On the study of veterinary medicine : being an inaugural address at the opening of the Edinburgh New Veterinary School / by John Gamgee.

ON THE STUDY

OF

VETERINARY MEDICINE;

BEING AN

Inaugural Address

AT THE OPENING OF THE

EDINBURGH NEW VETERINARY SCHOOL,

BY

JOHN GAMGEE,

LATE LECTURER ON ANATOMY AND PHYSIOLOGY IN THE EDINBURGH VETERINARY COLLEGE; LECTURER ON ANATOMY AND PHYSIOLOGY, AND ON VETERINARY MEDICINE AND SURGERY, IN THE NEW VETERINARY SCHOOL, EDINBURGH.

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ON THE

STUDY OF VETERINARY MEDICINE.

GENTLEMEN,

Next to plague in man, the natural and well-founded cause of greatest fear amongst the people of a country, is plague amongst the lower animals. The two may, and often do, occur simultaneously, or plague in animals may be the cause of very general disease amongst men. Attention to this has been especially called within a few years, and the study of the diseases of animals by medical men has been strongly recommended, so as to give an impulse to the study of Veterinary medicine.

The diseases transmissible from animals to man, and *vice versa*, or the diseases common to both, have been recognised as not so few or unimportant as was at one time believed. The maladies of this class that have been more especially studied, are characterized by a degree of malignancy that has no parallel. What more horrible than death in man by glanders, by hydrophobia, or by malignant carbuncle. There are many more affections common to animals having intercourse with each other, and the large number of accumulated facts promises a rich harvest to the future inquirer and to the reflective pathologist.

But, investigations of this kind can only be undertaken by those possessing the advantages of a good medical education.

The science of Comparative Pathology, in its present incomplete form, may be based on the numerous scattered observations of men of all kinds, but its future development must be intrusted, and indeed will be effected, by those who can take comprehensive and philosophical views on medical questions. No science can more require the exercise of the higher faculties of man. I do not allude alone to researches respecting epidemics and epizootics, but to the investigation of morbid phenomena in general in all animals. The last few years fully prove, even with reference to the epizootic diseases of Great Britain, how imperfect is our knowledge respecting them, and how insufficient have been the inquiries. It is impossible that a person aware of what should be the qualifications of a Veterinarian, can unblushingly read the reports which have spread from various parts of the United Kingdom respecting murrain amongst cattle.

Those who read the daily newspapers might often be led to ask, Have we no Veterinarians in Great Britain? It is said that a dozen animals have died altogether on one farm, and that in some districts the best part of a hundred valuable oxen has been swept off, in a manner as quick as it has been mysterious, and there is no one at hand to furnish the world with anything like a correct account of the real facts of the case. A plague is spreading from the Russian steppes; it is supposed to have made a leap close to the west coast of Ireland, or in the North of Scotland; we know nothing about the cause of death there; but we must go to Hungary, to learn what might be learnt at home, from books written almost centuries ago, though certainly in a foreign tongue.

Hundreds of thousands of pounds are annually lost on British soil, which might be saved if the Veterinarian could be found wherever he may be in requisition, and if, at the same time, suitable training had rendered him a useful man.

But who would believe that, with nearly 8,000,000 animals

in Scotland, we could count little more than 120 Veterinarians. Am I to understand that Scotland can only support one Veterinary Surgeon in every 230 square miles of surface? As might have been expected, there is a greater or less congregation of these 120 practitioners in the larger towns, so that many considerable districts, and even entire counties, are unprovided with practitioners of the Veterinary Art, obviously to the serious detriment of the public interest. But, even where they are congregated, their insufficiency is too manifest; and the farmers in the three Lothians can give startling testimony, if asked, what kind of advice is to be obtained when their animals are sick; and how far they have, in the great majority of cases, to send for Veterinarians. Ireland is still worse. Nevertheless, look at the value of her stock! Is it astonishing that unqualified practitioners and blacksmiths swarm and prosper as they do throughout the land?

A few individuals, the majority imperfectly educated, can never be expected to develop the resources of a country like this. The shrewd farmer and talented laird will not request a daily attendance of stock, at a daily premium, if he cannot rely with implicit confidence on the person he has to appoint, with a certain authority, to give advice and assume responsibilities of no mean order.

