

Veterinary Public Health ca. 1880

THE INCREASED EMPHASIS upon the veterinary aspects of public health in recent years might lead one to suppose that veterinarians had given little thought to public health matters in the past. While it is true that veterinary public health as a specifically designated area of endeavor is a relatively late development, it should not be concluded that the founding fathers of the veterinary profession had given little thought to this matter. In fact, the early leaders of the profession had very well-defined concepts of the relation of veterinary medicine to human welfare, and took every opportunity to urge veterinarians to seek ways of serving as sanitarians.

Admittedly practitioners of the 1880's and later were preoccupied with the problems of horse practice, and perhaps all too few took full advantage of opportunities to serve in the area of public health. But to a greater extent it was a failure of public health officials to appreciate the potentialities of the trained veterinarian that resulted in so slow a development of veterinary public health as a basic discipline. More than this, veterinarians simply were not consulted on problems which were primarily of a veterinary nature, but which had public health implications. A few boards of health, notably those of the city of Brooklyn and the state of New Jersey,

early recognized the interrelationships of human and veterinary medicine in the interests of public health, and some of these boards have included veterinarians since the early 1880's.

In addressing the graduating class at the American Veterinary College in 1878, J. W. Arnold, M.D., of the College of Physicians and Surgeons, stated:

Veterinary science is undoubtedly a branch of medical science, and not only does its influence extend to the preservation of the domestic animals used as "beasts of burden," but also to those upon which omnivorous man depends so largely for his food. . . . It is your part to take cognizance of . . . every form of disturbance in the lower animals which can be transmitted from one species to another, and from these even to man himself.

Thus it is for you to perform the work of sanitarians. The community at large should then acknowledge the position which you occupy, and it is for you, gentlemen, to gain its full confidence and respect by your own actions — by your own achievements.

ADVOCACY OF THE GERM THEORY

A knowledge of the coming science of bacteriology was soon to be a prerequisite to an adequate grasp of the public health problem, and the *Review* appears to have been a major influence in bringing the germ theory of disease to the attention of the veterinary profession in America.

Germ of the Germ Theory

Several converging factors are involved: the editor evidently needed material to fill his pages: being French, he turned to the literature of his native country; the work of Pasteur and others in bacteriology was commanding attention in Europe; Liautard apparently had come to the conclusion that Pasteur—and not his critics—was correct, and chose to exploit this new controversial field, rather than “playing it safe,” and filling his pages with case reports and the like. Liautard not only selected and translated these articles, but in in his editorials he leaves no doubt concerning his beliefs:

The believers in the spontaneity of the development of contagious diseases have found in M. Pasteur a powerful opponent, who slowly, but surely, demonstrates by undeniable proofs that the virulent properties of those affections is due to the presence of microscopical organisms.

The first volume of the *Review* offered long overdue proof by the French veterinarian, Bouley:

On the Identity of Anthrax in all the Species of Domestic Animals . . . that, in fact, the glossanthrax, tongue-evil, black quarter, black leg, splenic apoplexy, constituted but one disease.

The agricultural journals in particular had been the repository of much confusion in the matter of describing one disease under a variety of names. Thus unless symptoms were carefully recorded—and frequently they were not—there would be no way of knowing what was meant by *black leg*; in some cases this obviously was anthrax, in others it apparently was clostridium infection currently denominated as blackleg. Bouley says:

M. Pasteur, it seems to me, has given a perfectly exact definition of the disease, where he defined it by this agent itself, the bacteridie, which is found in all species identical.

The second volume offers a long article on “The Germ Theory, its Application to

Medicine and Surgery,” by Pasteur and others. In some respects this is possibly the most important feature of this particular volume in that it brings to the American veterinary profession of this time, an overt statement of the germ theory of disease—at a time when other journals were already attacking it. It would seem that Pasteur’s startling message must have made an impression on at least some of his American readers. He says:

All sciences gain by assisting each other. When, after my first communication on fermentations, in 1857–58, one could admit that ferments . . . were living beings, that germs of microscopic organisms exist in abundance on the surface of all objects, in the atmosphere, and in waters, that the hypothesis of a spontaneous generation is actually chimerical . . . medicine and surgery paid attention to these new lights. A French physician, Dr. Davaine, made the first happy application of these principles to medicine in 1863. . . .

Our researches of the last year . . . have rendered as most probable that septicemia results from the presence and multiplication of a microscopic organism, but the rigorous demonstration of this important conclusion remained undone. To affirm experimentally that a microscopic organism is really an agent of disease and of contagion, I see no other way, in the actual state of science, than to submit the *microbe* . . . to the method of successive cultivations. . . . Such is, for us, the undisputable proof that anthrax is the disease of the bacteridie. . . .

It is horrid to think that life may be at the mercy of the multiplication of these infinitely small ones. It is also consoling to hope that science will not always remain powerless before such enemies. . . . At the beginning of these researches—for they only begin—and though already a new world is discovered, what is to be looked for in most instances? It is the positive proof that there exist diseases transmissible, contagious, infectious, whose cause resides essentially and uniquely in the presence of microscopic organism. It is the proof that, for a certain number of diseases, we must forever drop all ideas of spontaneous virulency . . . opinions fatal to medical progress. . . .

Scientific novelties often come against prejudices. Well, some will say, what of your bacteridies and vibrios? What are those infinitely small to us? Are they not seen swarming everywhere? . . . Is there any danger? To these I would ask, of what infinitely small do you speak? We have seen that alongside the

most dangerous vibrios, there exist very harmless ones. . . . In the study of microscopic beings, any method is precious, if by it one may succeed in separating from each other numerous species whose association is so common. . . .

If I was a surgeon, impressed as I am by the dangers which would rise from the germs of the microbes thus spread upon all objects, particularly in the hospitals, I would not only use instruments of perfect cleanliness, but, after having washed my hands most carefully and exposed them to a rapid singeing. . . I would have . . . all the bandages, and all the sponges first exposed to a temperature of 130 to 150 degrees, and would only employ water which had been exposed to a heat of 110 to 120 degrees [centigrade?]. All this is practical. In this manner, I would have to fear only the germs in suspension in the air all round the bed of the patient; but observation shows us easily that the number of those is almost insignificant when compared with that of the dust on the surface of most objects . . . and, besides, nothing would prevent the use of the antiseptic manipulations, which, united to those that I indicate, could be considerably simplified. A phenic solution, even very weak and consequently without inconvenience by its action upon the hands of the operator or for his respiration, could be advantageously substituted for strong carbolic solution.

In discussing his research upon the anero-bic organisms of purulent infections, Pasteur states that this "is a new confirmation of our principle: fermentation accompanies life without air; a principle which, I am persuaded, will one day predominate all our knowledge upon the physiology of the cell." Of more immediate interest, however, are his closing thoughts, repeated from one of his medical colleagues, who had urged:

The success, as well as the failures, in surgery would find a rational explanation in the principles upon which the *germs theory* rests, and that this would give birth to a new surgery, already inaugurated by a famous English surgeon — Doctor Lister.

How deeply this penetrated the sensorium of the average practicing veterinarian is, perhaps, a moot point, but from this time on an increasing number of contributors to the *American Veterinary Review* evidence an understanding of, and a belief

in, the germ theory of disease. In the same year (1878), James Law states:

As both the contagious and parasitic diseases are propagated by germs produced in countless numbers in the body of the victim, it follows that the aggregation in a limited area of men and animals, in which they can live and increase enormously, enhances the danger to both kinds of victims.

N. S. Townshend, M.D., writing on hog cholera, states:

If the disease is typhoid fever, we should expect to find that contaminated water is a principal medium through which the disease germs pass from one animal to another. How far exemption from attack may be secured, when the food and drink are free from all possible contamination, has not, so far as I know, been determined.

Abortion, Anthrax, and Cholera

At this time, when "sympathy" was still considered a primary factor in producing infectious abortion in cattle, the *Review* presents a translation from Professor L. Frank of Munich, who attempts to answer the question:

What is this suspected infectious matter, and from whence does it generate? and, 2. In what manner does it penetrate into the pregnant animal, and thus produce abortion?

He cites the finding of bacteria in the after-birth of an aborted fetus, and the experimental production of abortion by introducing mucus from the vagina of an aborting cow into that of a healthy animal: "This fact is a matter of great importance." Also, the finding of bacteria in the amniotic fluid of an aborted fetus with the amnion intact leads Frank to conclude that the bacteria

were already contained in the uterus and penetrated into the foetus through the amnion. . . . These facts tend to show that infectious abortion is due to the action of a contagion.

