple cysts with which they were so long confounded, as well as for a knowledge of the real nature of the former. The diagnosis, prognosis, and treatment of Bright's disease are all aided by the information the microscope conveys.

The thermometer to the clinical physician affords, as we have already seen, information of the highest practical value, whether regard be had to diagnosis, to prognosis, or to treatment.

The laryngoscope has enabled us to appreciate changes in the larynx which, without its aid, could not have been suspected, and to determine with certainty the presence of other lesions which, without it, could only have been suspected, *e.g.* growths within the larynx, paralysis of one or both vocal cords, small ulcers on the cords; and in two of these affections, to detect the disease with certainty is to be able with equal certainty to cure the patient.

The ophthalmoscope has afforded valuable definite information in aid of the diagnosis of some of the most obscure diseases of the brain and its membranes.

The sphygmograph has accomplished something for medicine as a science and an art, and promises much more.

The balance is an instrument of great importance in determining the progress, that is the advance or otherwise, of certain important diseases, and so the value of the treatment being pursued; *e.g.* diabetes and phthisis.

Another great gain to modern Medicine has resulted from the diffusion of more correct ideas as to the meaning of the word cure, and of the distinction to be drawn between curing the disease and curing the patient.

The meanings of the word cure are best illustrated by reference to some special diseases.

We cure scabies. It is to be observed however that when we cure scabies we do not cure the visible symptoms of the disease; but we destroy the agent, the presence of which calls forth the visible symptoms. That agent being destroyed, nature cures the inflammation, vesication, pustulation, &c. We do what the surgeon does when he removes a thorn; he does not cure the inflammation excited by the thorn, but he removes that which keeps up the inflammation; and then nature cures the inflammation.

Ague is, again, a disease of another kind, which we remove, that is, cure, by the use of certain drugs. The ague fit once established is not curable; *i.e.* it runs its

course; and then we prevent the recurrence of the ague-fit. We cure or remove the condition which leads to the recurrence of the fit, over the symptoms and duration of which we exercise no control. We cure the disease.

Epilepsy is another disease which we cure. Each fit, like the attack of ague, once begun runs its course uncontrolled. Epilepsy is sometimes occasioned by a special exciting cause, an irritant present at some one point, the thorn so to say. For example, a man suffered from epilepsy, he passed joints of tape worm; the worm was removed, and the fits did not recur. Years afterwards the epilepsy recurred, and he said, "Oh! I must have another tape-worm." A dose of male-fern did remove another tape-worm; and again the fits ceased. Now we may say the epilepsy was cured by the removal of the tape-worm, but it is to be noted that, although the excitement of the attacks was removed, the disease of the nervous system was untouched, as was shown by the recurrence of the manifestations of the disease as soon as the special irritant was again applied.

Again, we cure epilepsy, we say, when by the administration of drugs we so modify the nervous system that, on the applications of the irritants which previously induced a fit, no attack follows.

We cure patients suffering from the acute specific diseases. An acute specific fever is analogous not to ague generally but to a single fit of ague, and as we have no drug that controls the duration of the fit, so we have no drug that controls the course or duration of the acute

specific fevers. We have no drug to cut short the fever, no drug that exercises, so far as is known, any influence on the specific disease. But, notwithstanding this, there is probably no class of diseases in which we more frequently cure the patient; that is, by our knowledge of the course of these diseases, of the dangers which threaten the life of the patient at each stage, and by the judicious employment of remedies, under which are to be included air, food, stimulants, and drugs commonly so called, we directly, positively, prevent the patient from dying. The treatment is not expectant; it is positive and even often anticipatory. We do not stand by and let the disease run its course unmodified. We interfere at every stage to prevent, control, or counteract the consequences of the disease. We restrain diarrhœa; we check hæmorrhage; we prevent septicæmia; and we regulate, by giving or withholding stimulants and food, the powers of the patient.

We cure, but how we know not, a patient suffering from local nerve-pains, we cut short the pain by the administration of drugs concerning the mode of action of which we know nothing.

We cure the most distressing sufferings of constitutional syphilis by the administration of drugs, concerning the *modus operandi* of which we are really ignorant.

The distinction between curing the disease and curing the patient is real.

Though the science of medicine had attained to such degree of perfection that the diagnosis of special diseases was perfect, and the prognosis in individual

cases invariably correct, the public would have little practical interest in its spread. Its practitioners would be engaged in solving puzzles, and in little more. So far as concerns the non-professional public the aims and objects of Medicine ought to be—

to prevent disease:
to cure disease:
to prolong life:
to alleviate physical suffering.

But then it is manifest that the definition of special diseases must precede all attempts to determine their several causes and their modes of cure. Every advance, therefore, in the correct definition of special diseases, and in the diagnosis of special diseases, is a step in the direction of an advance of preventive and of curative Medicine.

In illustration of the advances made in preventive Medicine, I will adduce the firm establishment of the fact that drinking water is one of the greatest agents in the spread of two of the most fatal acute diseases of the present time, viz. cholera and typhoid fever.

In the ten years ending 1866—21,848 persons died from cholera in England and Wales, and 192,562 from fever. From the Registrar-general's returns, it is not possible to say precisely how many of the 192,562 persons died from typhoid fever; but, seeing that typhoid fever is the endemic fever of our country, and that typhus prevails as an epidemic only, and that in limited localities and for a short time, we shall be within the limits of high pro-

bability when we say that 150,000 persons died of typhoid fever during the ten years in question, and that in no one year of the ten did less than 10,000 persons die of that disease.