A useful Veterinary Surgeon, settling down to practise in a country district, may so instruct the people around, as to diminish considerably the amount of disease, by establishing a better system of management of animals in health. This has not been done, because the study of hygiene has been totally neglected in our schools; but, besides which, I have heard it urged, that it is against the Veterinary Surgeon's interest. Not so; let him fulfil his mission —if animals are kept, some must be taken ill, and some must die—the better the animals are kept, the more will be reared; and, if not, though the per-centage of patients be

small, it is always large enough amply to repay a Veterinarian to adopt an honest and disinterested line of conduct.

There is a spot in Aberdeenshire where six or seven Veterinarians are at a short distance of each other. They all appear to understand so little about the prevention and cure of disease, that application was made to me from a farmer's club for a skilful Veterinarian to go amongst the rest. Enough was promised to enable a person to venture against severe opposition; and the right man might undoubtedly prove himself to be in the right place, both as it concerned himself or his patrons. Near to that same district, about forty years ago, a quiet unobtrusive young surgeon commenced his labours amongst the suffering of his kind. The quack, or the routine and ignorant practitioner, kept up a fierce contest for a prolonged period, but the young surgeon's sterling merit and extensive acquirements rendered him too confident to succumb, and too strong to be beaten. His name spread from the quiet village to be universally known and revered wherever medicine is taught. Far from the towns, which are looked upon as the seats of learning, at a distance from libraries, and deprived of the healthy influence of association with men of his tastes and of his profession, he worked for science, for medicine, with such zeal and talent, that his works are with many the constant theme of admiration. This is what a country practitioner of human medicine has done, and what is perfectly within the reach of the instructed Veterinarian.

But I am longing for the day to come when it will be recognised, that young men cannot learn as much as they require very easily in a very short time; that all they need through life is that amount which may be considered sufficient to stand an hour's examination. In this way they soon believe they are sufficiently well-informed for every purpose, and they never can attain that condition to derive real pleasure in search of information for its own sake, with an ever-widening

field before them, offering unlimited scope to expend time and labour in a manner ennobling to themselves and profitable to their fellow-creatures.

A man is never a real, or as Dr Struthers has called it, a "model student," until he acquires that desire for an intellectual repast, which a hungry animal manifests for food. Dr Struthers remarks: "There are different degrees of earnestness or intensity of study; the languid or careless mind finds itself wandering to other matters, or the subject is enveloped in a haze; while the eagerly applied mind carries point after point of difficulty, and absorbed in the keen intellectual pleasure, is surprised at the end to find how time has fled. 'There is nothing,' says Sydney Smith, 'so horrible as languid study, when you sit looking at the clock, wishing the time was over, or that somebody would call on you and put you out of your misery. The only way to read with efficacy is to read so heartily, that dinner-time comes two hours before you expected it. This is the only kind of study which is not tiresome, and almost the only kind which is not useless; this is the knowledge which gets into the system, and which a man carries about and uses like his limbs, without perceiving that it is extraneous, weighty, or inconvenient.'"*

That desired amount of knowledge which, Sydney Smith says, "must get into the system," cannot be greater for any one than for the Medical man or the Veterinarian. Many sciences have to be learnt, to acquire correct judgment and powers of discrimination in a "new world of relations, occult and complex in their nature, to be reasoned upon and resolved, with a principle of change, moreover, ever operating upon them, and deviations from nature under the forms of disease, which render all conclusions liable in a thousand ways to error." We have to learn chiefly by enlightened observation and experience, availing of all that may be gleaned from the

* Dr John Struthers *On the Study of Medicine.* 1856.

history of science, and of all the resources with which nature has individually endowed us.

Professor Laycock says, in his work *On Medical Observation and Research:* "Your power to comprehend and control disease will depend upon the amount of your physiological, pathological, and etiological knowledge. In proportion as this is extensive, will you be successful as practitioners and investigators. *Here knowledge is synonymous with power*, and, in this respect, a junior medical student of the present day is far superior to a Hippocrates or a Sydenham." What the Veterinary student seeks generally, is to obtain a diploma in a few months; and the Veterinary Surgeon is afterwards driven to continue for years, seeing case after case, and prescribing dose after dose, without adding to his knowledge or to that of others, proving, as Dr Watson has said, that, "If every man were to depend upon his own unassisted observation for his knowledge of disease, every man would be marvellously ignorant, and the *science* of medicine would stand still, or cease to be." Yes, Gentlemen, Veterinary Students and Veterinary Surgeons being constantly urged to trust alone to experience, which, in their case, is almost invariably acquired by unassisted observation, the natural result is, that *we have done nothing better than stand still.*

