

whence it came, there is another gradual yet certain loss which, in time, will be felt—I allude to the amount of phosphorus in our bodies—a loss to be attributed to the respectful and pious custom followed in all civilized countries, that of burying the dead. By this practice much is entirely withdrawn from circulation; for the depth at which the bodies are deposited in the ground is below the reach of vegetation. Supposing the inhabitants of the United States at this time to amount to twenty-five millions, and that each individual contains, on an average, four pounds of phosphate of lime, (which will be found not far from the truth,) when this population shall have passed away, one hundred millions of pounds of the phosphate of lime will have been abstracted from the soil, or from activity in the endless change of life.* It will be borne in mind that the extinction of the present generation does not limit the loss; for population increases much more rapidly than supplies; and if we reflect how wonderful has been its augmentation in the United States since its settlement, and its probable continuance, even in a greater ratio, we shall be less apt to underrate the future consequences.

The ocean is a vast reservoir of life's requirements, from which science may find means of recovering supplies, especially of this valuable ingredient.

It is hardly necessary to remark that, while phosphoric acid is an essential part of all fertile soils, it is not the only substance required, for the application of the phosphates may be made without any apparent good result, owing to the absence of other substances not less necessary. With a view to supply every important quality, much ingenuity has been employed in making artificial and saline mixtures, not only to furnish special manures for special crops, but such also as would satisfy the wants of all vegetation. Many saline mixtures may be compounded to increase the efficiency of each other, and at the same time to accelerate, promote, and supply the requirements of plants; but we cannot refrain from cautioning the farmer against the exaggerated accounts now everywhere published in favor of certain fertilizers. They are far from being always what they are described, either in composition or effect, and are very often quite the contrary. At best, composts would frequently appear to be mere dilutions, or attempts at making the truly useful do more service than is possible. The most shameful impositions are being daily practiced. From the nature of the substances employed, these frauds may not easily be detected by the farmer; but he should rather trust, if he will have unusual mixtures, to such as he may manufacture on his own ground, and under his own eye, from materials of positive utility, and purchased from dealers of undoubted character.

* Monsieur Elie de Beaumont, who has made a similar calculation, in detail, for the amount of phosphate of lime abstracted from culture, by burial, estimates that France has thus lost not less than two millions of tons.—See *Etude sur les Gisements Géologiques du Phosphore*.

The reader will thank us for directing his attention to the above-named work, recently published by our distinguished friend and professor, M. M. L. Elie de Beaumont. We have read it with great interest, and are indebted to the learned author for many valuable suggestions.

VETERINARY SCIENCE AND ART.

BY CAPTAIN JOHN C. RALSTON, PRESIDENT OF THE COLLEGE OF VETERINARY SURGEONS, NEW YORK.

In this country, the veterinary art appears to have suffered, and is still allowed to suffer, unaccountable and most undeserved neglect, in an educational or duly qualified point of view. Its practice has mainly fallen into the hands of the stable-man, the shoeing smith, and the charlatan; for the number of educated practitioners, derived from foreign schools, (chiefly from the Royal Veterinary College, London, or the Veterinary College of Edinburgh,) is very limited, when contrasted with the forcible occasions and wide field for their services, at once to be found in the larger cities and in the farming districts everywhere. Grave considerations, alike creative of surprise on the one hand and of regret on the other, are thereby involved, when due reflection comes to be directed to this state of things: of surprise, because this country has been so quick and ardent as relates to the introduction or improvement of whatsoever otherwise has presented any aspect of benefit or utility; and, assuredly, veterinary science prefers very high claims, whether in relation to agriculture, stock raising, or any other public or social interest, and may be said to be only second to those claims which appertain to the science of human medicine and surgery: of regret, because the horse, first, and after him all other domestic animals, requires, and should have, intelligent and scientific care and treatment in health and sickness, and which can never prove the case where the means of education and right information are wanting. The aforesaid neglect seems the more singular when the vivid example presented by other countries is considered. The veterinary schools of Europe are numerous and highly valued; have been sustained by monarchs, governments, associations, and individuals; and are acknowledged on all hands to have been the sources of no ordinary general benefit; while the attainments and skill of the members of these schools have conferred high professional respect, alike in private life, public or governmental employ, and in the capacity of commissioned veterinary-medical officers of the cavalry and artillery services.