Now, with reference to cholera, the special facts collected by Dr. Snow proved that one of the great agents in its diffusion was drinking water; that every virulent outbreak of the disease in a limited district was clearly coincident with pollution of the drinking water supplied to that district; and that persons living at a distance, if by accident they drank of the polluted water, suffered as certainly as if they dwelt in the district specially affected. The conclusion which follows from the facts collected by Dr. Snow is that, the conditions existing, be they atmospheric or other,which determine the epidemic disposition to cholera, the presence of minute portions of cholera excreta in the water supplied to a district for drinking purposes, will be followed by an outbreak of cholera in that district.

Careful investigations into the circumstances attending local virulent outbursts of cholera during the last epidemic have proved the truth of that conclusion. I will refer to two such special investigations in confirmation, viz. Mr. Radcliffe's admirable researches into the relation between the water-supply and the spread of cholera in London; and to Dr. Bellot's most conclusive observations on impure water as a cause of cholera in Holland.

Dr. Snow's investigations traced special individual cases and local outbreaks to one exciting cause. Mr.

Radcliffe's researches bear especially on the influence of the polluted water in determining excess of mortality in a large district of a great city. Dr. Bellot's facts show that those towns and those parts of a town in Holland, in which there was the greatest facility for the contamination of the water-supply by cholera dejections, were those which suffered by far the most severely.

The spread of typhoid fever by contamination of the drinking water-supply is, if possible, less disputable than is the spread of cholera by the same means. Every new investigation has added new proof to the strong presumptive evidence afforded by Dr. Flint's cases. Solitary cases, outbreaks confined to single houses, to small villages, and to parts of large towns—cases isolated, it seems, from all sources of fallacy—and epidemics affecting the inhabitants of large though limited localities, have all united to support by their testimony the truth of the opinion that the admixture of a trace of fæcal matter, but especially of the bowel-excreta of typhoid fever, with the water supplied for drinking purposes, is the most efficient cause of the spread of the disease; and that the diffusion of the disease in any given locality is limited or otherwise just in proportion as the dwellers in that locality derive their supply of drinking water from polluted or from unpolluted sources.

The proof seems complete, that a large proportion of those who drink water containing a minute quantity of the intestinal excreta from a person suffering from cholera will suffer cholera; and that a large proportion of those

who drink water containing a minute quantity of the intestinal excreta from a person suffering from typhoid fever will suffer typhoid fever. These diseases occur like small pox, scarlet fever and measles, *as epidemics*, owing to causes of which we know little or nothing; but, when epidemic, unlike small pox, scarlet fever and measles, a local outbreak of cholera and of typhoid fever will be determined by the impurity of the drinking water. Had the water supplied to the East of London been as free from organic impurity as was that supplied to the West of London, the death-rate from cholera at the East would have been a little larger only than was the death-rate at the West of London. Had the drainage and water-supply of Winterton, Terling and Guildford, been what modern Medicine has shown for health-purposes they should have been, these places would not have suffered the terrible outbreaks of typhoid fever of which the Medical Officer of the Privy Council gives such full details in the tenth volume of his inexpressibly valuable Reports. The persons who died at these places from typhoid fever, and a large proportion of those who died at the East of London from cholera, were as certainly killed by the water they drank, and killed without need, as if the water supplied to them had been contaminated with arsenic. And I am sure we all agree with the most distinguished Officer of the Privy Council, that "the distribution of fouled water by the Guildford Board is as proper a case for judge and jury, on action for damages by any of the five hundred people who had typhoid fever in that town, as any case in which a

railway collision brings some score of passengers into harm; and the fact that these water-purveyors gave typhoid fever to their customers would be brought home to their consciences, and be suggested as a warning to other water-purveyors, in a far more conclusive and effective manner by such legal proceedings than it can be by any departmental statistics and remonstrances."

Another advance in preventive medicine, second only in importance (even if it be second) to those just mentioned, has resulted from the knowledge lately acquired of the influence of dampness of soil in the production of phthisis. Dr. Bowditch's and Dr. Buchanan's independent researches have placed beyond question the relation between dampness of soil and phthisis, and have proved that drying of the soil, by proper drainage of any given locality, is followed by remarkable diminution in that locality of the death rate from phthisis. By improved drainage causing drying of the soil, in Rugby the phthisis mortality has fallen 43; in Salisbury 49; and in Ely 47 per cent.

Thus by the advances of modern Medicine the public have gained certain knowledge of the means of preventing, to a very great extent, the spread of two of the most fatal of acute diseases, and of preventing the occurrence in a large number of cases of the most fatal of chronic ailments.

The advances of curative Medicine have been as decided as those of preventive Medicine. Not only have sounder views of the rational treatment of special diseases, based on

advances of pathological knowledge, been established, but new drugs of great practical worth have been introduced into our Pharmacopœia, and old drugs have been found to possess virtues heretofore unsuspected.

How wonderful is the influence of bromide of potassium over diseases for the treatment of which we were but a few years since almost impotent. A dull heavy looking lad suffered for seven years from epileptic attacks, steadily increased from the first in severity and frequency, till many occurred in the 24 hours. For a year he was treated by a physician on general principles with little benefit. The case was in all particulars most unpromising; yet from the time the boy took the first dose of bromide of potassium to the present, nearly three years, he has not had a single fit.