In writing on anthrax in Canada in 1879, Dr. McEachran states:

I am not aware of any records of outbreaks of this disease in Canada having been kept, but in conversing with old people who have lived nearly a lifetime in the country, I find that they have no difficulty in recalling to mind repeated instances in which farm stock have died mysteriously, and which then as now was usually attributed to toxic plants, malicious poisoning, "the evil eye," "elfshot," or "a visitation of Providence." . . . The chief source of anthrax is contagion dependent on the existence of a specific poison in the blood.

He is not quite ready, however, to decide whether the bacteria universally demonstrable in the blood were present "as a cause or product of the disease."

In 1880 Liautard editorialized on Pasteur's work on chicken cholera:

He shows that chicken cholera is not only due to the presence of a microbe, developing itself in the organism of the hen . . . but that it can be prevented by inoculation—a fact that goes far into the prophylaxy of the disease, and which cannot escape the attention of our agriculturalists. . . . Veterinarians will, no doubt, read with interest, the long papers that M. Pasteur read before the Societe Centrale de Medecine Veterinaire, and which we reprint in full.

In demonstrating infection of chickens by ingestion of the cholera bacteria, Pasteur states:

In this manner one can easily understand the manner of propagation of the disease in chicken yards. Evidently the manure of diseased animals plays the largest part in the contagion.

He logically suggests sanitation as the principal prophylactic measure. And in relating how by attenuation of cultures of the organism he was able to produce immunity to the disease, he states:

Though realizing the propriety of a becoming humility in presence of these mysteries, I hope that the society will see in the facts I have the honor to present, unexpected explanations of the problems presented by the study of virulent diseases. . . . How many mysteries in the history of contagions will one day receive solutions still more simple than the one I am speaking of! Let us throw aside

the theories, that we can contradict by positive facts, but not by the vain pretext that some of their applications escape us. The combinations of nature are at all times singular and more varied than those which meet the ordinary conceptions of our minds.

One of these phenomena, beyond "the ordinary conceptions of our minds," was presented by Pasteur in 1881 in an article on "The Attenuation of Viruses and their Return to Virulency." In finding that serial passage of an infectious agent may increase its virulency, and thus account for diseases "which appear *spontaneously* in all countries," he states:

And now virulency appears before us in a new light, which is not without alarm for humanity. . . . An inoffensive microscopic organism . . . a being [which] cannot develop itself in our body, or in that of . . . [some other] animal . . . could penetrate into another of the thousand species of the creation, invade it and make it sick. Its virulency, then strengthened by successive journeys into the members of that species, might become in condition to invade other animals. . . . By this method one may create new virulencies and new contagions.

He states that the opposite is not made improbable by this finding—"the possible diminution of virulency by the journey of a virus through some subject," but he had not yet found any such examples. Perhaps few, other than Pasteur himself, envisioned just how important this concept was to become as a tool in medical research and practice.

More Light

Pasteur was well aware of the scepticism and outright disparagement of his discoveries by many leading medical investigators and practitioners. In writing on: "The Connection of the Germ Theory with the Etiology of Some Common Diseases," he stated in 1880:

I know that in medical investigations it is difficult to avoid interference with preoccupied ground. Again, I do not forget that medicine and veterinary science are strangers to me. For this I ask the judgement and comment of this illustrious society. Indifferent to frivolous and

capricious objections, and with just contempt for the vulgar scepticism which adopts doubt as a habit, I look towards the militant scepticism which properly makes doubt a stimulus to inquiry, and whose rule of conduct has for its motto: "more light."

As suggested above, the publication of the researches of Pasteur and other continental workers was perhaps the noblest mission of the *American Veterinary Review* during its early life. To a greater extent than many medical journals, and the *Journal of Comparative Medicine and Surgery*, the *Review* not only reported, but supported the germ theory of disease with a fervor that would have gladdened the heart of Pasteur himself. But this would have had little immediacy of value unless American veterinarians did more than read this passively. It would appear that relatively few veterinarians, unlike some of the more voluble medical writers, were openly critical of Pasteur's work. Of greater importance, however, is how many veterinarians took active steps to apply the findings of Pasteur to teaching and research in America. It would be most instructive if we had transcripts of lectures given at the veterinary colleges at this time, but few of these have been published. Nor was much bona fide experimental investigation being done by veterinarians.

Fortunately, the professional career of D. E. Salmon, following a short period of practice, was channeled into veterinary research. In his early writings in the *American Veterinary Review*, Salmon demonstrated through his complete understanding of the germ theory of disease the logic of his being chosen in 1883 to head the Bureau of Animal Industry.

In writing on fowl cholera in 1881, Dr. Salmon states:

We are satisfied, after a long series of experiments, that there are points in its natural history which enable us to control it with comparative ease and with a considerable degree of certainty. . . . The disease germs are seldom, if ever, taken up by the air . . . the virus . . . is generally, if not always, taken

into the body with the food; it is distributed over the grounds, feeding places, etc., in the excrement of affected birds, and the food, drink and gravel are thus contaminated.

He recommends destruction of sick birds, disinfection of the premises, and isolation of healthy birds from any potentially infected, and:

The value of the method of preventive inoculation or vaccination discovered by Pasteur has not yet been decided, but in view of the comparative ease with which the affection may be controlled by the measures detailed above we doubt if it can ever be advantageously adopted as a means of preventing this particular disease.

Pasteur himself had noted that the results of inoculation were still erratic. Salmon's article, incidentally, is one of the first reports of American veterinary research to be presented in the *Review*, although only his conclusions are given.

The medical editor of the *Journal of Comparative Medicine and Surgery* in 1880, leaves some doubt as to the course he expected to take concerning

the over-strained germ-theory of disease. We have no doubt that a careful comparison of the results obtained by different observers will show that molecular movements and microcytes have frequently formed the basis for new "germ-theories" in some cases, and the accidental presence of bacteria . . . in others. A judicious study of the finer chemistry of the fluids in infectious diseases would probably lead to more definite and more valuable results.

Salmon, at least, did not humor this die-hard proponent of the humoral theory of disease. Nor can his critics be credited with real prescience in anticipating the contributions to microbiology being made with the electron microscope.

The Faith That Is Within Us

In 1881 an article by Salmon on: "Charbon and the Germ Theory of Disease" appeared in the *American Monthly Microscopical Journal*, and was reprinted in the

Review. In this he states that from Koch's investigation of the *Bacillus anthracis*:

the germ or bacteria theory of contagion received a new impetus. . . . There have always been doubters, however, particularly among English-speaking people, most of whom have been unable to follow the investigations as closely as is necessary to reach sound conclusions. . . . It is not uncommon to see such doubts expressed in very strong terms in medical and scientific periodicals. . . . It seems opportune, therefore, to present the evidences for *the faith that is within us*, so that all may see that we have a foundation clearly and firmly established. [Italics mine]

In presenting "a series of facts which show the connection between the virulence of the blood and the presence of the *Bacillus anthracis*," Salmon asserts:

A single fact of this kind might indeed be called a coincidence . . . two such facts . . . a strong probability . . . but when it comes to a set of nine facts, each of which taken alone would be a remarkable confirmation, it seems to me that, as scientific men, we must accept them as a demonstration . . . the organism and the virus are one and the same thing, and I believe that any unprejudiced scientific man must accept this conclusion as necessarily following from the above facts.

Continuing his theme, Salmon charges that many "scientists" had either adopted superficial concepts, or rejected sound ones, by "playing fast and loose with the germ theory, in a style not very consistent with the elementary principles of scientific reasoning." These varied opinions, he adds:

are not evidence either for or against the germ theory. In science a fact must be demonstrated before it can be accepted, and when once properly established, it must remain a fact, no matter what results are attained by other lines of investigation. In other words, facts do not contradict each other, and when they appear to do so, it is only because our knowledge of the subject is superficial.

In summarizing the work of Pasteur and others on anthrax, Salmon states:

This being the entering wedge for the germ theory in scientific pathology, it is perfectly right to demand the most conclusive evidence

before admitting it; but this evidence has now been furnished — the germ theory has a substantial foundation — and medicine is destined to make its most brilliant triumphs by the discoveries to which it will lead. The progressive pathologist will waste no more time in criticising what is so well established, but will press onward to other and equally important discoveries.

For many years the agricultural press, and the *American Veterinary Review* since its inception, had pressed for the formation of a National Veterinary Bureau to combat the rising toll of animal disease. In some respects it might be considered fortunate that legislation establishing the Bureau of Animal Industry was sidetracked until Salmon had achieved sufficient prominence to become the logical choice for its first head. Fortunate, at least, that some considerably less able individual — who might have had a long tenure in this position — was not given the nod simply because he was available and earlier Salmon was not — a happenstance perhaps all too frequent, even today.

Who, Except Dr. Salmon?

