

My readers, we are not shut up to such an awfulness of desolation as that. There is life and we know it; there is sight and we know it; there is growth into a Kingdom and we know it; and above the voice of the baffled seeker after *things*, who cries, "I ask, and I receive *no thing*; I seek and find *no thing*; I knock and it is not opened unto me," yet there is the still, small voice that whispers, "Ask and ye shall receive; seek and ye shall find; knock and it shall be opened unto you."

I see two souls go down life's hillside; one with the unanswered question ever held like an open book before him, with shaking head, with trembling step, with shivering heart; down life's hillside he goes toward the valley of the shadow of death. His feet touch the brink of the stream yonder. "How?" is the only word and thought that fills his soul. At the touch of the icy stream there is a shiver, a struggle, a cry "No God!" a leap in the dark! The waters gurgle and he is gone. I see

another walking, in the language of those wonderful words, "Though I walk through the valley of the shadow of death, I will fear no evil: for Thou *art* with me; thy rod and thy staff they comfort me"—and he comes down to the water of the stream. Unshrinking he enters; the chill strikes to the center of vitality, but above the tremor of nature, "Then shall my latest breath whisper Thy praise," rises a song of prayer to God. Deeper he goes; still calm; deeper and deeper, the death wave sweeps upward; and yet he sings: "Jesus, Thou Prince of Life, Thy chosen cannot die." And now it is almost over him. The wave is icy chill to him too, now; and from his lips the cry, "O Christ, my Christ, can this be death?" And then he sinks from sight; and all is over. Over! Oh, no, not over. For there comes the rush of angel spirits, and the triumphant soul is borne away in song of cherubim and seraphim up to the throne where Christ sitteth at the right hand of God.

—R. S. Holmes, D.D.

THE WORLD'S DEBT TO MEDICINE.*

BY JOHN S. BILLINGS, M. D.

THE word "medicine" in the title of this article is used in the broad sense of including surgery, obstetrics,¹ the various specialties relating to diseases of the eye, ear, throat, skin, etc., and the so-called medical sciences such as anatomy, physiology, pathology,² and pharmacology,³ as well as the treatment of disease by means which do not require the use of instruments, or internal medicine as it is sometimes termed. Modern sanitary science and practical hygiene are not included, because these will be treated of in another article. Taken in this extended sense medicine has been of benefit to the world both directly and indirectly. Its direct effects have been produced by preventing, or by removing or mitigating the effects of, disease or injury; by making life more comfortable for individuals; its indirect benefits have consisted in part of

the good work which has been done for the family and the community by those persons whom it has preserved and sustained, and who could not have done such work without its aid, and, in part, of the results of the powerful stimulus which it has given to other branches of science and of art, and of the effects of the influence which it has exerted upon psychology,⁴ theology, and jurisprudence.

Medicine holds a high rank among the civilizing agencies of the world, and the history of its development is, to a great extent, the history of human progress. Perhaps the simplest way of giving some idea of the world's direct indebtedness to medicine will be to contrast the possibilities of relief three hundred years ago with those of the present day, in some dangerous conditions or diseases.

Let us take first the improvements which

*Special Course for C. L. S. C. Graduates.

have been made in the management of childbirth, and their results. In 1594, for every thousand children born, at least fifteen and often forty, mothers died. In those days they had no anæsthetics;⁵ they knew very little of the nature of the difficulties which sometimes involve a fatal result both to mother and child if they are not removed; and the instruments which the physician of to-day uses in such cases with excellent results had not yet been devised. They knew nothing of the causes or nature of puerperal fever, which followed the visitations of certain physicians, nurses, or midwives like a pestilence, "which closed the eyes just opened upon a new world of life and happiness, bowed the strength of manhood to the dust, and cast the helplessness of infancy into the stranger's arms, or bequeathed it, with less cruelty, the death of its dying parent," and they could suggest no useful remedy. They saw the eyelids of the newborn babe redden and swell, and yellow matter exude from between them, and could foretell that in a few days or weeks the child would be partially or wholly blind; but they knew nothing of the simple and efficacious means by which the skilled physician of to-day averts such a calamity. To-day more than half of the dangers and terrors of childbirth are put aside by medical art, puerperal fever is almost unknown in cases where the proper precautions have been taken, and the death-rate of the mothers is less than five per thousand births.