Is this a solitary case? Certainly not. We could all match it. But it illustrates well the power of a new drug over a class of cases which, not long ago, were regarded by practical men as almost as much beyond the curative influence of drugs as is a case of cancer of the breast.

To one other of the powers of this drug I must advert, viz., its influence on the sexual organs; a power which enables us to exercise a real curative influence over a class of most distressing affections, for which, by drugs at least, we could formerly do nothing.

Other illustrations of the strides made in drug-therapeutics are afforded by the influence of cod-liver oil on the cachexia of tubercular disease and of rickets, of iron on the cachexia of the aged, of digitalis as a cardiac tonic,

of ipecacuanha in the cure of dysentery, of sulphites and sulphurous acid and of carbolic acid in the treatment of vegetable parasites, and of Faradization and the continuous current in some morbid states of the nervous system.

The progress of pathological knowledge has been followed by an equal advance in the rational treatment of disease. Means were formerly sought to strangle a fever, to cut short a pneumonia. Increase of knowledge has taught us that these diseases always terminate within a limited period, but are never cut short; while collections of facts have proved what, in the present state of pathological and physiological knowledge, might have been predicated; viz., that a larger proportion of these diseases terminate in health under restorative treatment than under depleting remedies. The propriety of the substitution of food and moderate quantities of stimulants, as routine practice, for the lancet rests on the firm basis of results, and this firm basis is established without regard to the answer that may be given by science to the question, is alcohol food, or heart-stimulant, or a "nerve-power supporter?" But, while admitting this general conclusion, the profession as a whole have not forgotten that there is no one treatment applicable to all cases of disease bearing the same name. They have not failed to see that the practitioner is distinguished from the routinist by his ability to discern when, with advantage to the patient, he may deviate from rules of practice generally applicable. No tables, however carefully compiled, however ably analysed, can teach a man how to treat *the* case of fever, or *the* case of pneumonia, now under his care.

A good illustration of the help yielded to us in the rational treatment of a special disease from advances in our pathological knowledge in regard of that disease is afforded by chronic pulmonary vesicular emphysema. The diminution of the elasticity of the lung can in many cases be retarded, the exciting and determining causes of overdistension of the air-vesicles can be shunned; the causes of temporary impediments to the flow of blood through the pulmonary capillaries can be avoided; congestion of the heart, liver, kidney, &c., can in this way be lessened, and by direct remedies still further diminished or removed. And thus sufferings are alleviated, serious secondary lesions of structure in organs, the integrity of which is essential to life, in a great measure prevented, and life itself indefinitely prolonged.

The benefit derived from opening the trachea in croup is another illustration of the value of rational treatment in the prolongation of life.

With reference to the power of our art to alleviate suffering, how great is the difference between the medicine of to-day and that of our youth! Who that has suffered from a painful local affection can think of the alleviation to his sufferings which followed on the subcutaneous injection of an anodyne without gratitude? Who is there that has had to submit to the knife of the surgeon whose heart does not overflow with gratitude to those who introduced and perfected local and general anæsthesia. The electric telegraph, the second greatest marvel of our time, was a thing which in a rough way scientific men had long thought pos-

sible, but to be cut for stone and know nothing of the agony, to have a leg removed and smilingly ask, when the operation is over, "When are you going to begin," to have a nail torn away and look on and laugh while that most painful operation is proceeding—these are marvels of which none dreamed. No extravagance of fiction equals this reality. The discovery of the value of subcutaneous injection of anodynes, of local anæsthesia by ice and ether spray, and of general anæsthesia by ether, chloroform, and nitrous oxide, are advances in alleviative Medicine worthy to rank with the advances in preventive, curative, and prolongative Medicine to which I have referred.

Keeping in view then those practical aims and objects for which medicine is esteemed by the public, viz., its power to prevent disease, to cure disease, to prolong life, to alleviate suffering, I feel that I have said enough amply to prove the truth of my assertion, that the progress of medicine as an art during the past twenty-five years* has been second to that of no other science. While the present advanced state of medical education—the perfection of the means of physical research—the many new centres of knowledge being established in our colonial empire and in America—the widely diffused acquaintance of the profession with modern languages—the rapidity

* Too narrow a limit must not be given to the twenty-five years, as the writer intended rather to fix a time within which the illustrations given had become part of the stock knowledge of the Profession than fix with accuracy the date when each fact was published by its discoverer.

with which knowledge spreads—the confirmation, correction, or refutation which follows so quickly on the publication of novelties—the great ability, the absence of prejudice, the untiring energy, and the truthfulness exhibited by the younger workers in the field of our science, render me hopeful that the next quarter of a century will be distinguished by far greater progress than has the last, great though that be.

And I can even now in mind realize the day when most of us, our faculties numbed by age, shall take but listless interest in the then present, or be, as is perhaps to be hoped, where suffering has no place, and when another, as full of sympathy for physical suffering, as anxious to relieve it as we are now, shall stand in this place and tell how, twenty-five years before, one stood here and with exulting voice spoke of the advances of Medicine in the preceding quarter of a century, but only to add that the sum of those boasted advances was but as nothing compared to the strides the profession had made as a practical art since that far-away day.

Address

DELIVERED AT THE

OPENING OF THE SESSION 1866-7

OF THE

EPIDEMIOLOGICAL SOCIETY.