In the early times of Europe and Asia, veterinary art was assiduously cultivated. In ancient Greece, especially, it obtained a leading place, along with the general pursuit of medical and surgical knowledge. The physicians of those days seem to have given coequal attention to anatomical and physiological research and pathological investigation, human and veterinary, and have left behind numerous treatises upon the latter art. By the Romans, veterinary art was also held in much esteem, and their medical and agricultural writers have treated of it with acumen. Among the Moors, particularly during their domination in Spain, solicitous attention was, in like manner, bestowed on the subject. But it were not fitting, here, to seek to enlarge on these remoter chronicles of this estimable science, except to note the forcible

impressions which prevailed in favor of its cultivation in those early times, when flocks and herds held a prominent place, and the welfare of all the domestic animals was well nigh the most important of considerations on the part of communities. The downfall of Rome, and the oblivion of learning during the dark ages, overwhelmed veterinary, as it did all other science. During the later and still rude middle ages, the iron defense, termed the shoe, was adopted for horses' feet, (or, at least, came to be somewhat more used,) and the horse-shoeing of the farrier began to be recognized as an operative art. It was at this period that this craft appears to have appropriated veterinary surgery, (in like manner as the barber craft had become the surgeons and phlebotomists of those days,) and, unfortunately, it continues to be only too generally accepted, that the operator who makes and nails on a horse's shoes, has thereby acquired a knowledge of his diseases and their treatment, which, otherwise, can only be obtained by means of education and the well-trained pursuits and investigations of science.

In the sixteenth century, some effective degree of revival of this always important though so decayed art began to take place. In France, the spark thus rekindled was worthily fostered by Francis I, in a very marked manner. This sovereign caused translations of Vegetius and other ancient writers to be made and disseminated, both in the Latin and modern languages. From this period, in Europe, the step-by-step advancement of veterinary science is to be discerned. In 1761, the French king and government founded a veterinary college at Lyons, which still is flourishing, and in 1776 the present noble institution of Alfort, near Paris, was opened to the public. Subsequently other schools, at Strasbourg, Montpellier, Toulouse, &c., were founded; and these examples were followed by most of the other European states, until now none are to be found without one or more veterinary institutions, enjoying state and public approbation and support.

Great Britain, somewhat singular to be observed, was slow to follow in the footsteps of improvement, in this direction, although a country which, it would seem, should have early recognized the importance of aught relating to the care, treatment, or improvement of stock generally, and of horses more especially. The art of equitation, which had earlier taken a strong hold in England, more particularly from the time of Henry VIII, seems to have (from among its professors, and similarly on the part of one or two human anatomists and surgeons, still later,) contributed better information and practices, and also some publications on veterinarianism. It was not, however, until toward the close of the last century that any general movement ensued, in England, as to laying the educational foundations of this art. Several efforts to establish a school had successively proved abortive; until, in 1792, the present Royal Veterinary College was founded. This institution was projected by M. St. Bel, who had been educated at the school of Lyons, and who became its first professor. He died in 1793, having hardly had time to see the tree he had so striven to ingraft give promise of fructification. St. Bel, by whom some treatises of merit were left, was succeeded by the late Professor Coleman, with Mr. Morehead as colleague; the latter, however, soon resigning in order to go to India, in the service of the East India Company, where, not long

