United States. In the India service there were veterinary schools for the sons of deceased soldiers and others, who were trained in a knowledge of the horse's foot, and the art of shoeing. As vacancies occurred, these young men were detailed to the different regiments as farriers. At regimental headquarters there was a farrier major, and to each troop a farrier and assistant farrier. The captains of troops, respectively, acted as the veterinary surgeons, and had a monthly allowance for shoes, medicines, and necessaries. It has often surprised me to note the excellent practical skill evinced by many of these officers, derived from casual opportunities of attendance on veterinary lectures, reading, and observation. The said system worked very well, and would have worked better still if troop-officers had been induced to follow a regular course of instruction, to a certain extent. In this country, were a veterinary professorship instituted at West Point, it might prove the source of much practical utility, inasmuch as the cadets, generally, could attend a series of lectures of a character to interest them, and promote their general range of information, while the cadets of cavalry and artillery could more especially acquire the elements, and lay the foundations of a useful knowledge, which could afterward be valuably extended to their commands. Above all, some acquaintance with the structure and functions of the foot of the horse and mule, and the art of properly shoeing them, would have results of high value, and in like manner some knowledge of the nature and treatment of the more obvious accidents or maladies. Probably officers already in actual service might have opportunities for attendance on a course of these lectures; farriers, moreover, could also be instructed in improved principles of shoeing; and, furthermore, an army veterinary code and shoeing manual could be serviceably compiled. If a permanent professorship of this nature should seem not quite eligible at West Point, then a modified appointment for a certain course of lectures each year might be effected. In the same connection, it may appropriately be observed that army horse-shoes should be supplied, sized, (say eight sizes,) fullered, nail-holed back and front, finished, filed up, and all ready for putting on cold, except it might be a blow from the hammer to close up any too great width of shoe. Machine-made shoes, finished in rough, are as heavy to carry about as in bar, and more inconvenient; require as much forging and finishing; are never as well fitted; and are hurtful and imperfect. In this question, a very important consideration of service, effectiveness, and economy, lies.

VETERINARY MEDICINE.

(*Ars Veterinaria post medicinam secunda est.*)

BY DR. B. F. CRAIG, OF WASHINGTON, D. C.

The benefits which the human race has received from the cultivation of medical science and from the progress of the medical art, are so habitually and universally enjoyed that their existence is hardly noticed and their real extent seldom justly appreciated.

They are enjoyed too much as a matter of course to be duly valued, and too equally by all classes of the community to have their importance illustrated by frequent contrasts of the relative effects of their possession or their absence; and besides this, men are so apt to consider health as their natural and ordinary condition, and to look on every departure from it as an accident that could hardly have been expected, and that should, in the nature of things, be susceptible of prompt and easy correction, that they can scarcely regard with much favor a science which assumes the unpleasant truth, that human flesh is heir to many ills, difficult to escape by the utmost care, and only to be overcome by well-devised efforts.

Instead of the relief that medicine can give to suffering being regarded as a cause of thankfulness, and as a triumph for humanity, the fact that such relief is not always complete and speedy is felt as a grievance, and complained of as an instance of the entire impotency of the art; and in proportion as disease is disarmed of its dangers, and the pangs of suffering allayed, as men are habitually called upon to endure less, does the impatience of what has still to be suffered and encountered increase.

A vent is often sought for this impatience in language directed against medical science and its results—language which men, by frequently repeating, come at last partly to believe; and the perversion of correct views thus brought about is so liable to interfere with the exercise of judgment, that it becomes necessary to set forth and establish the real facts of the case before proceeding to discuss any question upon which they have a bearing.

The results of medical treatment in individual instances can fairly be appreciated only by professional men, and they cannot draw conclusions from any single case, but from a comparison of many similar ones.

It is not like the application of skill and force to inert objects, where the change brought about is a distinctly visible one, and the effects of our exertions are easily distinguishable from those of all other causes.

The real condition of the sick, in the first place, is only to be discerned by the eye of reason and knowledge, and not by the uninstructed spectator; and when that condition is known, the change in it that follows the application of any remedial measures proves nothing, since a change of some sort is constantly going on by the operation of Nature,

which may take one or another direction, in accordance with circumstances almost impossible to appreciate, and to which we may plausibly ascribe almost any event that may occur.

If, in a number of cases, apparently similar, certain changes generally follow certain measures, and but seldom occur in the absence of those measures, there is better ground for reasoning, and conclusions may be drawn which are reliable in proportion to the number and the degree of coincidence of the observations upon which they are based.