Gentlemen,—Since the commencement of the last session, the physician who from its foundation in 1850 till two years since presided over the Epidemiological Society has passed from among us. Learned, and possessed of considerable intellectual power, accomplished and refined, unobtrusive and gentle in manner, the type of an amiable man, Dr. Babington was loved and respected by all acquainted with him. His powers, knowledge, and influence he was at all times willing to exert in the cause of humanity and his art. And no small additional praise of him it is to say that, although a practical and practising physician, he never wrote a line which can have been supposed to have been dictated by other motives than a desire to advance or to diffuse knowledge, and that he wrote nothing which did not answer the end for which it was written. No one feels more strongly than I do how inadequately I can fill the place in this Society which Dr. Babington so long held, and which our second president so ably occupied. The time at my disposal is short—so

short that I could not hope, had I the ability, to advance our knowledge. Nor should I have responded to the offer of the Council had I not been told that other positions which I happen to fill would, in their opinion, render me of service to the Society when, as often happens, it has to communicate with other authorities. This evening, I shall, it seems to me, be best performing the duty of my post by reviewing from a particular point of view—namely, from that which every practitioner of medicine necessarily occupies, very briefly and in general terms, that great group of diseases to the investigation of the laws of a single class of which this Society especially devotes its labours. I review the whole group, because the diseases constituting it, dissimilar as they are in their pathology, are so intimately connected in their etiology, that the removal of the causes of one of the group would certainly and greatly diminish the mortality from all.

To cure disease was the great aim of Medicine in the last century. The idea of the vast majority of the public or medical subjects is the popular expression of the views held by the physicians of the generation just gone. The present popular idea of the science and art of Medicine is that it aims chiefly at the discovery of special cures for all special diseases. During the past few months the authoritative utterances of the daily journals have afforded the clearest proof of the truth of this assertion. What is the use of veterinary art if it cannot tell the public a cure for the cattle plague? What is the use of the science and art of Medicine if it cannot point out to us a cure for cholera?

Such has been the substance of many articles in the journals, which are the reflex of the popular ideas of the day.

The asking such questions, as well as the filling of column after column of the same journals with alleged specific cures and discussions on specific modes of treatment, afford practical evidence of the ignorance of the public on medical subjects.

In regard to the cattle plague, the trying proposed specifics and seeking new specifics was indeed grasping at a shadow, in place of taking the substance offered by one of the most distinguished, best-informed, and able of our veterinary surgeons.

No one acquainted with the present state of the science and art of Medicine will for a moment question that to prevent disease is its first and most important aim. That this is the great aim of Medicine is a statement made in the opening lecture of all teachers of Medicine, and in all their subsequent teaching they never lose sight of the fact. We spend time at the bedside in elaborating the history of cases and establishing diagnosis, and hours in the dead-house, that we may throw a little more light on the mode of attaining this, the great aim of our profession. Failing to prevent, Medicine strives to cure; unable to cure, it strives to lengthen life, and by lengthening life often saves life; and failing in all these, it can still be of service to large numbers by alleviating suffering.

Diseases have been grouped under the heads preventable and non-preventable; and although there are a con-

siderable number which belong to the debatable ground, and many which can only be diminished in frequency and severity, it is of practical importance that the fact of the existence of a great group of preventable diseases should be often and often—it cannot be too often—urged by our profession, collectively and individually, on the general public.

In his well-known, remarkable, and able paper, Dr. Greenhow attempted to estimate the undoubtedly preventable mortality from disease. He compared the death-rate of the healthiest registration districts in England with that of the least healthy, and then ascertained the diseases from which the excess in mortality arose. These diseases should, he argued be able to be so reduced in frequency in the unhealthy districts as to bring down the death-rate of the now unhealthy districts to a level with that of the healthy districts—*e.g.* to reduce the 36 death-rate of Liverpool to the 17 death-rate of group C of the Registrar-General.

There is, however, another mode of estimating generally the enormous amount of life sacrificed unnecessarily—*i.e.*, of deaths from preventable diseases—viz., to consider what diseases experience has proved to be due to definite, well-ascertained causes, and then, having regard generally to the direct and indirect mortality of those diseases, to examine how far their causes are practically removable. Much of this figures cannot express—the Registrar-General's returns cannot show. He alone who practices medicine on a large scale among the poor can appreciate it, and that necessarily only approximately and in a general way.

First among preventable diseases I will place one the mortality from which, in London at least, is so great as, beyond question, to swell largely the death-rate of children under two years of age, and yet one that has no place in the Registrar-General's returns. I mean rickets, the English disease, as it was formerly called. Not one child *ought* to die from rickets itself, and death from its consequences ought to be extremely rare; and yet the mortality from rickets, from diseases which would not occur but for the pre-existing rickets, and from diseases which would be trifling but for the co-existing rickets, is enormous. Laryngismus stridulus, chronic hydrocephalus, teething, convulsions, atrophy, disease of spleen and of liver, remittent fever, tabes mesenterica, spinal disease, bronchitis, diarrhœa, measles, whooping-cough,—these are some of the names under which deaths really due to rickets appear in the Registrar-General's returns.

Syphilis, like rickets, is a preventable disease—the mortality from which is far greater than it appears to be in the Registrar-General's returns. It is only in recent times that physicians have begun to appreciate the gravity of the chronic constitutional consequences of this affection on the individual and on his offspring. The frequency with which cases of hepatic disease, of so-called tubercular phthisis, of Bright's disease, of brain disease, are referable directly to syphilis, and the many cases of so-called strumous disease in the child due to inherited syphilis, becomes daily more apparent.