Interest in the germ theory of disease did not end with its "discovery" by American veterinary medicine. Admittedly, few veterinarians in America were ready to make experiments to prove it for themselves; and as late as 1890 C. B. Michener asked, "if indeed we except Dr. Salmon, who of us has accomplished any original work?" As editor of the *Review*, however, Liautard pursued a praiseworthy objective in continuing to present the work of continental veterinarians and research workers which was to lay the foundation for the science of bacteriology and animal disease research in America. D. E. Salmon, of course, was the notable exception; in many respects he was the first American veterinarian to both envision the full scope of the necessary work of the profession and to pursue this vision with relentless and intelligently directed energy.

In 1882, continuing his exposition of

"Fowl Cholera and the Germ-Theory of Disease," Salmon states:

No longer than a year ago, there were so many criticisms of the germ-theory continually appearing in our medical and scientific periodicals that the writer felt it a duty to place the evidence bearing on the question before the working microscopists of the country in such a connected form that they could scarcely fail to appreciate it. . . . After patiently waiting a year to allow those who oppose the germ-theory ample time to place their objections to this evidence on record, without any such objection appearing, it may be concluded that up to this time at least, there are no substantial grounds for doubts.

As a working theory, we have seen more light thrown upon contagious fevers by its use for half a dozen years than was gained before in the whole history of medicine; but notwithstanding this, its true friends do not care to press its acceptance in advance of the actual results obtained by scientific investigations.

Upon the basis of Pasteur's work on anthrax, he continues:

We may confidently announce that the first story of the edifice has been reared upon the foundation, and that it is so well finished as to be perfectly safe for use, and to serve as a support for future work.

Not all veterinarians were as willing to accept this new concept, and the writings of some demonstrate a lack of appreciation of the germ theory of disease. But, unlike the medical press, few overt objections to this theory appeared in the veterinary literature. If it were necessary for editors to screen out some contributions of this nature, we can at least be thankful for this much. Salmon mentions that in the medical press:

Still, we occasionally see elaborate articles intended to prove that the bacteria of contagious diseases are nothing more or less than one of the forms assumed by coagulating fibrin.

In support of this statement he mentions an article: "No Bacteria in Diphtheria," appearing in the *Medical Record* for 1882.

In 1883 the *Review* quoted the *Rural New Yorker* on Salmon's work on inoculation in which it was noted:

The method adopted by Dr. Salmon for lessening the virulence of the virus so as to fit it for inoculating, or rather vaccinating, purposes, differs considerably from the "attenuating" system of Pasteur, and we are glad to learn that the Doctor is to have an opportunity of thoroughly testing its efficiency.

The same year Salmon reported in the *Review*: "On the Production of Immunity from Contagious Fevers by Inoculation with Diluted Virus." Working with fowl cholera, Salmon set out to produce a culture of standard virulence, and to use dilutions of this to produce immunity by inoculation. This work demonstrated two important facts as concomitants of all such biological research:

. . . the individual peculiarities of living animals . . . that susceptibility and insusceptibility are only relative and never absolute conditions.

Finding that extreme dilutions fail to produce any result, but that with stronger dilutions "local resistance to the germ fails while the constitutional resistance may still be perfect, and . . . this local multiplication of the virus is sufficient to grant a very complete immunity," he concludes:

The most virulent virus may be diluted to such an extent as to become practically a vaccine, and . . . in this condition it may be used safely for producing insusceptibility.

The advantages of his method over that of Pasteur, Salmon states, lie in the use of a standard virus, of longer activity, and requiring only minutes instead of months for attenuation; in addition, less virus is needed, and less dangerous experiments are required to learn the proper degree of attenuation. On this basis, he suggests:

I should not be surprised if greater advances are made by the investigations of the future, for the prevention of contagious diseases, than have been accomplished in the past, but at present the question is fairly before the medical profession—Shall we vaccinate with a large number of comparatively inactive germs, or with a small number of those which retain their greatest virulence?

In commenting on Salmon's work, Liautard considers this to show that:

Dr. S. is quite a master of the subject, and that the appointment which he has just received from the Commissioner of Agriculture was well deserved. . . . It will be gratifying to the veterinary profession of America to learn that, young as she is in the field, she is already making her mark in the most important department of their calling, viz., that of the prophylaxy of contagious diseases.

And concerning his own efforts:

In accordance with the original programme accompanying the first issue of our journal . . . we have kept our friends informed in reference to the theories and facts of prophylaxy as inaugurated by European practitioners, and applied to the contagious diseases of animals. . . . We cannot but feel persuaded that at least those of our veterinarians who have kept themselves advised through the publications in question, must derive much personal advantage, in various instances, from their advanced knowledge and more enlightened judgement in the course of their professional labors. . . . We shall continue to pursue the same course in the future.

Law on Zoonoses

In 1878 James Law entered a lengthy "Plea for Veterinary Surgery," in which he goes considerably beyond the area suggested by the title of his subject. This was printed in the *Report of the Pennsylvania Board of Agriculture*, and reprinted in the *American Veterinary Review*, and thus undoubtedly came to the attention of a number of influential persons. In this he explains:

When we enter on the list of contagious and parasitic diseases, we are at once brought face to face with a sanitary question of supreme importance alike to man and to his living possessions. Several of the specific and contagious diseases of animals are communicable to man, with a more or less deadly effect. . . . The aggregation in a limited area of men and animals enhances the danger to both kinds of victims. If physicians are left ignorant of the affection in the beast, and veterinarians of the same in man, they each miss the golden link which would reveal the true nature and dangers of the disease, and enable them to contend with it successfully.

In giving specific examples of the relation of veterinary knowledge to human welfare,

Law singles out rabies, glanders, and tuberculosis. On rabies he charges:

Even among the medical profession, we find the most injurious blunders on the subject. How often do we read accounts of hydrophobia in man as the result of a bite from a dog which is known to be alive and well.

And on glanders:

What frightful sufferings and horrible deaths had resulted at all times and in every part of the civilized world, before the discovery that man owed this disease to the domestic animals, can never be revealed, but from the number of cases reported on all sides, as soon as Waldinger's discovery became generally known, a very high mortality can be safely inferred. Here again we have a terrible example of the loss sustained by the disassociation of human and veterinary medicine. The criminal negligence of our State Legislatures to enact laws forbidding the use or exposure of animals suffering from this and other fatal disorders, contagious to man, may be in part charged to the apathy of the medical profession on the subject.

On the subject of tuberculosis, the eradication of which in cattle was to become one of the prime achievements in the entire history of public health, Law urges:

The importance of this discovery of the communicability of tubercle to animals and man, cannot be overestimated, and speaks with trumpet-tongue of the value of comparative pathology to the physician and veterinarian.

With these examples as a basis for his principal argument, Dr. Law goes on to state:

The object of the present paper is to show how much the medical profession may gain from a closer association with comparative pathology and especially from veterinary medicine. Such a connection would accrue even more to the profit of the veterinarian, alike in giving him the status that he ought to possess, and in furnishing him more thoroughly for the practice of his profession. The average veterinarian is, to say the least, no better informed on many of the points referred to than is the average physician, and broader views and sounder practice will come to both from the mutual cultivation of that field which is common to both.

Law recognizes that many rural areas will not support both a physician and a veterinarian, especially if their fields of work are to overlap. He therefore proposes that the veterinarian secure additional qualifications in the area of public health, perhaps more or less akin to the training afforded by the Master of Public Health degree today, for:

If properly educated, he would prove a sounder guardian of human health, from his acquaintance with the diseases of the dependent animals, and he would be a safer veterinary physician for his extensive acquaintance with the pathology of man. . . . For this new field, I propose a new style of practitioner, more comprehensively educated and equipped than either physician or veterinarian—one who has given a longer time to acquire his education . . . [and] has made himself thoroughly acquainted with the diagnosis and treatment of the maladies of man and beast.

It is in the department of sanitary or preventive medicine that the value of the work of the veterinarian is the highest. . . . With animal plagues, the first case of illness is pregnant with a mighty and ever increasing danger, not only to the other stock of the same owner, but to all the live stock in the nation, and even in some cases to the citizens as well.

The veterinary profession at this time, through Alexandre Liautard and the American Veterinary College, enjoyed cordial relations with the Society for the Prevention of Cruelty to Animals and its New York promoter, Henry Bergh. Speaking more or less in the same vein as Law, but perhaps with some bias toward his own more immediate interests, in 1878 Bergh assures the students of the College:

the "Horse Doctor" has disappeared, to be replaced by the veterinary surgeon, who now takes rank by the side of the human practitioner. And I fail to discover, gentlemen, any essential difference between the principles and purposes which underlie the human and animal medical science. . . . The consequences to the public of a better education in the laws of animal medicine, are only beginning to be fully realized.