As the child grew up, three centuries ago, one of its greatest dangers was due to small-pox, which appeared in epidemic form at intervals of about six years. All grown people in those days had either had small-pox, and were more or less pitted with its scars, or had proved themselves insusceptible to the poison. It became epidemic in a community as soon as enough young children had accumulated to furnish fuel for its flame, and the mothers and fathers waited helplessly to see which of their three or four young children was to fall a victim to the scourge. Now, thanks to vaccination, this danger is almost entirely removed.

Diphtheria existed in the old days; but it

was not known by that name; it was the malignant sore throat, or the *garrotillo*, or strangling disease, and absolutely nothing was known as to its course or proper treatment. This disease has caused a greater mortality within the last fifty years than it has ever done before; but the causes of its spread are now becoming understood, and there is good reason to hope that the persistent study and experimentation of a few physicians during the last three years has resulted in the discovery of a remedy which will greatly reduce its mortality.

In the sixteenth century fevers and dysenteries decimated the villages, the armies, and the prisons. No one knew anything definite about the differences between various kinds of fevers, and the corresponding differences of treatment which they demand. Malarial, typhoid, typhus, and relapsing fever were confounded. They had no quinine or cinchona⁶ bark. Gradually we have learned to distinguish between some of the different forms of fever, although there is still something to be done in this direction; and we have also learned how to treat some of the specific forms in such a way as greatly to reduce their mortality. The death-rate from typhoid fever under modern treatment is only about half of what it was fifty years ago.

Little attention was given in the sixteenth century to the recording of deaths or to the calculation of death-rates; and hence we cannot state accurately how much greater the expectation of life is in civilized countries to-day than it was three hundred, or even one hundred years ago; but we do know that it has decidedly increased. The average duration of life among the better class of Roman citizens, according to the Pandects⁷ of Justinian, was 30 years; in Geneva during the sixteenth and seventeenth centuries it was not more than 20 years; fifty years ago it was about 38 years, and now it is between 45 and 50 years. This great saving in human life is due probably much more to better hygiene than to improvements in therapeutics,⁸ but it should be remembered that improvements in preventive medicine have been largely due to the

increase of knowledge by physicians in the matter of distinguishing different forms of disease, that is to say, to improvements in diagnosis.

Until the physicians had learned to distinguish the so-called "Devonshire colic" from other forms of abdominal pain, and had shown that it was due to poisoning from lead dissolved in cider, little or nothing of value was done in the way of prevention. It was not until the differences between typhoid and typhus fever had been discovered, and it had been shown that the former was rarely directly contagious, but was due to excreta,⁹ while the latter spread by contagion which depended largely upon overcrowding and lack of ventilation, that rational measures could be taken to prevent, or limit the spread of, these diseases.

The most direct evidence of the prolongation of life and relief from suffering for which the world is indebted to medicine is to be found in the records of surgery and some of its special branches.

Three hundred years ago, when a surgeon was bold enough to amputate a crushed or gangrenous limb, to remove a large tumor, to attempt to relieve a strangulated bowel, or to extract a stone from the bladder, he had no anæsthetic, and his great dread was of the spouting blood from the vessels which he was obliged to cut. In 1564 Ambrose Paré had described and recommended the method of ligating blood vessels divided in an operation, instead of using the red hot iron to burn the ends, as was the usual method; but it was more than a hundred years after that before the ligature came into general use for this purpose. It is only within the present century in fact that we have come to understand the importance of shedding as little blood as possible in operations, and the best methods of doing this. The surgical patient in old times deferred the torture of an operation as long as possible, and when he was at last compelled to undergo it, he did so with comparatively little hope of surviving its effects; for pyæmia¹⁰ was then the rule rather than the exception after an operation, especially in hospitals. In a large proportion of cases in

which the surgeon now operates with a fair chance of success, such as tumors of various kinds, crushes and gangrene in the upper part of the thigh, dilatations of the great arteries in the neck, the armpit, the groin, etc., there was then no hope of relief, and the unhappy sufferer could only look forward to inevitable death.