I have sometimes had to admire the ability displayed, and shrewdness manifested, on the part of men who have had it in their power to do Veterinary Surgeons much injury, because the latter did not start out sufficiently in the vantage-ground as to enable them to hold a forward position through life—I mean some country blacksmiths called upon to treat disease. I met with one of these men last summer, and the amount of information I obtained from him was greater than from many qualified members of my profession. The fact is, that he had possessed the same advantages as the Veterinary Surgeons to

learn in a rough way by unassisted observation, and his unenlightened experience was not much surpassed by those who commenced practice with a knowledge of medicine insufficient to make them able and rational physicians. It must not, however, be understood, that this better-informed blacksmith could converse on medical questions, and be as useful in practice, as if he had had the privilege of a suitable education. All I say is, he could well compete with the Veterinary Surgeons around him.

A noble Lord, of great experience in matters concerning horses, and who honours us with his patronage in our present undertaking, was remarking to me a short time ago, that he thought sick animals were never cured. It is true, his country seat was far away from where he could command the best professional advice; but even in London, where he often has a large number of animals in his stables, he assured me that he was very sceptical as to the usefulness of Veterinary Surgeons of the present day, and expressed great anxiety that something might be done to alter the system of education. A few days since I was induced to call on an extensive proprietor of horses, because I knew for certain that his loss amounted annually to about one-fourth or one-fifth of the animals he employs. Long experience had so prejudiced him, that he told me he would rather see his horses die than call a Veterinary Surgeon to them. His experience was, that any horse put under treatment was ill for weeks and months, and in the end had to be destroyed, so that he had come to the conclusion long since to trust to his own skill, or that of his groom and farrier. Some persons would think it hardly possible that that man, whom I knew for certain must have lost somewhere about £1000 worth of horses last year, could give proof to the effect, that had he paid Veterinary Surgeons' fees, these would only have amounted to additional loss.

It is too true, that some diseases are to be classed amongst

the incurable, and may with great difficulty be prevented. But let us forget plagues and other extraordinary maladies! Let us look at the crippled animals daily suffering torture in the service of man! Ninety times out of a hundred, these animals are to be relieved, not by trusting alone to the active and skilful mechanic, in turning bars of iron, to fix on to feet which have, perhaps, been cruelly bruised and mangled by sharp knives and deep-cutting rasps; but by a variety of means, including the labour of the mechanic, under the guidance of a Veterinarian, who, as a physiologist and a medical man, is capable of appreciating the true requirements of each separate case.

Our large herbivorous quadrupeds are peculiarly liable to diseases of the digestive organs. These are very easily prevented; but as animals are badly kept, the prevalence of those maladies is so great, that it is quite matter of surprise. As I have elsewhere said, throughout Scotland devastation by colic is devastation as by a plague. In Mid-Lothian, the loss by colic, inflamed stomach, and inflammation of the bowels, was at least 37½ per cent. of the animals that died of disease in 1851, about 28 per cent. in 1852, upwards of 40 per cent. in 1853, nearly the same in 1854 and 1855, and upwards of 45 per cent. in 1856. An influential farmer of East Lothian, at a meeting of the Highland and Agricultural Society, was alluding to the ravages produced by this disease, and of the futility of calling Veterinary Surgeons to attend the suffering animals, or of following out the indications met with in the popular treatises on Veterinary Medicine in the English language. He believed animals died quicker when subjected to treatment; but he wished a prize to be offered for an essay on the disease. Before, and since then, I have heard many farmers express the same opinion; but it is likewise an undoubted fact, that, under proper management, nstead of about 40 per cent. of the animals that die of disease dying of colic, there should be a per-centage of *one* or *two*.

Gentlemen, it is our desire to aid, if possible, in educating men who may be good comparative pathologists, useful Veterinarians, to supply the great need that is felt, and which is but too apparent, in every part of her Majesty's dominions. I fervently hope, and may say I firmly believe, we shall not be disappointed, for there are so many favourable influences immediately affecting the great object in view, as to enable us to overcome difficulties that are by no means insignificant.

Those who have devoted themselves to the study of the Veterinary profession, and who have annually entered our schools, belong, of course, to a very mixed class. An Oxford or Cambridge man, fond of animals, is at the one extreme—a polished groom, or plodding farm servant, at the other. A medical student, a farmer's son, or working smith, and a certain number of the sons of Veterinary Surgeons, enter our schools every year. To have such a mixed class offers its many advantages. We have all heard of the studious servant devoting himself successfully to some difficult branch of science, such as chemistry; the breaker of stones, to become a great theologian; the shepherd, to develope into an astronomer of extraordinary merit. The great difference amongst men depends on the amount of perseverance they respectively display.