Not only is the skill of the veterinary practitioner applicable to diseases and accidents of domestic animals, but his learning and experience should be employed by the State in a sanitary point of view. That the national

health is greatly deteriorated by the inhuman treatment of animals while in transit upon railroads and otherwise, by which the flesh becomes vitiated so as to be the source of numerous fatal diseases, no sensible physiologist or surgeon will deny. Can there be a more exalted ambition or duty, than to educate young men to stand as sentinels between the unsuspecting public and the diseases and death which the cupidity of corporations engender?

And Liautard, in editorializing on the need for a veterinary sanitary bureau, criticized a proposal in the medical press which urged the addition of several specialists to boards of health, but which did not include a veterinarian. He argues:

The health of our nation cannot be properly protected by sanitary physicians, engineers, and meteorologists alone, for many of the most destructive diseases known depend upon, or originate in, the lower animals, and it is to those scientists versed in their causes, treatment, and prevention to whom we are to look for protection.

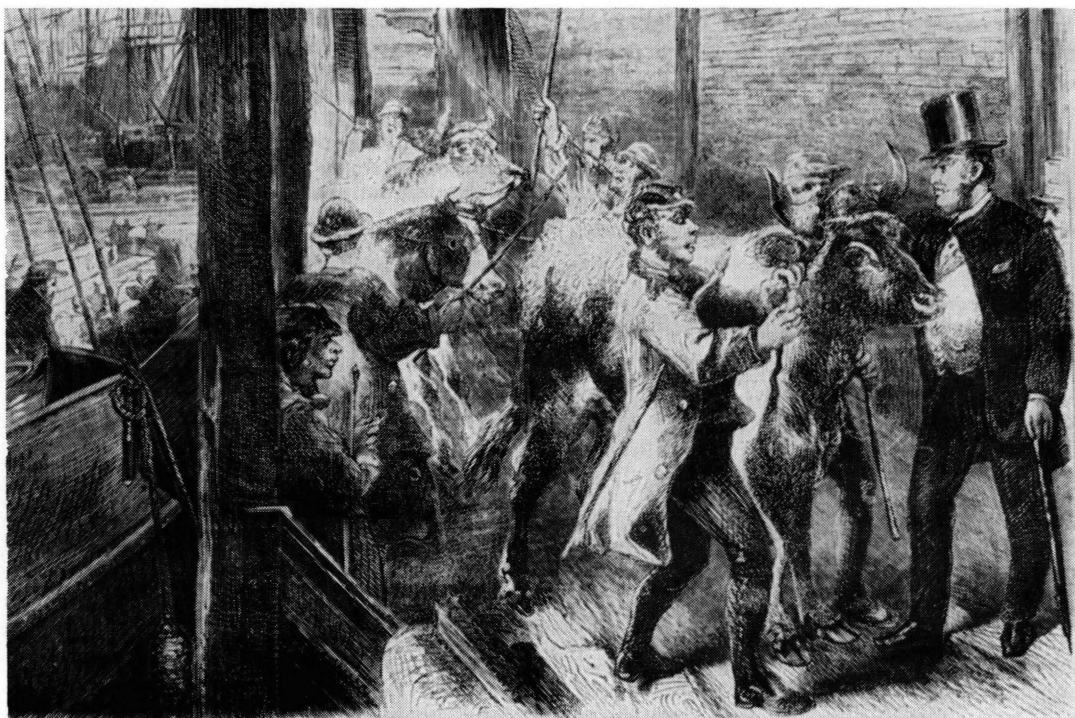
For this reason we would ask that to the National Board of Health be added a veterinary sanitarian, and also that a Veterinary Sanitary Bureau be formed in Washington, to which all State Boards should report.

And speaking later (1879) of veterinary sanitarians:

In the cities of New York, Boston, Brooklyn, and perhaps some others, veterinarians have been added to the Health Boards; but the position has been only an honorary one; the services of the consulting surgeon being rarely called in requisition.

In so far as we know, out of the few States which have established State Boards of Health, the State of New Jersey is the only one in which a consulting veterinarian is appointed. . . . The public health, and individual prosperity and wealth, demands the presence of the veterinarian in all Health Boards; not as an unpaid official, but with a remuneration proportionate to the services rendered.

The American Public Health Association early recognized the veterinary aspects of public health. At the ninth annual meeting in 1881 one session was devoted entirely to veterinary papers, including: "The Contagious Diseases of Domestic Animals," by



Inspection of American cattle arriving at British markets during the 1860's led to the disclosure that some were diseased, and in 1879 an embargo was placed on stock from the United States. *American Agriculturalist*

Ezra M. Hunt, M.D.; "Diseases among Texas Cattle," by Dr. J. R. Smith, an army surgeon; "Examination of Hogs at the New Orleans Abattoir," by Dr. J. M. Partridge; and "Trichinae Spiralis in American and German Hogs," by F. S. Billings. While Hunt recognizes that veterinarians should play a distinctive role in certain aspects of the control of animal diseases, he urges:

Medical men and others of this association should feel these investigations to be as worthy of their labor as those directed to some human diseases. The time has come when medical and sanitary experts should recognize the study of the comparative plagues as a part of their work and devote the closest study thereto . . . be it man or beast, it is a common concern in a common welfare.

ANIMAL DISEASE AND MEAT INSPECTION

In the late 1870's the federal government began to show some belated concern over the fact that foreign governments were on the verge of prohibiting the importation

of animals and animal products unless it was evident that adequate measures were adopted to control the spread of contagious diseases. A circular issued by the Treasury Department in March, 1877, demonstrates just how inadequate was the practically nonexistent system of quarantine:

While the department has no authority under the law to prohibit the importation of horses, sheep and swine, it desires that all measures practicable be taken on the arrival of such animals from the countries named to prevent the possibility of contagious diseases being communicated thereby to stock in the United States.

Great Britain did take action in 1878, and in commenting on "The Cattle Trade Stoppage Bill," N. H. Paaren, later State Veterinarian of Illinois, reported in the *Prairie Farmer*:

The British government has especially notified the United States government that, in

case the latter desires to be exempted from the operations of "The Contagious Diseases (animals) Act, 1878," the lords will require a statement of the laws which regulate the importation of animals into this country, and the method adopted to prevent the spreading of any contagious disease when it exists in any part of the United States.

The reply which the United States Government can give . . . must certainly be one of a most humiliating nature. . . . In the "Revised Statutes of the United States" we fail to find any reference whatever to legislation for the prevention of the spread of infectious and contagious diseases amongst our domestic animals. The few acts that have been passed by some of the states are totally inadequate for the purposes for which they were passed, and most defective also in their operation regarding the prevention of the sale of diseased animals for consumption as food. . . .

We do nothing to prevent the spreading of disease, or to exterminate disease, but eat all our diseased cattle. Instead of qualified veterinarians being employed to check the progress of maladies, the butcher's services are in requisition, or the animals are hurried off to the stock yards or slaughter houses of our larger cities. The traffic in diseased swine is on a larger scale than most people would believe. . . . The state of our meat trade is a disgrace to any civilized country. . . .

One reason . . . is the neglect of veterinary science in this country, and consequently the backwardness of that science. The spread of diseases among live stock in the United States is also facilitated by the totally unchecked trade in diseased animals, and by the absence of all proper means to detect and counteract disease. . . . Veterinary science is in its infancy among us, and for the want of a sufficiently numerous membership of the veterinary profession, the country has not been fortunate in gaining a knowledge of its capabilities. As time wears on the need of educated veterinarians will become an urgent necessity, as veterinary science itself has now become an essential of civilization.

Enter Billings

Regarding the sale of glandered horses in Massachusetts, F. S. Billings, he of the frequently ill-tempered tongue, charges:

No veterinary police inspection exists at the market in question. Yet the good old commonwealth has a Board of Cattle Commissioners, supposed to exercise control over this and other animal pests. We are not entering into a personal war with these Commissioners. Far

from it. The trouble is not so much with them as with the laws and regulations which are entirely inadequate to the business in hand. The Commissioners, only one of whom is active, do not and cannot, single-handed, control these dread ravages. . . .

It is of great public interest and importance to know in how many of our States we have any laws or regulations for the suppression of these animal pests. In 1876, Dr. Bowditch, of Boston, published a very interesting and valuable book . . . entitled, *Public Hygiene in America*. The same is a most condemning proof of our insufficiency in this regard. With reference to laws for the prevention of cattle diseases . . . we find twenty-one States without any whatever; ten States have some regulations; sixteen States are reported as indefinite, and from one illustrious State no information in this regard could be gained. No national laws or regulations of any importance exist, so far as we know. There is no competent veterinary councilor or head in connection with our national government. In advocating a National Veterinary Police, we are well aware, we touch upon one of the most sensitive points, not only of State, but individual ignorance.