If he had a cancer of the lip, or she had a cancer of the breast or womb, death was prayed for to put an end to the persistent pain and horrible sights and odors with which they were afflicted, while now such persons, if they present themselves in time to the surgeon, can be relieved in the majority of cases, and thus the bread-winner of the family is preserved, the mother remains with her children. The patient inhales a little sweetish vapor, and sleeps. The surgeon works deliberately and carefully, every bleeding vessel is secured at once, everything that is allowed to touch the wound has been carefully sterilized by heat or chemicals, so that none of the bacteria which cause suppuration can gain access to it, and when the patient awakes he finds himself in his bed looking up vaguely into the face of the trained nurse who stands by its side, and wondering why the operation has not commenced. He does not have to look forward to weeks and perhaps months of suppuration, with daily dressings, before his wound has healed—for several days he has nothing to do but eat and sleep, his bandages will be looked at, but probably not touched before the end of the week, when they will be removed, and instead of an open wound there will be seen a thin red line marking the place of the future scar.

The world's debt to surgery does not consist merely in the number of lives saved by the latter, but it also includes the vast shortening of the period of suffering and unproductivity which formerly existed after an operation.

It is in what is called abdominal surgery that medicine has recently obtained some of its greatest triumphs and has conferred some of its greatest benefits. The removal of ovarian and uterine tumors is now so common and successful an operation that

it is a little difficult to realize that less than a hundred years ago the means of relief for these affections did not exist.

In former days many people died of painful diseases of the abdominal cavity, of the true nature of which little was known, and which were vaguely called inflammation or obstruction of the bowels. Now it is known that many of these are due to inflammation and perforation of a little worm-like body attached to the beginning of the large intestine in the right side of the lower part of the abdomen, and which is known as the appendix vermiformis; and hardly a day goes by that a successful operation is not somewhere performed for the cure of disease of this organ.

Wounds of the abdominal cavity implicating the intestines were formerly considered to be almost necessarily fatal, and no attempt was made to put the injured organs in a condition to repair the damage done; while now in such cases the abdomen is opened almost as a matter of course, the bleeding is stopped, the effused blood and other matters removed, the openings in the intestines closed, and in many cases life is preserved.

Turning now from these triumphs of general surgery, the list of which it would be easy to greatly lengthen, let us consider for a moment the great increase to the comfort and producing-ability of man which has been brought about by the studies of physicians on the mechanism and diseases of the eye. The number of men and women who have been freed from headaches and various obscure forms of nervous irritation, and who have been enabled to do their daily work with comfort, and to enjoy the beauties of nature and the pleasures of literature, by means of glasses properly fitted to correct the effects of the irregular and distorted structure of their eyes, is very great, and is becoming greater every day. The operations for the removal of cataract, and for the making of an artificial pupil have literally given sight to the blind in thousands of cases.

The benefits of medicine in diseases of the ear are not so marked as they have been

in diseases of the eye; but the many deaths formerly caused by the extension of inflammation from the internal ear to the membranes and venous canals of the brain are now being prevented by the timely operation which physicians urge in cases of chronic discharge from the external ear.

The removal of tumors from the larynx, and the passing a silver tube into the organ in cases of croup or diphtheria have already saved many lives, although they are comparatively recent discoveries.