after, he died. By degrees the college began to flourish. It was warmly promoted by George III, who made appointments of its graduates to the various regiments of cavalry and corps of artillery, as commissioned veterinary-medical officers; and it was also aided by annual government grants. The press and public evinced the most favorable approbation of its objects; and the medical teachers, and the profession in general, cordially acknowledged this affiliation claim. The great John Hunter was a veterinary examiner, and an early and zealous friend; and Sir Astley Cooper, who was brother-in-law of the veterinary professor, exerted earnest and active service in its behalf. The school gradually became confirmed in repute, and increased year by year in the attendance of pupils, until, in 1841, after the death of Professor Coleman, the profession was chartered by an act of Parliament as the Royal College of Veterinary Surgeons. This corporate body, the Royal Veterinary College, the Veterinary College of Edinburgh, the veterinary professorships of the London University, Dublin, and the Andersonian University, of Glasgow, combine to afford the means and to be the guarantee of that veterinary knowledge which is claimed in behalf of the domestic animals. What benefit Great Britain has derived from these veterinary schools, her farmers, stock raisers, horse owners, and the public generally, can avouch. Of her horses, it can be said that, despite a climate not favorable to raising the finest races, without certain artificial appliances, they are unsurpassed, and sought for throughout the world; while her cattle and sheep stock have been the sources of improvement everywhere.

And now, let it be asked, how is all this in the United States? The answer must be both perplexing and mortifying. Four or five years back, there was not even the apparent germ of a veterinary school. Some three years since, one was opened in Boston, but which has lately been given up. In Philadelphia, a veterinary association and college are making efforts to secure a creditable footing; and it is to be much wished and hoped that they may succeed. New York has incorporated a college of veterinary surgeons, the prospects and progress of which have, as yet, all to be put on trial. In these young and inadequately aided or sustained efforts is mainly contained the history of the means for educational veterinary science in this country.

The school accommodations of the College of Veterinary Surgeons, of New York, are contained within the Veterinary College Institute, 75 and 77 West 23d street. A brief description may be not amiss here. They consist of a lecture hall, museum room, faculty room, and in a separate building, students' dissecting room, &c. The entrance to these is on the east side; on the west side is the entrance for horses, leading to a noble stable of seventeen stalls, having ample space and light, and thoroughly drained and ventilated. On the same floor is a handsome and commodious office, &c. In a separate building, in the rear, is an eight-box-stall stable, for sick horses, forage loft, &c. The floor below, which is equally well-lighted, drained, and ventilated, contains a seventeen-stall stable, eight box-stalls for horses lame or requiring treatment of the leg-joints or feet; the shoeing forge, which is light, roomy, and well-arranged; a store-room for iron, shoes, &c. Water is introduced to every stall; hot water is supplied in each stable;

a steam drying apparatus is adapted for drying the straw used for the horses' beds; and two ventilator furnaces heat the whole building when required. Every arrangement has been kept in view which is found in the best-planned European stables, and an example is presented of the manner of stalling and keeping horses, wherever comfort, health, and high condition are studied. There is no country to which improved veterinary knowledge, or the treatment which the domestic animals claim, is of greater importance than to this. The horse, who stands in the front rank as regards utility and value, demands primary and corresponding consideration. Any effort to introduce improvements on the housing, management, and stable economics of this noblest subserver of the occupations and enjoyments of man, is worthy of public appreciation and support; and this claim can be well and forcibly advanced for the Veterinary College Institute of New York. As regards veterinary science, in a more generalized sense, it may be further added that its cultivation in this country would be followed by advantages of no limited amount. Among others, it would open for many young men a new professional path, at once attractive and emolumental in pursuit. To medical students it not only tenders opportunities for improving their knowledge, through comparative inquiry relating to animal structure and functions, but, also, for becoming acquainted with the complaints to which domestic animals are subject, and the treatment appropriate, whereby the sphere of usefulness and professional income may be extended. Such opportunities are presented in the classes of the Veterinary College. Another very useful and profitable source of occupation for young men whose educational opportunities or means have been more narrowed, is to be found in the veterinary scientific art of shoeing. Some competent knowledge of the anatomy and physiology of the horse's foot, and the requisite expertness or skill for preparing the hoof, fitting and fixing the shoe, &c., can be acquired by any intelligent young man in two or three months, in the lecture room and the shoeing forge of a veterinary institution; whereupon, by purchasing finished shoes, a business—which, divested of the more rude labor of the forge, may be then very properly termed an art—of a very remunerative nature can readily be established in any town or farming district, by means of only a small capital. Toward this object, courses of lectures on the horse's foot and shoeing, and likewise forge instruction, are proposed to be afforded at the Veterinary College Institute. So essentially important is the art of better shoeing, that, in the tariff of charges annexed to the circular of the institution, a price per set for finished shoes and nails is stated, and the same can be sent to horse-owners, with shoeing instructions, and their smiths can then put on said shoes, charging the same half-price as for removes of shoes; better still, if in every stable and on every farm there were one or more hands who could properly pare and rasp the hoofs and fix the shoes, which would prove a most material economy of time, money, and horses' feet.