On the question of states' rights vs. moral right, he argues:

One can but ask, What is the use of the State of New York spending thousands of dollars to kill out the disease [pleuropneumonia], while New Jersey is keeping a pestilential hot-box by her side? . . . New Jersey, under such circumstances, becomes a nursery from which pestilence may be dispersed all over the country.

In a more temperate vein, regarding: "The Suppression of Contagious Diseases among our Domestic Animals," Billings later suggests:

Veterinary medicine finds its strength and gains public appreciation, not like human medicine, in the gratitude of the patient or his family, but in its ability to prevent, in a measure, individual or great national losses, and, what is still more important, its ability to prevent many serious diseases or unpleasant disturbances to the human organism. . . . What the profession desires, is advancement, as a whole, in public appreciation. In the appointment of Commissions, or, rather, in the manner they have thus far been conducted, this end has been most signally lost sight of. . . .

As practitioners we are but of interest to the customer. As practitioners alone, we can never get beyond the stable door; the back door which enters to the family, to the legislative halls, to public advancement of our body, is not now, and never will be, open to or opened by the practicing veterinarian. It is only when we manifest our ability to save the community from large losses, from contagio-infectious causes; it is only when we demonstrate our ability to become valuable and faithful guardians of the public health, more valuable in many respects than the M.D., that we can look for public advancement as a profession.

Billings was well known to the American veterinary profession before he became a member of the USVMA in 1880, for beginning with the first volume of the *Review*, he had contributed numerous translations of German articles on a variety of subjects. In welcoming him as a "new member of the profession" in 1877, following his graduation with honors at Berlin, Liautard states:

German entirely as he has proved himself in his writings, we cannot expect from him other than Germanized principles. . . . A department for medical and veterinary investigations would give him a great opportunity to apply his extensive and thoroughly acquired knowledge; but, it appears to us, that at the wheel of advancement of veterinary science proper, is his place. . . . We cannot but regret that it may be some years yet before he has joined our ranks.

In a lengthy review of Billings' *Relation of Animal Diseases to the Public Health and their Prevention* (1884), Liautard states:

The work possesses many excellent points, but would have lost none of its value if the language of the author had been, in many cases, less severe, and in many parts uncompromising.

Billings, some of whose work is considered elsewhere, remained the gadfly of the veterinary profession. Associated at various times with the American Veterinary College, the Chicago Veterinary College, McGill University, and the University of Nebraska, it was at the latter institution that

he gained notoriety with his announcements of untenable claims regarding the cause of hog cholera and Texas fever. In 1885, after a period of study with Virchow in Germany, he was for a time in charge of the pathological department of the New York Polyclinic Medical School, the first such appointment of an American veterinarian.

Exit Billings

Retiring to practice in his native Massachusetts in 1892, Billings continued his warfare with the Bureau of Animal Industry, and D. E. Salmon in particular. The USVMA and the veterinary profession in general were prime targets after his expulsion from the USVMA in 1890 for unprofessional conduct. Upon his death in 1912, the magnanimous Salmon, whom Billings had most uncompromisingly reviled, wrote:

Dr. Billings was a man of vast knowledge, but his contrary disposition of mind, his great desire for controversy, and possibly a very nervous and irritable character, prevented him reaching in the profession the position to which his education and facilities seem to give him a claim.

Curiously enough, the stand taken by Billings toward Salmon in 1885 belies the enmity which was to develop. In reviewing the first annual report of the Bureau of Animal Industry, Billings states:

Every unbiased mind must become convinced of several things in reading this report: 1st.—That we, as a profession, have a most creditable representative in Dr. D. E. Salmon, Chief of the Bureau. . . . The report, in every way, confirms the views we have been advocating for the past ten years. . . . At last we have a veterinarian at Washington who is not afraid to publish the exact condition of things in his report.

An examination of the early writings of Billings demonstrates the promise he exhibited as a prospective member of the veterinary profession. While yet studying at Berlin in 1879 he contributed an article to the *Review* concerning the proposed

National Board of Health in which he expressed alarm over the omission of a veterinarian from the roster of personnel. His description of the qualifications requisite for a veterinary member of this board would suggest that he had himself in mind, but this does not alter the merits of his argument. Undoubtedly, he was one of very few veterinarians at the time whose training reflected the breadth of vision and abilities such a position would require.

Such a veterinarian, Billings claims, should be a comparative pathologist in the true sense:

Numerous mistaken writers have spoken of veterinary pathology as comparative. We have veterinary and human pathology. The union of both, and comparison of the results of both forms of investigation is true comparative pathology. . . . We are fully aware of the difficulties the nation would find, in searching for a man equal to the emergency . . . [but] we will say at once, the man can be found, and a veterinarian at that.

Concerning the qualifications of such an individual:

First, he must be a gentleman; further, he must be well educated in the rise and progress of medical art and science, and of the difficulties which have been overcome. He must be at home in the history of his own profession in every land, and he must be able to exert a healthy judgment over the stand of veterinary medicine in those lands. He must know why it is that his profession has been always in the back-ground, why in most lands it is still holding religiously on to the skirts of the last century. He must be an American in the true sense of the term. He must be impregnated with the scientific spirit of the day, and with fore-seeing ability suiting him to mould things for the future. He must be at home with the various forms of American life, and have power to mould these forms for the good of the whole. He must be a gentleman of culture, a philosopher, as well as a mere technicalist. He must be acquainted with the entire veterinary police laws and systems of the world, and, if possible, have lived more or less in them. He must have an organizative ability of the highest stamp, for he has almost single handed to lay the foundations of a veterinary educational and police system, and woe betide him if he fails.

Such is the irony of fate that Billings probably little realized he was describing, to a greater extent than any other living veterinarian, the man whom he was to make his "arch-enemy," D. E. Salmon, who as first Chief of the BAI initiated and directed many of the functions visualized by Billings.

Meat Inspection

In editorializing on the matter of veterinarians on boards of health, Liautard states in 1879:

While we are not over sanguine as to the probability of our suggestions being at this time acted upon, there can be no doubt as to the ultimate recognition of the importance of veterinary science in conjunction with this all important subject; and soon or later the veterinarian will find his knowledge in requisition by health boards. Especially needed are veterinarians as meat inspectors, for no other can be so well fitted to detect the presence of disease in the animal intended for slaughter, or the evidence of its previous existence in the meat that is offered for sale. . . . It is a notorious fact that where deficient inspection exists, the avarice of unprincipled dealers imposes upon the unsuspecting public, meats unfit for human food. . . . To fully protect our people . . . necessitates the employment of inspectors who possess greater qualifications than are found in the common police officers usually detailed for such duties.

In an editorial on "Veterinary Inspection of Meat" in 1883, Liautard states:

While considering the question of the regulation of sanitary veterinary medicine, we are brought to the consideration of the relations existing between the veterinarian and the public health in connection with the inspection of meat in reference to its fitness for human consumption as food. . . . How are our Meat Inspectors appointed? What amount of knowledge are they required to possess? With one or two exceptions, outside of New York, are the persons appointed qualified for the position? We reply without hesitation, they are not. Politicians, police officers, and butchers are those who receive the responsible office which empowers them to condemn or approve the meats brought to market for public consumption.

The days are gone when veterinary medicine in the United States consisted only in the treat-

ment of diseased animals. The days of the old-fashioned "horse doctor," and "cow-leech," are gone by, and within a few years the veterinary profession has taken a foothold amongst us which must become more and more assured every day, and more widely accepted by the public.

In a one-man crusade to warn against the dangers of trichinosis, F. S. Billings published a series of articles on this subject in the *Review* from 1881 to 1883, noting that in general the intimate connection between certain human and animal diseases:

is a subject which has been left, until the past few years, too much out of consideration, not only by the public itself, but by those who are especially employed in the study of the question of public hygiene. . . . We are living in the day which marks the birth of systematic attempts at the development of preventive medicine.

After noting a number of deaths from trichinosis in the United States, Billings charges:

Neither the law nor the community recognize the existence of any such disease. . . . Even our Boards of Health simply recognize the existence of the parasites in pork as a scientific fact, but take no steps to prevent its sale. All the hogs examined by myself were cut up and sold, even though the Massachusetts Board knew that I was continually finding trichinae among them. . . . Until the public becomes alive to its own interests, we may be sure no steps toward prevention will be taken by the State.