Strumosis and tuberculosis are induced in a large pro-

portion of cases, and the development of tubercle determined in a still larger proportion of the cases of unavoidable tuberculosis, by preventable causes. Strumosis and tuberculosis have no place in the Registrar-General's returns; and yet to the pre-existence of these diseased states, in a large proportion of cases, is due the death in scarlet fever, in measles, whooping-cough; and but for these states how large a number of cases of Bright's disease, hepatic disease, and puerperal mischief would never have occurred.

Delirium tremens and cirrhosis of the liver are as certainly preventable diseases as are syphilis and rickets.

Gout and its concomitants, Bright's disease, &c., are the consequences, in a large proportion of cases, of preventable conditions.

Of scurvy and the diseases due to the injurious influences consequent on the exercise of certain trades I will not now speak. They are too numerous to be considered even briefly on such an occasion as this. That they are to a great extent preventable, no one can doubt.

Passing from these, we have, lastly, those preventable diseases in the consideration of which our Society is especially interested—viz., the whole class of zymotic diseases.

The causes exciting or permissive of all the preventable diseases I have enumerated are—impurity, excess, or deficiency of food, air, clothing, light, or exercise, sexual excitement, or inherited tendency. As the individual, society, or law can regulate or guide the supply of these agents of health and of disease, to some extent at least, it

is clear that to that extent diseases due to them are preventable. Although no one of these diseases could, by the spread of practical knowledge, by care or watchfulness on the part of society, or by any law, or, with the exception of one, by any moral change in individuals, be altogether prevented—although, in the best conceivable condition of society, cases of these diseases would be present among us—the mortality from them might be enormously diminished, and thus the annual mortality be reduced far below the ideal of perfection of the Registrar-General—17 per 1000 living.

There are three modes of effecting this diminution :—

1st. By the spread of the knowledge of sanitary laws. Practical knowledge of this kind can be only spread by frequent reiteration. One constantly meets persons, accomplished and highly educated, who would be ashamed to be ignorant of classical and mathematical knowledge, and are yet even now practically ignorant of the simplest sanitary laws. Not long since, I saw a body of men lodged for months, by the authority of highly educated gentlemen, in rooms where each man had considerably less than 200 cubic feet of breathing space. And who is not acquainted with towns springing up under the fostering care of rich and influential proprietors, without any other mode of drainage than the collection of the filth of each house into its own cesspool, and no other supply of water than surface-pumps. Death on a large scale must be the necessary result, and that before the Sanitary Act of 1866 can prevent it. These things could not be if the public

had practically realised the truth and force of the sanitary laws. Had they done so, none could sin from ignorance, and the force of public opinion would be too strong for greed to give power to a man or even to a company to withstand it. Who, knowing the importance of the study of sanitary laws, does not heartily join in the hope expressed by Dr. W. Farr "that one day our University will teach the doctrines of public health, and recognise those doctrines in granting degrees"? Line upon line, precept on precept, example on example, must be placed before the public. In season and out of season, we must force the subject forward. We must consent to be considered bores, as all sanitary reformers have been, if we would have the public so indoctrinated with the science of health as to carry its laws into practice.

2nd. By the force of special legal enactment. When a man's acts are calculated directly to endanger his neighbour's health, then the law should interfere to restrain him from the commission of those acts. Again, when the united simultaneous action of many is required for the performance of some work essential to the public health, the force of law is necessary, in the great majority of instances, to secure such action.

3rd. By the philanthropic efforts of the wealthy, the health of the poor may be directly improved, and indirectly the death-rate of rich and poor diminished.

I will now consider the several preventable diseases just enumerated, and endeavour to apportion to each its causes, and so to estimate to what extent inevitable conditions,

want of acquaintance with the present state of sanitary knowledge, the indifference of society, and defect in our laws are severally answerable for the deaths from these diseases. By doing this we shall gain a position from which to judge how far or to what extent these diseases are likely in years to come to be prevented in practice.

Rickets.—The causes of rickets are, poorness of the mother's blood, errors in diet—*i. e.* feeding the child with food, unsuited to its wants and to its digestive powers—and, as subsidiary causes, deficient light and impure air, produced especially by overcrowding of the sleeping room. Poverty—inevitable poverty—plays a great part in the production of some of these causes. If society did its duty in providing suitable abodes for the poor they would suffer little from want of light or overcrowding at night. The anæmia of the mother would be less, and her blood better fitted to nourish the infant. Ignorance of the proper mode of feeding the child assists in the production of rickets in a larger degree than poverty. Judging from my own experience, I should say that rickets, so severe as to lead even indirectly to death, would be comparatively rare did the poor know how to feed a young child—were the poor aware of the necessity of the infant being fed with food fitted to its age. Law can do something here; for it can make compulsory the teaching of the *practical* laws of health in all schools supported in any degree by the public money. To teach young girls how not to destroy their future children, is surely as important as to teach them much of what is now considered essential for them

to know. I would have an infant nursery attached to every national girls' school, so that the girls might be practically taught how to fulfil their practical duties to their family and to society. Diffusion of practical knowledge is the great preventive remedy of rickets. Law can aid in the spread of that knowledge, and society, if it did its duty, would remove the subsidiary causes of want of light and overcrowding. Inevitable poverty might possibly still keep rickets in a grave form among us, but were rickets kept within unpreventable limits the death-rate of infants in London would be perceptibly diminished.