Medical science rests upon observations too numerous and concurrent to be much influenced by chance, and derived from sources too independent and various, as to persons, place, time, and country, to be governed by any common prejudice or perverted by any common interest; but while no well-informed person, free from unhealthy peculiarities of mind, can doubt that laws have been ascertained which give a right direction to the healing art, there is still an apparent difficulty in estimating the amount of good that is done, or that probably will be done, by that art.

To form a just opinion on this point, the most proper course would seem to be to inquire into the general amelioration of mankind in all that relates to health and disease, which has accompanied the great development undergone by medical science during the last three centuries.

It were too narrow a view to limit the field of medical science to the sick-room, or to the every-day duties of the physician.

The preservation of health, the proper regulation of diet, of clothing, and of lodging; those measures of hygiene which are applied to cities, to ships, to armies, to hospitals, and to prisons; the means of protection against plague and pestilence, are matters upon which knowledge has been acquired only by a long course of observation and reflection.

However simple some of the established rules may now seem, and however universally they may now be admitted, there was a time, not very remote, when they were unknown or unappreciated; and if we look at their history, we shall find that they have been established in the face of prejudice, false opinion, and false habit, by laborious exertions on the part of those who have made the human body their study.

If the medical sciences had been neglected in the progress of civilization, we have no reason to believe that the increase of material comforts and resources would have more than counterbalanced, if it counterbalanced at all the evil effects on man's physical nature which arise from the luxuries, the temptations, the artificial modes of life, and the increased wear of mind attendant upon the busy struggle of modern times. Whatever superiority, then, in length of days, and in freedom from disease and infirmity, is possessed by the present, as compared with former times, may fairly be claimed as directly due to that science which makes the attainment of such superiority its object; and the amount of this amelioration may best be determined by inquiring into its extent on those points, concerning which we have the most ample and reliable information.

If we take, as a subject of consideration, the average length of human life at different periods since the dawn of modern medicine, we

will find that it has been undergoing a progression, remarkable both for its amount and its regularity; and of this fact we have proofs, derived from various European countries, where, for a greater or less time, records have been made and preserved which give information on this, and on other subjects connected with social economy. The conclusions to be drawn from these records, wherever kept, agree so well as to show that some general cause must have operated in all parts of the civilized world, independently of those historical changes which have affected particular communities. The most complete records of the kind referred to are to be found in the statistics of the town of Geneva, in Switzerland, where a detailed account of the population, of the deaths, the births, and the marriages, has been kept since the year 1549, forming a valuable body of information, an abstract of which, extending from 1549 to 1833, a period of nearly three centuries, has been published, both in French and English journals. It appears, from these statistics, that the proportion of the number of deaths to the number of the whole population, which, in 1600, was one to twenty-five, in the next half century, was one to twenty-seven; in the next, one to twenty-eight; in the next, one to thirty; and in the next, one to thirty-four; and, during the half century lately passed over, the proportion is known to have decreased still more rapidly. We find that the difference cannot, in this case, be explained by a decrease in the number of births, and consequently of the number of persons of the age most liable to mortality.

The average duration of life—that is, the average age of all persons at the period of their death—has increased from twenty-two years and three months at the end of the sixteenth century, to forty years and eight months during the period between the years 1814 and 1833; and not only has this increase of longevity been uninterrupted, but the rate of the increase during the present century is greater than that for any former time.

The probable length of life, which is determined by taking the age to which one half of those born survive, shows a still more striking difference, for from the end of the sixteenth to the middle of the eighteenth century, it increased more than threefold, and from the end of the sixteenth century to the present time, more than fivefold.

It would be difficult to imagine any equivalent that men would be willing to exchange for this increase of life, or to appreciate the amount of sorrow inflicted, if we were to retrograde to the rate of mortality of the sixteenth century; but, for our present purposes, we may view the subject under a different light, and consider only the effect of this alteration on the material prosperity of the community, and its value in that point of view in which the conclusions drawn would apply with equal force to the case of our domestic animals.

The value of man to society is very much in proportion to the length of his life. If he dies early, he fails to make return for the care and expenses bestowed upon his infancy and childhood; if he lives long, and exercises his matured strength and practical skill in industry profitable to the community, he adds by so much to the general wealth.

As the period at which man is fitted for labor does not begin much

before the twentieth year, it can easily be seen how important an element in the progress of the race is a change from twenty-two to forty years as the average length of life; and what an increase of productive industry is implied in that simple fact! But, to illustrate the same point still further, we may take up the question of longevity in another manner.