The subject of meat inspection continued to be discussed, but with little in the way of concrete action resulting until passage of the first meat inspection law in 1891. In 1892, W. L. Williams charged:

During the whole period of human history probably no other vital science has been allowed to drop so far behind its associates nor suffer so seriously from a long and baneful dormancy as the inspection and control of the flesh and milk of animals intended for human food . . . [but] we now have abundant promise that meat and milk inspection will soon occupy a highly honorable place in the front rank of the sciences holding a vital relation to human life, health and happiness. . . .

In our opinion meat and milk inspection should be carried out primarily in the interests of the intended consumers of the food products, and not, as is too often the case, in the interest of the producer. . . . The prime obstacle to effective meat and milk inspection has ever been and will continue to be the irrepressible and unavoidable conflict between the consumer, and upon a scientific and practical adjustment of these interests must meat inspection rest if it is to succeed.

He notes that the recently enacted federal inspection laws "appear to be, in most respects, adequate and beneficent." Experience was to show, however, that this was not the case. The story is resumed under the activities of the Bureau of Animal Industry.

Regarding the restrictions placed by foreign countries upon the importation of American pork products, the *Review* had noted in 1881:

The widespread prejudice against American meats can be adequately met and overcome only by a rigid system of official inspection by competent experts, appointed by the National or State Government, and empowered to use a seal or other device representing Governmental authority. In the European mind, an official seal is inferior in potency only to the edict of Royalty itself. . . . The European meats with which our own come into competition are nearly all officially inspected, and until American hams and bacon bear the official examination, they will be, in presence of existing prejudices, at a serious disadvantage in the markets of the Old World.

One Nuisance vs. Many

An inventory of the dead animals received at the New York docks for the year, ending March, 1882, reveals some 8,000 horses, 150 cows, 200 sheep, and 23,000 dogs:

An inquiry might be made, where are the hogs which died in New York, or are found dead in the trucks of the railroads which bring so many of those animals into the metropolis — are they turned into hams and sausages? Our Board of Health might enlighten the public in answering the question.

The following year at least a few hogs seem to have been unfit for whatever pur-

poses they may have been utilized previously, for the inventory lists: horses 6,354, of which 2,118 were killed by the S.P.C.A., cows 187, steers 21, calves 816, sheep 531, cats and dogs 13,367, mules 24, goats 128, hogs 21, colts 23, snakes 2, buffalo 1, seal 1, monkeys 2. Also at this time:

The manure nuisance in New York is the most troublesome problem that the Health Board has to solve. The secret of the trouble is that the manure is worth money, and that its price has been raised until its value is fictitious. The owners and keepers of horses are responsible for the nuisance, and they should be compelled to see that the manure that is produced leaves the city. At present the stable owners say that it is better to have one nuisance — the manure mound at the foot of East Forty-fifth street — than to prohibit the cartage of manure to it, and thus make a nuisance of every stable in the city. One thousand loads of manure are produced in New York every day. The Health Commissioners insist that it must not be allowed to accumulate either at the stables or at the dumps.

Of the 10,000 horse stables in New York City in 1880, A. S. Heath, M.D., writes:

Not more than one in a hundred is in perfect sanitary condition. About one-quarter of the horses are kept in dark, damp stables, or places equally bad. These are the direct sources of most of the mortality of our city horses. As compared with the mortality of stables on the first and second floors, the mortality of the cellar stables is about as ten to one. . . . Of the two thousand cowstables, there are not ten which are in sanitary respect perfect. . . . Many of the city-kept cows sooner or later suffer from tuberculosis, because of the bad sanitary condition of the stables. The average life of the city cow is less than a third of that of the country cow.

Milk Inspection

The subject of milk inspection also received due notice in the 1880's. Writing on "The Milk We Use and the Source It Comes From" in 1881, Dr. McLean states:

The time is fast approaching when society at large will expect and demand more of the veterinary profession in the way of certifying as to the healthy condition of the animals slaughtered for their use, and particularly that

the animals supplying us with so important and extensive an article of diet as milk, be properly fed, housed and of a healthy condition. . . . There is a great and immediate necessity for a radical reform. . . . Doubtless the lactometer will detect the presence of water in the milk. But I have seen cows milked in this city in such a diseased condition, that the mixing of water with their milk would be the reverse of a crime. . . .

Nothing but a periodical scientific inspection — without fear or favor — of physical condition of dairy cows can remedy the present deplorable state of matters. . . . Had our general public an accurate conception of the diseased condition of the animals in our cities that supply their tables and families with milk, there would be an unanimous and immediate demand for reform.

McLean states that a number of local boards of health had ordinances prohibiting the sale of milk from cows fed on swill, or from diseased animals, but these were "a dead letter, for the very good reason that said Boards have no competent officers on their staff to regularly visit and examine these cows as to their physical condition."

In 1856 the first milk law had been passed by Massachusetts prohibiting the adulteration of milk, and in 1859 the first milk inspector was appointed in Boston to enforce a regulation against the feeding of distillery slops to cattle. In 1864 Boston prohibited the use of milk from diseased cattle. Washington, D.C., legislated against insanitary cow yards in 1863 and against adulteration of milk in 1871, but the first dairy inspector was not appointed until two years later. There is no indication that veterinarians were appointees to any of these positions. The first city to authorize the inspection of dairies appears to have been Newark, New Jersey, in 1882, followed by Washington, D.C., in 1895, New York in 1902, and Chicago in 1904. By 1909 the number of cities having dairy inspection rose to 36, but five years later this number was reduced to nine. Regular bacteriological examination of milk was first undertaken by Montclair, New Jersey, in 1900. Chicago, in 1908, was the first city to require pasteurization of all milk except that from tuberculin tested cows.

In 1883, perhaps somewhat prematurely, Liautard noted:

When the first Board of Health in the United States was organized, a few years ago, in New York, and a proposition to appoint veterinarians on the Board was made, it was received with ridicule and sarcasm. The recommendation that "horse doctors" should be employed by the State in connection with an organization having for its object the care of public health, was treated as the wildest of absurdities. How changed is all this to-day; and how different the popular appreciation of the competent and educated veterinarian!

While a few veterinarians had been employed by health boards prior to 1880, a notable advance was the creation in 1884 of the position of "Veterinary and Food Inspector" by the Department of Health of Brooklyn, "and the filling of such by a regular graduate of veterinary medicine only." Liautard comments:

At last the time has come when educated veterinarians will have their recognition in Boards of Health — no more as a compliment, but as regularly appointed officers.

Later that year it was announced that an examination for the position of Assistant Inspector was held by a board consisting of four physicians and A. Liautard. Of the four applicants, R. A. McLean and W. H. Hornblower, both A.V.C. graduates, were appointed. R. A. McLean was the son of Lachlan McLean, M.R.C.V.S., who was Veterinary Inspector of the Department of Health of Brooklyn, but there would seem to have been no basis for any suspicion of nepotism in either appointment. Like any conscientious mentor, however, it undoubtedly pleased Liautard to see two of his recent charges, one the son of a close associate, get the nod.

It is apparent that Liautard's urging that veterinarians seek employment as sanitarians found fruit in other graduates of his school also. In giving the history of the A.V.C. Alumni Association in 1884, W. H. Hoskins states:

On State and city boards of health five graduates from this school have given efficient

service, and their usefulness and worth in this regard has many times shown itself in remarkable proportions. . . . The outbreak of glanders in Newark, N.J., that so long existed as a calamitous danger to her people and the noble animals that must ever do man's bidding, was moved upon by one of our number [Julius Gerth], and to his vigilance and persistency, in that they have placed the disease under the most rigid control, much credit is due. Many such instances could be enumerated, alike the preservation of our infantile population from the dangers of tubercular and otherwise tainted food and milk. Their vast usefulness in this direction is a subject for much deliberation among us, and we should not wait for boards to call us to these positions, but we should constantly agitate among the people their necessity, and thus arouse them to demand such representation for their safety and welfare.

Passing on to a finer subdivision, one from among our number [Thomas Rogers] is now officiating as Milk Inspector for a large district. . . . From his reports I garner a large and varied number of methods of adulterating and doctoring milk. . . . Another fills the position of Meat Inspector, and I am sure but a few years will elapse when the history of this Association will count scores of her men filling similar positions.

In a long article in 1886 on "Milk — From a Medico-Sanitary Standpoint," Rogers states:

The pump has been from time immemorial the milkman's best friend. Water is added in all proportions, from the lump of ice placed in the can without dishonest intentions, to the 60 per cent of water and 40 per cent of milk peddled by a dealer in New Jersey who, when caught, was selling 34 quarts off a yield of 14. How can this fraud be detected? In a limited degree it cannot be detected at all — we must grin and bear it.