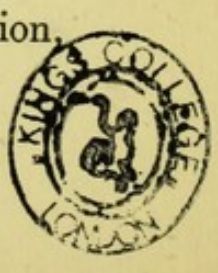
Syphilis.—A large portion of the male population of this country are, at the age when the passions are the strongest, precluded by the necessities of their position from marriage. Under such conditions, either prostitution, seduction, or masturbation will be the prevailing vice. If by law public prostitution could be put down, the two latter of the three vices would undermine the health and lower the moral nature of the masses far more than does the present prevalence of the "social evil." This inverse relation in the prevalence of masturbation, illegitimate children, and prostitution, cannot be too strongly impressed on the public mind. All men have a repugnance to referring to these matters; but it is our duty to do it. On the attention of the so-called religious world this knowledge should be especially forced. Prostitution cannot be suppressed by law; perhaps ought not to be if it could. But prostitution is necessarily accompanied by syphilis. Syphilis more often than has been commonly

believed means death—death to the primarily syphilized, and death to his offspring. The spread of this knowledge may have a little effect; but my experience has never yet made me acquainted with the case of a youth made continent by the fear of syphilis, but it has taught me that when a youth is deterred from promiscuous sexual intercourse by the mere fear of contracting disease he, as a rule, gratifies his desire in even a more discreditable manner. The vicious gratification of a natural desire is the cause of syphilis. If every young man curbed his passions, syphilis might die out. Let teachers of morality and religion endeavour to impress on young men and lads, above all on the latter, the necessity of exercising this restraint. But until they have succeeded in their teaching, it is the duty of authority to prevent, as it could to a great extent, the spread of this terrible disease. Moral teaching may do something; the spread of knowledge and society can do almost nothing; but law could do much to diminish the mortality from syphilis. It could prevent the prostitute plying her trade in the public thoroughfares, and thus keep temptation to some extent out of the way of the merely irresolute and thoughtless: it is a disgrace to authority that it does not frame and put in force such law. Again, law could check to a great extent the wide diffusion of syphilis. A little has been done in this direction; more is being attempted; but something more than the Contagious Diseases Act of 1866 is necessary, if the community at large, and not only our troops, are to be benefited.

Tuberculosis may be inherited or acquired. That tuber-

culosis is transmitted from parent to child, is one of the best-established facts in medicine. The extreme frequency of tubercular diseases in some circumscribed country districts is, in part at least, explicable by the frequency of intermarriage amongst persons living in such districts; and, conversely, the exemption of particular circumscribed districts from tubercular disease is in part due to the same cause. In the one case, from some special circumstance, tuberculosis has been introduced into the district, and then spread in it from the cause I have mentioned—*i.e.*, intermarrying. In the other case, the freedom from the disease of the district at any given time is the cause of its continued freedom. Intermarriage of the inhabitants, the disease being present, spreads it far and wide; intermarriage of the inhabitants, the disease being absent, prevents its introduction. Dr. Christison, in his able address to the Sanitary Association in 1863, did not, it seems to me, give its due weight to this circumstance when estimating the causes of the relative frequency of tubercular disease in different localities. Very little can be done to prevent so much of tuberculosis as is due to transmission from parent to child. The spread of knowledge may do a little. But, seeing the frequency with which tuberculosis in its most intense form is produced in the children by the intermarriage of men and women as well acquainted with the facts of inherited disease as we are, the hope of diminishing tuberculosis by the spread of this kind of knowledge is indeed small. As to the causes of acquired tuberculosis, they are errors, especially deficiency of food, clothing, air,

exercise, light, and previous diseases. Tuberculosis may be developed from these causes; but the preventable death-rate is especially increased by the effects of these causes in determining the formation of tubercle in those who inherit tuberculosis, and it may be only in trifling degree. Doubtless, poverty, inevitable poverty, necessitates the exposure of large numbers to these causes of tuberculosis and tuberculisation. But as in rickets, so in tuberculosis and tuberculisation. Ignorance of the proper mode of feeding her child, of the necessity for it of fresh air and of light, leads the mother to induce or intensify these diseases in her children—to cause the death of her child, or to render it liable as it grows older to be affected by causes which otherwise would have been innocuous. Society might do very much by providing the poor with residences, and with grounds in cities for exercise, where they could have light and air. It is not charity that is asked; but the rich can do that for the poor which no fore-thought, no economy of their own could effect. Capital is required. Law can do much by enforcing proper practical sanitary education, by regulating more perfectly workshops—*i.e.*, by inspecting, &c. The Law declares that machinery shall be properly protected, so that no life may be lost by the careless or unwary being entangled among its wheels; but for everyone that could, if no protection were enforced, be quickly killed or mutilated, tens of thousands are killed or reduced to ill-health, and pass their acquired disease to their children, by the want of stringent and efficient laws regulating the size, ventilation,



&c., of our workshops. The Sanitary Act of 1866 may do a little to remedy this want; but unless amended and made far more stringent and easy to put in force, it will do *very* little.

The remaining diseases which may be in part or altogether prevented are the so-called *Zymotic*. The majority of these are contagious, and all have a specific cause.

Our knowledge has advanced so far as to enable us to say that, for the spread of contagious diseases *generally*, four things are essential:—

1st. The contagious or zymotic substance; be this germ or seed, animalcule or vegetable, or a merely chemical compound.