It has often been a matter of surprise to me, that out of a large number of very good men annually entering our Veterinary schools, so few ever distinguish themselves in after-years, and none attain scientific eminence. This has been accounted for by saying, that students either lack principle or education when they enter the school. The first is an unwarrantable assertion, and the second a very fair excuse.

So far as principle is concerned, I can only say, that I have been in Medical and in Veterinary Schools, and the difference has never struck me. Certain it is that Veterinary Teachers have greater opportunities than Professors in crowded Universities, to exert a marked influence over the ways of those

attending their classes; and it must not be forgotten that no course of education is better calculated than a scientific one to turn the current of the thoughts of youth—to alter the tendencies of, and, indeed, to metamorphose the inward man. Students, nevertheless, have their future much in their own hands; they must not forget Bacon's words, that "either wise bearing or ignorant carriage is caught, as men take diseases, one of another; therefore, let them take heed of their companions."

Veterinary Students and Veterinary Surgeons have unfortunately too often injured themselves by having sought the company of men whom they should have kept in their proper place. And it has been justly said, that a ploughboy that has never travelled beyond his own village, and has seen nothing but thatched houses and his parish church, is naturally led to imagine that thatch belongs to the very nature of a house, and that that must be a church which is built of stone, and especially if it has a spire upon it. A child who has seen soldiers with red coats, or ministers with long black gowns, persuades himself that these garbs are essential to the characters, and that he is not a minister who has not a black gown, nor can he be a soldier who is not dressed in red. Just in the same way the public mind can never be brought to such a degree of independence as to be thoroughly exempt from the influence of association; and unfortunately for us, the members of the Veterinary profession have so impressed the public mind, that many look on a Veterinarian as one practising a mean and degrading profession—as the fit associate for persons in the humbler walk of life—an individual destined to a very insignificant position amongst his fellows. It is very true that some members of the profession have had it in their power to insist on their claims to distinction as men of education, but the reverse has occurred far too frequently. This has seriously affected the best interests of our profession. It

has kept out of it, or it has sent out of it, some good men; but it were well if Veterinary Surgeons, who, at the commencement of their career, have occasion to feel hurt that due deference is not shown them, were to remember that any one giving himself airs, and despising his art in the world, cannot have the true feelings of a gentleman; "because, instead of looking into his own mind as the seat and source of honour, he descends to the external trappings and decorations of his office, and only regards himself with complacency as he glitters in the eyes of others." Bourgelat, the founder of the first Veterinary School, in his work on the Art of Shoeing Horses, urges young Veterinarians to become thoroughly acquainted by study and practice with the anatomical, physical, and mechanical truths embodied in his work, and fully conscious of the influence of false pride, says, in the last words of his preface, "Genius alone ennobles man; he that is endowed with true intelligence has the right to the homage of others, and, in a word, there is no man vile but he that is vain, ignorant, and useless."

Touching the second point, which has been urged as a reason why students profit little at college—viz., deficiency of ordinary and classical education—I am persuaded that the influence of this has been over-estimated. Time will prove that it has not been the fault of the individual men, it is the fault of the pernicious system of Veterinary education. It is the great error of making them believe that a three year's apprenticeship fits them to practise their profession, and that the college afterwards is to give them a polish of what is profanely called "theory." It is the immeasurable injury of impressing them that they must try and get through with the work of two sessions of five months each; that ten months suffice to make them professors of the healing art. The physician of the lower animals, like the physician of man, must fit himself for a sphere of observation vast, and, "beyond all description,

difficult, laborious, exacting! So wide is its scope, that often something that shall influence it lies for some ages quite out of its reach. If any man were to rise and proclaim, as he might in truth, that there is but one science as there is but one nature, he might further say, taking as a centre the science which embraces most in the way of observation and fact, that the one and true science is medicine. We, indeed, unanimously claim this unity when we call ourselves physiologists; for physiology meant originally, and still means, the law of nature universal."*

It has totally been lost sight of that Veterinary Medicine embraces as wide a sphere as Human Medicine, and that it calls for as much labour, as much time, and as much talent for its cultivation. We have to study medicine; and there may be few Veterinarians or many, according to the public want—that does not affect the question. If the Veterinary profession is to advance, we must bear in mind that it will do so in proportion as its members are educated "to take profound philosophical views," and "to apply those views to the practice of their art."