If we take from the Geneva tables the percentage of the whole number born, who survive to different periods of adult or useful life, we will find it to have varied in different centuries, nearly as follows:

	In the 16th century.	In the 17th.	In the 18th.	In the 19th.
Of 100 persons, there lived to the age of 20....	39	45	56	66
Of 100 persons, there lived to the age of 30....	30	37	49	59
Of 100 persons, there lived to the age of 40....	20	30	43	52
Of 100 persons, there lived to the age of 50....	14	22	35	44
Of 100 persons, there lived to the age of 60....	9	15	26	32

By this table we see that where, in the sixteenth century, nine persons lived to their sixtieth year, thirty-two persons do so now; and if we take the average number of survivors for all periods of adult life, it will be found to be at the present time considerably more than double what it was three hundred years ago.

We can also conclude from this table that the total number of years over fifteen which men live through on an average, has rather more than doubled in three centuries, and that, therefore, from this cause alone, the amount of work done by each person before he dies is more than twice what it formerly was.

The above statistics are all taken from the records of the same place, and the same people, and the conclusions drawn from their comparison may therefore be regarded as reliable; the more so, since they are in perfect accordance with the results of the vital statistics of other countries, where such statistics have been kept for a sufficient length of time.

Thus, in England, the expectation of life, that is, the probable future length of life, of persons twenty years old, is stated to be at the present time about forty-four years, while a century ago it was rather less than thirty-four years; so that there has been an increase at the rate of ten years for a century; and it seems probable that, for the last three centuries, there has been an increase averaging about eight years for each century, in this expectation or probability; an increase which would lead us to about the same results, as regards the average length of useful life, as those deduced from the Genevese tables, namely, that it has more than doubled during modern times.

Our knowledge of the advance made as to the length of life, is of course more capable of statistical demonstration than that of the other benefits resulting from the application of science to the preservation and restoration of health; but if we admit reasonable conclusions, from circumstantial evidence, we will find that, in other respects, the improvement has been at least proportionate.

The shortening of the duration of sickness, and consequently of the amount of time lost by each person from that cause, seems to be fully as great, in proportion, as the lengthening of life; more so, certainly, in some diseases.

In surgery, the improvement in the treatment of wounds, fractures, and dislocations, by which permanent disabilities are often prevented; the progress of conservative surgery, or that branch of the art by which limbs are preserved, which, without the exercise of peculiar skill, would have to be sacrificed; and other advances made by the profession, have done much toward the diminution of crippled and deformed persons in the community, as well as toward the preservation of life.

Without the instrumentality of medicinal science, many great enterprises would totally fail, or only succeed with extreme difficulty. Long sea voyages, for instance, which in former times often involved the loss of crews by disease, or the interruption of the voyage from the prevalence of scurvy, are now performed without a greater mortality than would occur among the same men on shore; and thus our knowledge of the world has been extended, commerce enlarged, and the ocean made a safe highway for civilized man, in a way that would, two hundred years ago, have been impossible, simply from the ravages of disease on shipboard. Many similar examples might be cited, which are, however, not needed for the establishment of the point here aimed at.

The consideration of the benefits conferred upon the community at large, and of the gain, in an economical point of view, to be derived from the cultivation of medical science, is not, it is true, necessary to turn man's attention to it. His greatest hopes and fears, his strongest feelings, are too much called forth by the sickness and danger of himself and of those around him, to allow him to neglect any available means of relief; and he will seek medical aid, and support medical men, even without giving a thought to the general utility and the economical value of their occupation.

In the care, however, of those animals which have been given into his dominion, and from whose labors he derives so large a part of his prosperity, it is to be feared that a sympathy for their sufferings and a humane regard for their welfare would be insufficient motives to induce him to attend properly to the treatment of their diseases, unless it could be shown that, by doing so, he increases his own wealth to an extent that fully compensates him for the expense and trouble thus bestowed.

There are, perhaps, some who fancy that the brute creation, living in accordance with natural instincts, or in obedience to some routine imposed on them by man, and destitute of that finer organization which in the human race is thought to render the system peculiarly liable to derangement, must be but little subject to disease; that their lives, with few exceptions, must pass through an even course, untroubled by sickness, and sink only when the lapse of years has weakened their vigor and brought them to the natural termination of their existence. Such is not the case, as far as is known, with any class of animals; such is certainly far from being the case with those which are under the care of man.

We often speak of the constitution of a horse, assuming him as the type of disease-resisting vigor and unfailing health; yet ample statistical reports in Germany, France, and England, have shown that the mortality of horses, in the prime of their life, is many times greater than that of man at a corresponding age.