2nd. A condition of atmosphere or of surroundings permitting the life or stability of the chemical constitution of the contagious or zymotic substance.

3rd. A vehicle for the conveyance of the contagious or zymotic principle to the individual, or rather to the part of the individual from which it can enter his system.

4th. An individual to receive the contagious or zymotic substance, whose body is in such a condition that in it the contagious substance—germ, seed, animalcule, or mere chemical compound—can multiply itself.

Our knowledge enables us to state, moreover, that any one of these conditions may be so modified by art as to favour or stay the spread of contagion.

As special diseases, the zymotic or contagious substance of which is certainly always about us, spread at times easily, rapidly, and to a vast number—*i.e.*, become epi-

demic,—and then, having reached a certain degree of prevalence, shrink to their former dimensions, we must admit either that changing conditions of atmosphere or of surroundings give increased activity to the contagious or zymotic substance, or that usually they destroy or weaken the contagious matter and now fail to destroy its life or stability of constitution; or that external conditions, preceding or present, have so modified the system of individuals as to render them more susceptible to the action of some one special zymotic substance.

With reference to the spread of special zymotic diseases.

1. Zymotic substance. While we know nothing of the nature of the contagious or zymotic substance of any one of them, we do know that it is present in a special state of activity in different excreta in different diseases: thus, in the gastro-intestinal secretions in typhoid fever, cholera, and cattle plague; in the skin and throat secretions in scarlet fever; in the throat secretion in diphtheria; in the pustular matter secreted by the skin in small-pox; in the discharge from wounds in pyæmia.

2. Surroundings. We know that special conditions of their surroundings have a great effect in favouring the spread of certain zymotic diseases. Thus a temperature of 32° destroys the poison of yellow fever; free dilution with fresh air renders the contagious matter of typhus innocuous.

3. Vehicle. It is now placed beyond question by the labours of Dr. Snow, confirmed as they have been by

experience, that water is one of the great agents in diffusing cholera; and, if possible, it has been more unequivocally proved that typhoid fever is carried from individual to individual in the same way. Pyæmia, ichoræmia, and septicæmia spread in wards by the morbid secretions of one patient being applied directly to some raw surface on another. The cattle plague contagious matter, being especially contained in the intestinal excreta, was conveyed by any substance to which that could adhere.

4. Individuals. Whatever lowers the tone of the nervous system renders men peculiarly susceptible to the action of the contagious substance of typhus—*e.g.*, famine, anxiety, fear. Persons suffering from scarlet fever and from Bright's disease are in a state favourable to the occurrence of pyæmia; those who have recently lived in a cold climate suffer more certainly than do those coming from hot climates when exposed to the zymotic principle of yellow fever. Dr. Beale states that he has recently observed in fatal cases of cholera certain changes of structure in the intestine which must have occurred before the attack itself.

As to the possibility, degree, and modes of prevention of the zymotic diseases.

The zymotic element of some diseases that from time to time burst out with violence—*i.e.*, become epidemic—is always present. The epidemic could not occur unless the zymotic element were there. So that one great measure of prevention is the destruction of the zymotic element, as fast as created, by chemical agents. The general and per-

fect use of disinfectants can only be secured by the diffusion of knowledge—especially in regard of the excreta in which the zymotic element is most concentrated,—and by the intervention of the law. Law has attempted to secure their use in some cases by a clause in the Sanitary Act of 1866. But their best action can only be secured by the diffusion of practical knowledge. Air and water are two most easily-applicable and powerful destroyers of the commonest zymotic substances. Society and law can secure a supply of these for every house.

In regard of the zymotic elements of diseases not always amongst us. By strict quarantine laws these may be excluded. The great preventive scheme of the Conference on Cholera that met at Constantinople was strict quarantine, especially between India and Europe—a most vexatious, and costly, and most impracticable scheme. At a far less cost the hygienic condition of Great Britain might be so much improved as to prevent the spread of cholera, even were its zymotic element constantly among us. And then the improvement in our hygienic condition to such a degree would not only prevent the spread of cholera, but diminish the mortality from almost every other preventable disease. Strict quarantine should, it seems to me, be enforced, in the present state of the world, only in regard of those diseases of which improved hygienic conditions cannot prevent the spread. The cattle plague seems to be such a disease.

As to the surroundings, it has been clearly shown that many conditions unequivocally removable favour the spread

of contagious diseases. Society has its part to perform in providing proper dwellings for the poor—*i. e.*, dwellings proper in regard of air, light, drainage, and water-supply. Law can do much to improve surroundings by enforcing general drainage and constant and sufficient supply of pure water. Great influence can be exerted in checking the spread of the zymotic diseases by subjecting to strict supervision the special vehicles by which each is known to be conveyed from individual to individual. It is beyond dispute that water has been in many cases the great agent in the rapid propagation of cholera and typhoid fever over a district. It becomes more probable with every searching investigation into local outbreaks of cholera and of typhoid fever that these outbreaks, so terribly destructive to life, are the result of the admixture of the zymotic element of the one or the other with the drinking-water, or of collections of fetid gas, or of such close packing of the inmates of the house, and such close relations of the inhabitants to each other, that the excreta of the first person affected is taken into the stomach of others.