To illustrate this, and, moreover, that you may perceive the connection of numerous sciences in the study of veterinary medicine, I think I cannot better engage your time than by selecting a scientific subject of an attractive nature, and which indicates how the study of structure, in its anatomical and chemical relations, is indispensable to a knowledge of function or of physiology, and how the whole is indispensable to acquiring correct and comprehensive views of disease. I shall therefore refer to the anatomy, physiology, and pathology of certain of the cutaneous textures.

The skin is composed of two distinct parts such as you see in a piece of elephant's hide. The thicker, highly vascular, and sensitive portion in continuity with subjacent textures, is the true skin or corium, and a thinner, less dense, non-

* *The Vocation of the Medical Scholar.* A Discourse by Dr Richardson.

vascular, and in many senses the protecting covering known as the scarf skin or cuticle. Of analogous structure to this scarf-skin are hairs, nails, spines, bristles, horns, and hoofs.

The most remarkable and striking difference between the outer covering of man and lower animals is the great development of the appendages to the skin just mentioned. Anatomists have long chosen this as a subject of research of unsurpassing interest; and from amongst them I may mention Fontana; Gult, Professor of Anatomy in the Veterinary School of Berlin; Heusinger, Todd and Bowman, Kölliker and Reissner.

I shall not detain you long with tedious descriptions; but that my subject be best understood, we shall trace the hair from its primitive formation to that condition in which many hairs are glued together to form bristles, horns, and hoofs.

The scarf-skin or cuticle is composed of cells which dry and flatten to form solid scales. From the vascular skin the cells are constantly being formed, and successive layers adhere to each other, so as to constitute a cuticle of some thickness. In a lamb's skin in progress of development, certain prominences are to be observed, and their section indicates that the bulging appearance is due to a deposit, an activity of growth and formation of new substance, where a hair is to appear. The true vascular skin makes room for the new structure, and recedes where the cuticle is most prominent. This is a centre of great vital energy, blood-vessels shoot towards it, a portion of the true skin is red and vascular where the new material is being thrown out. The cuticle acquires a considerable thickness—the newly-formed portion now occupies a cylindrical space, and hardens in the centre, whereas the cells around the latter, line, as it were, the newly-formed cavity; the central, dense, solid, transparent portion pushes up through the scarf-skin to form the shaft of the hair; and that part embedded in the skin continues to be the hair-bulb or the hair's root.

Close examination shows that the bulb of the hair is adapted over a vascular prominence of the skin, called a papilla, and the arrangement is that of an extinguisher over a candle; but the vascular papilla, to which the hair is fixed, is the centre of organic action for the growth, or in case of necessity, even for the reproduction of the hair.

Hair is therefore made up of superimposed scales, soft, as they are formed from the centre below—hard, as they become more superficial. If the hair is to be coloured, the pigment grains are also developed in the bulb or root, either forming distinct cells, sending out radiating processes, or in a diffused manner within the cells generally. "The shaft is much narrower than the bulb, and is produced by the rather abrupt condensation and elongation into hard fibres of the cells, both of those which contain pigment, and those which do not."

"The human hair has a proper bark or *cortex*, formed in the following way: A single layer of the cells immediately surrounding those about to form the fibrous tissue of the shaft, is seen near the bottom of the follicle to assume an imbricated arrangement, and gradually to mount on the hair, becoming more compressed against it in their ascent, until they form upon its surface a thin transparent colourless film, in which the overlapping of the delicate cells is still exhibited by elegant and exceedingly fine sinuous cross lines. The fibrous interior, and this peculiar cortex together, compose the shaft of the hair."

Horns and hoofs are formed of hairs arranged side by side, and glued together. Each hair springs from its papilla, but there is this difference between an ordinary hair, and one entering into the composition of horn, viz., that a portion of skin usually extends over a bone or bony prominence, and is exclusively intended for the secretion of horn. There are no hair bulbs, no cavities or follicles, in which the hairs are imbedded, but from a surface covered by highly

vascular and sensitive prominences, each fitting into the cup-shaped end of a hair, a mass of fine tubular filaments, in fact, a mass of hairs, are formed, which are packed side by side, and stick together, to form a compact, solid, and elastic body, which we all know to be horn.

I intend to go no further with structural indications, but shall say, in the words of a most remarkable and distinguished physiologist, Dr Calvert Holland, that the physiological views which it is our intention to develop, in reference to the causes determining the growth, and explaining the use of hair, &c., do not depend on the accuracy of these minute, and some of them disputed, points of anatomical research.