This mortality among horses is, no doubt, for the most part preventable; and we have no reason for believing that, with proper care and skill in their treatment, horses would die much faster than men; for the number of annual deaths during the years of youth and middle life does not depend upon the absolute longevity of the animal, and might be as small in the shortest as in the longest-lived species.

The annual mortality among horses in their working years is about five per cent., or one twentieth of their whole number; and as the number of horses in the United States is about five millions, there would, at that rate, be a loss of two hundred and fifty thousand every year; and if their average value be taken at fifty dollars each, the pecuniary loss will amount to twelve and a half millions of dollars.

The mortality among oxen is much less than that of horses; while that of sheep is greater.

Besides this regular and usual mortality of domestic animals, they are, like the human race, subject to occasional visitations of great and extraordinary sicknesses. Such epidemics, when of a certain degree of virulence, are known under the name of murrains, and seem, from the earliest ages, to have been regarded as among the severest afflictions to which nations were exposed.

A murrain was threatened to Pharoah as a calamity, the nature of which was fully understood by him; and, in this instance, as has often been the case in subsequent murrains, the pestilence was to attack more than one species of domestic animals, it being foretold that, "upon the horses, upon the asses, upon the camels, upon the oxen, and upon the sheep, there shall be a very grievous murrain."

Homer relates that the pestilence which was sent upon the Grecian camp, first seized upon the domestic animals congregated there; and some of the most eminent writers of antiquity, as Hippocrates, Plutarch, Livy, and Virgil, speak of the murrains which seem, at various times, to have visited Greece and Italy.

In the fourth century, a murrain of great virulence devastated Europe, and may, perhaps, be reckoned among the causes which hastened the downfall of ancient civilization.

Unusual mortality of cattle occurred, from time to time, in different localities, during subsequent ages; and, in the eighteenth century, the occurrence of a murrain which, originating in northern Asia, prevailed for a series of years over a large part of Europe, roused the public mind to the necessity of the better cultivation of veterinary medicine.

In the present century, the various domestic animals have, in different regions, been subject, at times, to great mortality; but nothing has yet occurred of the nature of a general murrain. Nevertheless, the teachings of history make it evident that such a thing must be expected at some future period, perhaps remote, but, it may be, near at hand.

The amount of devastation committed by such an outbreak in a country, a large part of whose wealth consisted of live stock, might be immense, and the loss would be especially felt if falling upon an animal like the horse, whose services are almost essential to the maintenance of every branch of industry.

There is, in general, no form of disease over which medicine seems to have more control than over great pestilences; for the prevention or cure of any one case, not only affects the individual chiefly concerned, but hinders an addition from being made to the intensity of the general pestilential action, and by so much checks the propagation of the disease and the virulence of its attacks.

Independently of the effect produced by the diminution of the annual mortality of domestic animals, we have to consider, so far, at least, as the horse is concerned, that which would follow the lengthening of the time during which they are maintained in a state of soundness and vigor. A horse is fed and cared for until he becomes old enough to labor, at an expense varying in different places, and which, for the United States, has been estimated to range from twenty to sixty dollars. For this outlay he makes return during his subsequent life; and the amount of the return made must depend upon the length of that life, up to the time at which he becomes unfit for work; so that, to render him of proper value to man, he should be maintained free from infirmity to the age when the inevitable operation of natural laws terminates his usefulness.

The horse attains to his greatest strength and vigor between the tenth and twelfth years of his life, but in too many cases he has scarcely passed, or arrived at that epoch, when he is already infirm, lameness or other disability having been brought on by injudicious management, or by neglect or maltreatment of some chronic disease.

That the natural decline of a horse's strength does not take place until a much later date than the period at which his usefulness is usually thought to terminate, has been amply shown, there being many instances of horses retaining their vigor after their thirtieth year, and some having been known to live to the age of forty and upward; the longest authenticated life of a horse in England or this country having been sixty-two years.

A writer in one of the English agricultural journals, who seems to have given particular attention to the prolongation of the working lives of horses, states as the ages of five horses in his stables, who were all serviceable animals at the time of his writing, the following numbers of years:

Thirteen, twenty-one, twenty-six, twenty-nine, and forty. He attributes their good preservation mainly to the care and skill exercised in shoeing them and in attending to their feet.

During the latter part of the eighteenth century, the want of judicious treatment of domestic animals, in health and disease, was seen with regret by many enlightened persons, and, among others, by the illustrious Buffon, who, in his work on natural history, after having treated of the horse, expresses himself on this point as follows:

"I will not here speak of the other diseases of horses, since to add to the history of an animal that of his diseases would be to render natural history too prolix. Nevertheless, I cannot finish my account