The application by law of a Sanitary Act capable of being worked from a central authority by the means of inspectors, is, it seems to me, the great remedy. Inspectors must precede, and not follow, the outbreak. Dr. Seaton's late investigations into the outbreak of typhoid fever at Tottenham show the importance of such a course. The inspectors, and not the inhabitants, should set the law in motion. As the act is now practically worked death may sweep away half a town or village before the

Sanitary Act is put into force. As every case of a zymotic disease is a centre from which fresh cases may spring, the country at large is interested in the sanitary state of every town, every village, every house. The health condition of the town therefore should be regulated, not by the will of the inhabitants, but by the will of the whole community —*i.e.* by some central authority.

The great objects, then, in the prevention of the present mortality from zymotic diseases are—

To exclude or destroy the zymotic element.

To improve the surroundings, so that the conditions may be less favourable for its development, and that fewer individuals who suffer may die.

To watch carefully the vehicles by which experience has shown the zymotic element may be conveyed to others.

To render individuals less susceptible to the influence of the zymotic element.

These objects could be attained in a great measure, and so the mortality from zymotic diseases be very greatly diminished,—

By the spread of practical sanitary knowledge.

By society providing proper residences for the poor.

By law really and at once enforcing proper drainage and water-supply, and preventing overcrowding.

Numerous points in relation to the zymotic diseases have to be cleared up before we can reach that position in regard of their prevention which we may hope one day to attain.

It is only by slow degrees that the profession has succeeded in separating some of those diseases from each other—small-pox and measles, measles and scarlet fever, rubeola notha and rubeola; and now, for the prevention of the zymotic diseases, one of the most important problems in practical medicine has to be solved—namely, the identity or non-identity of several of these specific diseases with others which resemble them in some of their most prominent symptoms.

Cholera is contagious; on this point there is no longer question. But what is the specific cause-relation between cholera and choleraic diarrhœa, and between severe summer diarrhœa and choleraic diarrhœa? Is cholera, in the form of choleraic diarrhœa, always amongst us? Again, what is the specific cause-relation between angina and diphtheria—between catarrh and influenza—between dysentery and typhus? We know that the zymotic element which produces contagious pyæmia may be generated in the frame of man *de novo*. A most important problem to be solved is that of the spontaneous origin of other zymotic diseases. The researches on the cattle plague have demonstrated how small a quantity of the zymotic element adhering to fomites may produce that disease in previously healthy animals. Again, the Cholera Conference considers it proved that the evacuations of cases of cholera so mild as to merit the name only of choleraic diarrhœa can communicate cholera; as modified small-pox may communicate the most virulent form of that disease.

Other points that require establishing are—

To what extent the conditions preceding an epidemic influence the occurence of that epidemic.

The different effect of different quantities of the same zymotic element.

The differences in the degree of contagiousness of contagious diseases at different stages of those diseases.

The period of incubation of each, and the circumstances which shorten or lengthen that period.

The duration of the stage of invasion.

To collect evidence on these points and others of similar kind would be well worthy the labour of this Society.

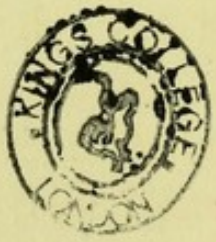
The value placed by a community on individual life is one of the great tests of the state of its civilization. It speaks but little for our advance in civilization that the death-rate in England, due as it is in so great a degree to preventable causes, should still be what it was twenty years since—that the death-rate of the ten years '41—'50, and the death-rate of the ten years '51—'60 should be nearly the same. It speaks but little for our advance in civilization that the State at once spent an enormous sum and made most excellent laws when oxen suffered, but spends with a niggard hand and frames the most inefficient laws when the lives of men are at stake. What will the Cattle-plague Commission &c. have cost? What has been spent in the investigation and prevention of cholera?

Allowing for the deaths due to degenerations, to unavoidably deficient and impure food, to unavoidable want of clothing, to unavoidably impure air and defective exerccise,

to individuals' own vice, prejudice, and greed, to zymotic causes which no forethought or care could avert, there still remains an enormous preventable mortality due to ignorrance of the simplest laws of health, of the necessities of the body in regard of air, light, exercise, and food —to the neglect of their duties by the wealthy, who know and obey those laws, but fail to give the poor the means of obeying them (short-sighted that they are: the zymotic disease that carries off the rich man has commonly first flourished and gained strength among the poor)—to the inertia of the Legislature, its unwillingness to interfere with individual action, its fear of touching vested interests, its dread of offending religious prejudices, though they be the offspring of ignorance. If of money matters the following could be said, how much more true is it of sanitary. How strictly it applies to all the Sanitary Acts yet passed:

"English legislation abounds in abortive expedients. It shrinks from difficulties. There is very commonly an admitted evil, and very obviously only one real remedy. But very often that real remedy is painful, and if public attention is but half roused to the subject, we are apt to put up with some half-measure, which gives little or no trouble, which looks as if it might mend matters a little, and which has no disadvantage save that it is not a searching cure of the evil to be remedied, and that in a little while it will be forgotten on account of the slightness of its effect, while the malady itself will rage as much as ever."—*Economist*, Oct. 1866.

Our duties are clear in this matter, both as individuals and as a Society—namely, to carry out in regard of other diseases what we have to some extent aided in effecting with reference to small-pox: to collect evidence, to disseminate knowledge, to spur on those in power to frame laws adequate for the occasion; to note every local outbreak of epidemic disease, and, either as individual members of the Society or by committees, to investigate or to stimulate others to investigate the causes of such outbreaks, and then to spread the knowledge thus gained.



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