The resources of modern medicine for the relief of pain are great and manifold. With the aid of the hypodermic¹¹ syringe and of the alkaloids obtained from narcotic plants, such as morphine for example, agonizing spasmodic pain like that caused by the passage of a calculus¹² from the kidney can be promptly done away with, while such drugs as the bromides, chloral, sulfonal, etc., are available to procure rest for the weary brain. Besides ether, chloroform, and other substances for producing general anæsthesia by inhalation, we can produce insensibility in a particular part by the use of cocaine, or by the intense cold produced by the ethyl or rhigolene¹³ jet, and thus be able to perform many painless operations.

Recently it has been discovered that a peculiar disease characterized by a swelling of the face and extremities, and by increasing mental weakness, and which is known as myxedema, is due to a failure of a gland situated in the front of the neck, called the thyroid gland, to perform its proper work, and such cases, which were formerly almost surely fatal, are now cured by means of an extract from thyroid glands of sheep.

Many of the disorders of old age which make life a burden are now susceptible of palliation or relief so as to secure comfort to the patient, although the degenerations of tissues and organs which give rise to them may be beyond the reach of art.

I have space for but one more specimen of the direct benefits which medicine has conferred upon mankind, and this is the improvement which has been made in the care and treatment of the insane and feeble-

minded. For hundreds of years these unfortunate creatures were supposed to be special objects of divine displeasure, to be possessed by demons, or to be suffering from witchcraft, and exorcisms were almost the only remedies applied. If these failed, the stake or the gallows was resorted to in many cases, and these were quite as fortunate as most of those who were confined in asylums in which all sorts of lunatics were huddled together like brutes. As Dr. Conolly remarks, it is difficult to account for the long neglect, in civilized communities, of those afflicted with a malady more dreadful than most other maladies in that, before it destroys life, it destroys all that makes life valuable or desirable. Yet nothing is more certain than that this complicated misery has been, not only the subject of neglect, but of the greatest abuse and cruelty. Through the investigations and efforts of a few physicians all this has been changed, and the majority of the insane are well housed and fed and receive skilled medical treatment, which in many cases results in their restoration to their families "clothed in their right mind."

Great as is the debt which the world owes to medicine for the saving of life and the relief or mitigation of suffering, this is small in comparison with the indirect benefits to society which it has conferred. Its practical utility extends far beyond the relief of individuals, for the actions and work of kings, of statesmen, and of the leaders of human thought and progress are at times dependent upon its aid. Medicine is the parent of the biological¹⁴ sciences, including anthropology¹⁵ and modern sociology.¹⁶

Educated physicians have led the way in all branches of natural history, and have contributed much to chemistry. Medicine has exerted a powerful influence, not merely by the discoveries which it has made and announced, but by disseminating the

modes of observation, of investigation and of reasoning, of its votaries. For hundreds of years the flickering and feeble flame of true scientific thought was kept alight mainly by men who had studied medicine, and in the organization of great scientific societies in the seventeenth and eighteenth centuries the physicians took a most prominent part.

The physician does not so separate the consideration of the psychical part of man from that of his physical organization, as is commonly done by the theologian or the jurist. The more he studies his subject the more he is convinced that with every mental or spiritual manifestation there is some co-ordinate change in bodily structure; that body and mind exert a powerful influence upon each other, that disorder of the one may produce disorder of the other, and that both must be taken into consideration in dealing with ignorance, folly, vice, and crime. This view has gradually become prevalent among educated men, the modern jurisprudence of insanity is based upon it, and it is beginning to be accepted by criminologists and social reformers.

The influence of the physician in social life has always been great, because he becomes the trusted personal friend of many persons who seek his advice and opinions in matters unconnected with their ailments, and it cannot be doubted that this influence has been almost invariably exerted for good. The example set by him of habitual self-sacrifice, of giving up his own comfort, and sometimes risking his own health and life for the sake of his patients, of punctuality, and of precision and accuracy in his work, which is often undertaken without the smallest prospect of pecuniary reward, is an example which has some effect upon those who are acquainted with his daily life, all the more because these things become habits which "exact no effort, involve no indecision, and, above all, no self-praise."