The attitude of the veterinary art in Europe has been adverted to, and also its great development in Britain, especially during the present century. The following extract from the London "Times" will more

directly serve to show, in an incidental manner, its elevation in the latter country:

"ROYAL COLLEGE OF VETERINARY SURGEONS.—On Thursday evening a *conversazione* was given by William Field, Esq., the President of the Royal College of Veterinary Surgeons, at the institute of the profession. The spacious suite of rooms were thrown open for the reception of visitors. On the walls were hung several valuable paintings, by Sir Edwin Landseer, J. Ward, R. A., and others. The tables in the board room were covered with microscopes, stereoscopes, and photographic drawings. In the council room, an extensive series of calculi of large size and varied composition, together with numerous morbid specimens, showing the results of disease in our domesticated animals, including several of rare occurrence, such as ossification of the heart, lungs, liver, spleen, brain, were supplied from the Royal Veterinary College, and the private collection of the president. These, together with a minutely digested preparation of the nerves of the heart of a horse, by Dr. Lee, attracted general attention. A select and rare collection of the chemicals and articles of the veterinary *materia medica*, as also specimens of the remedies used by the native practitioners of India, were placed in the library. Several articles of *Vertu*, with busts of Dr. Babbington and Professor Faraday, and carvings in ivory, from busts, by Chantry, ornamented the rooms. The bust of the late Professor Coleman, and cases of electrotyped medals, added to the general effect, and the decorations were completed by several beautiful exotic and other plants, from the Royal Botanic Gardens. The refreshments were supplied on the most liberal scale by the Messrs. Gunter. About one hundred and fifty noblemen and gentlemen were present, including names from every department of science and art. The professors of the Royal Veterinary College, and the leading members of the profession, very ably seconded their worthy president in the duties of the evening."

Veterinary medical departments are connected with the English army, and armies of India, and this has suggested the query, whether a similar department for the United States army would not be desirable, or likely to be productive of utility and benefit? A staff medical officer called recently at the Veterinary College Institute, and observed that the subject had been under discussion or consideration, at one time, in an official quarter. I will avail of the present opportunity, and venture to submit the views I would be disposed to entertain on this subject, so far as the limited means I have access to can enable me to form an opinion. It appears to me that the comparatively limited extent of the cavalry and artillery force of the United States, and the manner in which the respective corps are detailed for service along our extensive frontier, preclude any adequate occasion or opening for a regularly constituted army veterinary department, with its veterinary surgeons attached to regiments and corps. Still, it must not thereby be inferred that the advantages derivable from veterinary science should be denied the army. It is a question only of adaptation, cost, and effectiveness. That system which prevailed in the cavalry and artillery arms of the service in India for upwards of a century, would seem to be well fitted for adoption in an army so circumstanced as that of the

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,