The skin is the seat of active functions. As a surface exposed to the contact of air, there is from it a constant exhalation, an unremitting discharge of material which has served its purpose in the economy. We all know that we cannot cover ourselves with a Mackintosh without feeling an accumulation of moisture in our under-clothes; and we cannot wear boots of impermeable material without a quantity of exhalation accumulating within them, rendering our feet as wet and much more uncomfortable than if we allowed water to penetrate. Some animals appear to exhale much less than we do. Look at an ox and a dog for instance.

But let us for a moment consider the chemical nature of hairy or horny appendages. I need only allude to the fact that they consist of modified albumen in the solid or coagulated state, and in such a condition as to be rendered useless in the body, because insoluble. Being of the nature of albumen, hair contains carbon, hydrogen, oxygen, and nitrogen, so that through the hair, horn, &c., as Dr Holland states, the body is relieved of considerable quantities of superfluous elements. Vauquelin and Fourcroy state that, in conjunction with the other products of the skin, hair is capable of supplying the office of the kidneys.

"The purpose of the cutaneous exhalation," says Wagner, "has been avowed by all the highest authorities of the age in physiology not to be understood. The chemical analysis of the sweat is owned by Berzelius, to throw no light on the subject. 'Water,' he says, 'is in fact the principal article thrown off by the skin.' I believe it to be the only essential one, and reserving the development of the point for another opportunity, I merely state it here as a general thesis, that the business of the skin is to eliminate so much water, and this not to reduce or regulate temperature, as is commonly said, but for the specific end of maintaining the current of blood returning to the heart of higher density than that which is leaving it."

"How far this opinion is justly founded," remarks Holland, "it is not our business, on this occasion, to examine. The writer, as he states, has not fully developed his views on the subject; and therefore it would scarcely be correct to criticise a doctrine which is not fully before us."

"In the mammalia and birds, the cutaneous exhalation is ascertained by experiment to be remarkably limited. The fact has an important bearing on the principles which it is our intention to establish. The animal economy, in proportion as it loses the necessity for the expulsion of water from the external surface of the body, acquires other vital exigencies in the same direction, *for the emission of superfluous elements, in structural forms and conditions which have not been suspected by the physiologist.* The internal organs, in the vigorous exercise of their functions, create external appendages in harmony with their requirements, and the growth of them is the appropriation of matters which would not otherwise be disposed of."

The skin contains numerous glands, destined in a great measure for the separation of greasy or hydro-carbonaceous matters. In the lower animals, with an abundant covering,

the glands present many varieties, but they are all more simple, with rare exceptions, than the glands of the hairless skin of man.

I must again quote from Dr Holland, who says, that "the cutaneous actions, as expressed by exhalation, are not in the ratio of the nervous and vascular conditions of the skin. The vital processes carried on by the internal organs, necessitate, as in the human race, outlets for the escape of superfluous elements from the external regions, which are not furnished by transpiration—hence the inquiry to ascertain the means which nature provides. These we shall find to consist of hair, feathers, horns, and other analogous materials; and, in general terms, the same in their chemical composition. Facts of this kind shew, that though animals may differ greatly in their structural conditions, they possess the common similar organic requirements, with respect to the surface of the body, giving rise to the growth of appendages, the production of which is the appropriation of the superfluous elements created by the internal organs."*

Hairs, horns, and hoofs are developed in the vicinity of, or in connection with parts endowed with very great vital activity. That man walks nobly erect has been assigned as the reason accounting for the absence of hair on the general surface of the body, by influencing the circulation of the blood and distribution of nervous matter. That the horse is covered with hair, may likewise, in a great measure, be accounted for, when we reflect on the "movements of the four extremities, dependent on numerous muscles, the more important of which cannot be exercised without acting powerfully on the surface of the body, determining to it a quantity of blood far greater than would result from the action of two extremities, in connexion with a different structural conformation."

What more does Dr Holland say respecting the horse? "If we

* Page 61.

observe with attention his action, whether walking or at any other pace, we perceive that the entire cutaneous surface is excited, and in such a way that the aroused operations of which it is the seat—operations not transient, but often continued for a lengthened period—indicate, in this situation, the presence of a large amount of blood in vigorous circulation, as well as the distribution of nervous energy in a corresponding ratio."