On milk as a cause of disease, Rogers says:

Milk may communicate disease to man in several ways: it may undergo alterations, fermentative in character, through the presence of lowly forms of life, and thus acquire poisonous properties; it may be the vehicle by which vegetable or mineral poisons are introduced to the human stomach after having first, so to speak, been filtered through the cow. It may carry to mankind germs of certain diseases having origin in the lower animals; and lastly, it may, after being drawn from the body, act as a carrier, and possibly as a culture liquid,

for diseases affecting only the human species. It is important that we should bear in mind that the death rate does not depend so much on diseases well known in character, whose origin can easily be traced, as on the pernicious lowering of the vitality of the mass of the people through causes ill ascertained or obscure.

Rogers urges that the commercial dairies, largely swill-feeding establishments, in the cities be abandoned:

These cattle, when sick, are milked as long as milk can be drawn from the udder, are stuffed with grains—and those often in a state of decomposition—to increase the yield, and it is more by good luck than good management if the water supply is not contaminated by human or animal excreta.

If these dairies cannot be suppressed, he contends, at least they should be rigorously regulated, “and every infraction of the sanitary code promptly punished by fine, publication or revocation of the license.”

Conditions in the stables of private individuals were often not much better — if at all good. Rogers mentions being called to treat a patient where “on a lot 20 x 80 feet, were congregated seven human beings, one horse, one cow, three pigs, one goat, a number of ducks, geese, fowls, and rabbits, and several dogs and cats.”

In the same year, 1886, Billings states, concerning bovine tuberculosis in man:

Among the external causes, and certainly among the most important, is the food we eat and milk we drink, especially when the latter is the sole nourishment which we give to so many babes. . . . No part of such [tuberculous] animals, or any derivatives from them, should be sold for human food; yet thousands of them are, and hundreds of quarts of milk from diseased cows dispensed over our cities, or ignorantly consumed by the people themselves.

In 1888, the New York City Health Department recommended what Billings had urged for preventing the spread of tuberculosis: “First, the security of the public against tuberculous meat and milk, attained by a system of rigid official inspection of cattle.”

Lachlan McLean, Veterinary Inspector

In his annual report to the Commissioner of the Department of Health of Brooklyn in 1883, Lachlan McLean states:

In this, my annual report as Veterinary Inspector to your Board, I beg to particularly draw attention to the continued and increasing prevalence of contagious pleuro-pneumonia amongst the milch cows of the city and the immediate surrounding district, with the hope that you may be able to bring some concentrated action to bear to stamp out a disease that is financially ruining those who are locally engaged in the trade, supplying our families with unwholesome milk, and many of our butcher shops with beef, if not directly dangerous, certainly in the highest degree non-nutritious.

He gives an extensive history of the disease and recommends inoculation, saying that while slaughter would be the best method to extirpate the disease, this would ruin industry locally. In this he no doubt was acting with sincere convictions, but it may be doubted that his recommendations were in the best interests of either the veterinary profession or the public.

McLean mentions his “official capacity as Veterinary Inspector . . . for a number of years,” and that his “active connection” with the commission appointed in 1879 to investigate pleuropneumonia, qualifies him to state: “There is in the Union no other city of the same extent, in which the milk-producing stock is so extensively affected with contagious pleuro-pneumonia.” He claims that 10 per cent of the 5,000 cattle in the 450 stables in Brooklyn, were affected, and “at least eighty per cent of the stables are of themselves permanent centers of contagion, and that beyond the control of disinfectants.”

Although he recognizes slaughter as the most certain method of eradication, he says this will be too costly: “To stamp out the disease by this process would necessarily entail the entire destruction of the various stables as well as their occupants.” He believes, therefore, that an “obligatory and systematic” system of inoculation, as advocated by Fleming in England, would be

the best procedure. He agrees with Fleming that:

This pitiless and continued slaughter of diseased cows, and the terrible embarrassment to agriculturalists which the present fruitless measures produce, will soon become little short of a crime, in presence of the absolute immunity and humanity which are the attributes of protective inoculation.

Experience was to show, however, that the policy adopted by the Bureau of Animal Industry in ruthless slaughter of affected and exposed animals was the proper answer to the problem in the United States.

In writing on "The Veterinarian as a Sanitarian," McLean urges in 1885:

the communities amongst which we live have a right to expect that we will act actively and intelligently as sanitarians, in protecting them against the dangers of contracting, either by inoculation or ingestion, any of the many contagious or epizootic diseases to which our patients are liable. . . .

The practice of some Boards of Health, in employing medical men to do the work of the veterinary sanitarian, is not creditable to either profession. . . . Let our profession so advance that we will be considered an indispensable part of every well organized department of health, for not alone local but also national interests depend upon the vigilance and painstaking of the qualified veterinary sanitarian.

In addition to supervision of stables and dairies to prevent the spread of disease, he specifies:

The system of delivering milk in private cans to families should be prohibited; these cans being frequently taken into the sick room and there opened, returned to the dairy to be cleansed, still retaining a certain portion of the contents, after being exposed to the contaminated atmosphere of the sick chamber, to be handled and cleaned by the hands of the person who takes an active part in the next milking. . . . Before milking the teats and udder should be cleaned with a cloth and water kept for that purpose. One has only to see the contents of a milk pail before the milk is strained to appreciate the necessity of this arrangement.

What about the milk of diseased cows? I have no hesitation in saying that the milk of an animal affected with any contagious disease, whether zymotic or septic, should be con-

demned. . . . As to the advisability of using the flesh of animals affected with a contagious disease as an article of diet: Many of our profession are in favor of rejecting all such animals as being unfit for human consumption, while others advocate the rejection of only certain portions of the carcass. . . . [with] the idea that certain parts are good and others bad. Is it not more rational and consistent that all are bad, but certain portions are worse?

In 1884 the *New York Medical Journal* had reported:

The inspection of meat in New York is in a fair way to be made much more thorough than it has been heretofore, bills having been introduced into both houses of the Legislature providing for the appointment of five inspectors of meat by the Board of Health, and making it a punishable offense to offer for sale any meat that has not been inspected by them, the inspection to be repeated every second day until the meat is sold.

But this, of course, was not yet law. At a meeting of the New York State Veterinary Society in 1885, where McLean's paper was read, Liautard:

was pleased to pay a just tribute to the city of Brooklyn, and he regretted to say that it was ahead of his own city, that of New York, which had not yet thought proper to recognize the veterinarian as a sanitarian. Brooklyn and Newark, N.J. were the only two cities where the profession were recognized by the Board of Health.

McLean contended:

the medical gentlemen who were called upon to act as milk inspectors, knew nothing whatever about the diseases of the animal that gave the milk, although they could easily tell if there was much water in it, and that was about all they could tell.

He also stated that he knew of a herd of 90 cows, from which butter was sold at a premium in New York:

that had for the last three or four years been affected with tuberculosis, so that during that time, three or four had died each year from that disease.

The Society adopted a resolution to bring the matter of recognition of the veteri-

narian as a sanitarian to the attention of the New York Board of Health.

Clement on Consumption

In 1890 A. W. Clement, a graduate of the Montreal Veterinary College, and a one-time associate of William Osler, addressed the Maryland State Veterinary Medical Society, at which meeting W. H. Welch, M.D., of the Johns Hopkins University was present. Clement claimed:

As members of the veterinary profession, it is our right and privilege to advise the public upon questions of public health which are, beyond doubt, connected with the consumption of meat and milk, and the association of man and animals. . . . A disease which costs more lives by far than any other, is tuberculosis, or what is commonly called consumption. One person in every seven born into the world dies of this disease. . . .

How often, in our own profession, do we see . . . animals gradually lose in flesh and in the flow of milk, until they finally die, or become so valueless as to pass from the rich man's stable to the shed of one who is, to a great extent, dependent upon his cow to give him milk upon which to rear his family. . . . Then, too often, after she has been milked until, from the steady advance of the disease she ceases to produce enough to pay her keeping, the glue factory is cheated, at the expense of the citizens who buy her in small pieces at the stalls in our market places. Of course this is not first class meat, but it forms a very considerable proportion of the meat from which sausages are made.

Clement then goes on to outline the recommendations of the International Veterinary Congress, held at Paris in 1889, concerning meat inspection. This program is essentially that which later was followed by the federal meat inspection service in this country. He also outlines the resolutions adopted at the twenty-sixth annual meeting of the USVMA, which condemned the use of milk or meat from tuberculous animals, urged the employment only of veterinarians as inspectors, and the periodic inspection of cattle in all dairies supplying municipalities. Although he thinks it improbable that such a system could be adopted immediately, in part because of the division of opinion on the dangers of

consuming meat from diseased cattle, he strongly urges:

No such difference of opinion exists as to the milk supply. Tubercle bacilli have been demonstrated in the milk from tuberculous cows, even when there were no lesions in the udder. Such milk is no doubt to blame for much of the tuberculosis seen in young children.