And further on: "In the horse, and in quadrupeds generally, when excited by exercise, the quantity of blood transmitted to the surface of the body is considerable, and at the same time kept in vigorous circulation. Many of the elements which it possesses must have an outlet, which is not furnished by the transpiration of the skin; and therefore we contend, that the development of the external appendage is the using up materials which the animal system could not otherwise expel."

Hair and horn have been naturally looked upon as protecting structures, adapted to animals of peculiar habits and conformation. Bostock says, "One obvious use of hair in the inferior animals, is to protect the body from external cold; but, except on the head, this cannot be considered as applying to the human species, nor can we easily conceive what is its object in our economy; yet it is contrary to our ideas of the nature of things to suppose, that what is so constantly found to exist should not be formed for some useful purpose." Horn is more especially a protecting agent, but evidently, when we consider how nature has simplified the extremities of limbs from a broad hand with five fingers, to a simple row of bones, with much blood descending to the extreme ends, and vital action concentrated, there is, according to the physiological views emitted, an imperative necessity for the growth of horn, apart from the consideration of the latter being intended as a solid basis of support. The foot of the horse

is the seat of a very delicate sense—the sense of touch. A horse in progression trusts very largely to feel his way along. The extremities are constantly in a state of great vital activity, and the proportionate growth of horn is, in part, intended to carry off superfluous elements which cannot otherwise be disposed of.

Dr Holland, in making allusion to Mr Percival's attempt to account for the abundant growth of hair on the fetlock and its contiguous parts, says, that it is not very clear how "the tufts of hair sprouting from the fetlocks defend those parts from contusion when forcibly depressed in action, and serve at the same time as a protection to the heels;" and, moreover, "were they designed for either of these ends, man would have little power in arresting their growth. . . . . The racehorse has only the merest traces of them; yet, according to the argument employed, he should possess them in abundance, from the extremely severe pressure and violent action to which the joints of the four extremities are subjected."

Dr Holland attributes the extraordinary copiousness of hair about the fetlock to three causes:—It is upon a large joint at the extreme end of the limb; all the structures where it appears are very vascular; the weight of the body is thrown upon the posterior joint and its contiguous structures, exciting the nervous and vascular actions natural to them and proportionately aggravating the necessity for issues to facilitate the escape of superfluous chemical elements.

It has been often a subject of thought and inquiry, to ascertain the use of certain horny appendages on the inner part of the arms of horses, or in the vicinity of the hocks. I believe that they occur just for the same reason that there is hair in the axilla of man, and a large thickness of cuticle below the heel. In the horse, there being no clavicle, there is no axilla, but there is much vital energy in the pectoral region; and the need that exists for the hair of

the armpit in man is manifested also in the horse, and the structure occurs in a somewhat modified condition. The same argument applies to the horn near the hock compared to the great thickness of scarf-skin on the heel of man.

After this brief inquiry respecting the anatomy, chemistry, and use of hair, we must show the bearing of such knowledge on the study of disease.

Nothing can strike the practitioner of Veterinary Medicine more than the relation between vigour of the constitution, great vital energy, and the condition of the skin of animals—soft and supple, with spare, firm, and fine hairy coat, in an active and powerful well-bred horse; rough and woolly, under opposite circumstances, especially when, from depressing agencies, the naturally gross constitution is enfeebled, and when there is a manifest tendency to abnormal conditions of the skin and of the cutaneous products strikingly affecting the hairy covering.

Undue irritation and excited function of internal organs induces not only a diminution in the cutaneous exhalation, but an arrest of growth of hair, and a separation of the latter from the skin. Any cause calculated to restore the balance of function is then apt to be attended with so much determination of blood to the outer surface of the body,—so much determination of nervous energy, that unless exhalation from the skin is facilitated, the cutaneous structures, and especially those near the parts endowed with greatest vital activity, become congested and inflame. This is, in my opinion, the explanation of those mysterious attacks of inflammation of the skin, and of inflammation of the feet in horses immediately on the disappearance of acute internal derangement. In man, the suppressed secretion of the skin is easily excited; but in the lower animals we find that the superfluous elements, in case of determined vital action, have to be carried off in the shape of hair and hoof, a growth of which cannot be so sud-

denly excited, hence the highly vascular structures secreting them become the seat of intense inflammation.

I have always looked on the explanation given of those strange cases of metastatic inflammation of the feet of horses after attacks of severe irritation of the alimentary canal, as most unsatisfactory. The theory held is, that the skin and mucous membranes being continuous structures, there is great sympathy manifested between the two; and that if the mucous membrane of the bowels inflames, the skin being in continuity with it, may consequently be affected. This is certainly not right; and in many cases of colic, followed by inflammation of the feet, there is not inflammation of the intestines, but concentration of blood and nervous energy, which, in nature's attempt to restore the balance of functions, may be reflected to centres of vital action, whence hairs and horn spring.

The three causes which Dr Holland has pointed out as explanatory of the abundance of hair about the fetlock, are, according to the same author, the occasion of the frequent disease of these parts, producing what is called *grease, cracks, ulcerations*, and *fungous excrescences*. Had we time, many more facts might be pointed out to prove that simply "the hair on the fetlock is suggestive of deeply interesting investigations," and that "to the physiologist it is what the single bone was to the clear and capacious mind of Cuvier." If suggestive to the physiologist, it must be peculiarly so to those who make the diseases of the horse the object of anxious study.

The lesson we learn from all I have stated must prove an impressive one. It shows us that, until brought to perceive what is the nature and the use of a part, we cannot be expected to comprehend its diseases. Anatomy and physiology must form the foundation of any practically useful system of Veterinary education. As regards physiology, it has always

been very imperfectly taught in our Veterinary schools. In fact, I may say it has been simply acknowledged by name. Any attempt to investigate disease, to ascertain the influence of external agencies in its production, and to interpret symptoms, must prove barren, useless, and unatisfactory, unless researches are instituted with a complete knowledge of the anatomy, chemistry, and physiology of the animal bodies. The Veterinarian's opportunities for such researches are of daily, nay, hourly occurrence; and it is marvellous that the many practitioners of Veterinary medicine disseminated throughout her Majesty's dominions have contributed so little to the history of diseases in general; but it is easily explained, if we reflect on the curriculum of study which has been long practically adhered to in our Veterinary schools. One of our best and perhaps the most remarkable of living Veterinarians of the English school, I mean James Turner, has said, that of late the Veterinary Profession has been seized with *apathy*—"no weighty facts of the enduring kind, to last out all time, have been chronicled. The *remedy* and grand requirement of the present crisis is a fresh infusion of energetic *spirit* for research."

No one will doubt, then, that ours is a truly noble calling—that we must engage in arduous studies, excessively laborious, though truly more and more enticing as we advance—that none of us can truly succeed in this life except when possessing a large stock of information, an extent of knowledge which is not purchasable by gold. I hope that many who honour me with their presence here to-day will appreciate my state of feeling, my ardent love for my profession; and pardon me for any boldness or apparent rashness in resolving to attempt that which is almost overwhelmingly difficult, to improve the system of Veterinary Education in Great Britain.

Gentlemen, I have lately had much proof of disinterested kindness on the part of Scotchmen. I have observed in them such an amount of true love for their country, in risking

personal sacrifice for the public good, that I am now knit here by inseparable bonds of gratitude and affection. This school, Gentlemen, is being established by Scotchmen for the benefit of their country. It is no foreign importation. I am an instrument in good hands. Unless there be a flaw in this instrument, unless I be constituted of unsound metal, the cause must prosper. Many of you know me of old. I hope that I may soon have proof that I have not quite miscalculated my powers and my position. I scarcely think this, for I have so much felt my inferiority, as compared with the immensity of the undertaking, that I have gathered round me colleagues who I am fully convinced are endowed with qualities of heart and of mind rarely to be met with, and their zeal and ardour, under existing circumstances, can only be matter of unmingled astonishment, and worthy of all praise.

A word to our students. I must call on them from this moment, if they have not done so before, to fathom their motives in studying this profession. They have heard that they have not chosen an easy, but a most important one. They aspire to become members of a profession which has yet, in a great measure, to be formed, by addition to its numbers, and by a fresh infusion of true love for learning. All who aim at attaining mediocrity had better not waste time and money,—and there must exist no such consoling idea for those who wish to spare mental effort and the sweat of their brow, that hereafter the responsibilities will fall lighter on themselves than on the members of other professions. Let them not think their mission is a less holy one. They must be brought to do their duty as men towards their fellow-creatures, by cultivating the means calculated in their own special sphere to render them most useful. If it be their intention to avail of every advantage they possess to acquire knowledge, they shall have whereby nobly and profitably to engage themselves till they each outlive their three score years and ten, urging on all

those who may be, as they once were, commencing a career of usefulness calculated to procure for the zealous student days and months and years of unspeakable happiness in the investigation of nature's laws, to die conscious of the omnipotence of a Creator.