In discussing Clement's paper, Dr. Welch agrees:

We must regard the milk of tuberculous cows as dangerous and to be rejected for food . . . [but] the positive statements of veterinary and tuberculosis congresses as to the rejection of the flesh of tuberculous cattle and the views expressed in popular and alarmist articles on this point are not at present warranted by our knowledge of the facts. . . . This does not, however, lessen the importance of proper sanitary inspection of slaughtered animals, for there are many other diseases besides tuberculosis that can be conveyed by the use of diseased meat.

There should be no differences of opinion as to the desirability of the measures for inspection of food advocated by Dr. Clement. Public health demands that such sanitary inspection be adopted. It is clear that no efficient inspection of the meat supply can be secured until the law forbids the slaughtering of cattle, swine and sheep in a multitude of private establishments. It is absolutely essential that the reform should begin with the establishment of one or two abattoirs where alone it is permitted to slaughter the animals named. This measure, like many others for the public good, is inimical to certain private interests, and here lies the only opposition to it. As soon as the public is sufficiently informed as to the good which will be accomplished by the sanitary inspection of the meat supply, it is certain that these private interests will not prevail and that this community will adopt the only policy which can commend itself to an enlightened public.

Thus it is evident that the advocates of an adequate food inspection system had a strong ally in Dr. Welch. One of Welch's colleagues, W. T. Councilman, concurs with the sentiments expressed, but is of the opinion:

We are so accustomed to tuberculosis, it is so much with us that we have come to accept

it as a matter of fate and do not lift our hands in an attempt to mitigate its ravages. While it would, no doubt, be impossible to exclude all the sources of infection, still, many of them can be.

Dr. James Stewart, City Health Commissioner of Baltimore, indicated that he had advocated a law, "creating Inspectors of Food, especially of meat and milk," for the past ten years, and that these inspectors should be veterinarians, "but all in vain up to the present time. I do not despair, however, and shall continue my efforts in this direction in spite of all opposition."

A lawyer who had been invited to discuss the subject from the legal standpoint, states that three boards having jurisdiction in this area had been established: a State and a City Board of Health, and the State Live Stock Sanitary Board, the latter with William H. Wray as Chief Veterinary Inspector. But despite the fact that these boards had considerable arbitrary powers:

our laws are at present wholly inadequate to protect us from the dangers so vividly pointed out by Dr. Clement. . . . It would seem that our law-givers never had in contemplation the possibility or the danger of the communication of disease to the human family by infected meat or milk used for food. . . . To be sure, under the head of "Markets," in the City Code, there are two sections, imposing fines of twenty dollars, respectively, for selling unsound meat or milk from diseased cows. The enforcement of this, like the other provisions of the law relating to the markets, is left with the clerk of the market. How far the scientific and professional attainments of that officer enable him to detect and prevent the sale of the meat or milk of an animal with tuberculosis, I leave others to determine. . . . One, if not both, of the Boards of Health should include a competent veterinarian, whose duties should be especially directed to the inspection of our meat and milk food supplies.

George C. Faville, of the BAI, adds a point of information: "Of 163 stables supplying milk to this city, containing 2,160 cows . . . over 10 per cent of them show well-marked evidence of tuberculosis." With this as a basis, he then outlined a resolution to the state legislature and the

city council urging centralized slaughtering with adequate inspection, and the periodic inspection of cattle in the dairies.

The subject of this meeting is considered at length not only to demonstrate that veterinarians were aware of the situation and had a program to offer, but that they met with rational and sympathetic treatment, at least in some cases. As a major stumbling block to expediency in adoption of such a program, however, it is evident that most of those present — at this, and presumably other such meetings — recognized the proverbial slowness of legal processes which were utilized by private interests to insure the continuance of their own private advantage. The apathy of the public can perhaps be understood — at this time it was not well informed on the matter; but even after the matter was fairly put to the public, little enough was done. It required the lurid revelations of *The Jungle* (1906) to arouse a dormant public spirit.

Public Health Legislation

The Public Health Law of New York State in 1895 provided for the employment of veterinarians by the State Board of Health as deemed necessary. The board had the power to condemn cattle for tuberculosis:

but no such diseased animal shall be so killed on account of tuberculosis unless first examined by a veterinary practitioner in the employ of the State Board of Health.

After appraisal, "the veterinary practitioner in charge thereof shall forthwith make a post-mortem examination." If affected, half the appraised value (not exceeding \$60 for a registered animal, or \$25 for a grade) was to be paid the owner; if no lesions were found, full appraised value was to be paid.

In the case of glanders in horses, however, local boards of health were required to kill every infected animal found:

by employing a competent veterinary surgeon or other person or persons, who, in their judgment, are competent to pronounce upon the nature of the suspected disease.

Local boards were cautioned against "too hasty judgement, and advised to use every precaution to insure a correct determination as to the nature of the disease." Animals so killed were to be buried three feet deep, and all infected quarters and equipment disinfected.

"Sanitary regulations recommended for adoption by local boards of health" included restrictions against throwing offal, dead animals, and the like:

upon any street, road or public place, and no putrid or decaying animal or vegetable matter shall be kept in any house, cellar or adjoining outbuilding for more than twenty-four hours.

Prohibited for human consumption was "any flesh of any animal which died by disease, or which was at the time of its death in a sickly or unwholesome condition," or the meat of calves under four weeks of age, or of lambs under eight weeks, or of pigs under five weeks. Slaughtering within the limits of the municipality was to be carefully regulated. Also:

No animal affected with an infectious or contagious disease shall be brought or kept within the limits of this municipality, except by the permission of the board of health.

Bodies of such animals were not to be buried within 500 feet of a residence.

The Sanitary Code of the Board of Health of the City of New York, adopted in 1873 and amended to 1896, was considerably more specific in its provisions. Slaughtering of animals was prohibited "while in an overheated, feverish, or diseased condition," as was the offering of:

meagre, cased, blown, plaited, raised, stuffed, putrid, impure, or unhealthy or unwholesome meat or fish, birds, or fowl . . . unwholesome, watered or adulterated milk, or milk known as swill milk, or milk from cows or other animals that for the most part lived in stables or that feed on swill, garbage, or other like substances; nor any butter or cheese made from any such milk, nor any unwholesome butter or cheese.

Inasmuch as many of the provisions of such laws are designed to put a stop to

specific abuses, it is of some interest to note that the regulations for slaughter included the proviso:

That no cattle [meat animals of any species] shall be slaughtered, dressed, or hung . . . wholly or partly within any street, avenue, or sidewalk, or public alley or place; nor shall any blood or dirty water, or other substance from such cattle . . . be allowed to run, fall or be in any such street, etc.

Somewhat less astute were the regulations concerning rabies:

every animal which is mad or has the hydrophobia, or shows symptoms thereof, shall, by the persons owning the same . . . be at once killed; and every animal that has been exposed to such disease shall be at once confined.

Contributions not Welcome

The removal of manure from the horse and cattle stables within the city was quite a problem — as the protestations of residents near the river, where much of the manure was taken for the voyage to New Jersey would attest. Daily removal of manure and stable refuse was required, "unless the same are pressed in bales, barrels or boxes . . . to not more than one-third of the original bulk." Not only was the accumulation of manure in piles prohibited, but, "No person shall contribute to the making of any such accumulation."

Owners with animals having glanders or farcy were required to report the same to the board of health, and removal was under board supervision, whether the animal was dead or alive at the time. And any animal found by an inspector on the streets:

injured or diseased past recovery, for any useful purpose, and not being attended and properly cared for by the owner . . . or not having been removed to some private premises, or to some place designated by some officer or inspector, within one hour . . . may be deprived of life by such officer or inspector.

The only specific mention of veterinarians is in a provision requiring:

That every veterinary surgeon who is called to examine or professionally attend any animal within the City of New York having the glanders or farcy, or any contagious disease, shall within twenty-four hours thereafter report in writing to the Board of Health of such city the following facts, viz.: 1. A statement of the location of such diseased animal; 2. The name and address of the owner thereof; 3. The type and character of the disease.

Massachusetts Consolidation

From the early days of the colonies, various towns in Massachusetts — Boston in particular — had had ordinances concerning animal matters as they relate to public health. And from the 1850's the Massachusetts Cattle Commission, long headed by E. F. Thayer, had done yeoman work in the eradication and control of animal disease. By 1895 "an Act codifying and consolidating the laws relating to contagious diseases among domestic animals" appears to have been a necessary and logical step toward uniform regulations throughout the state. The principal personnel called for by the act include "one or more persons to be inspectors of animals and provisions," appointed by the local authorities for each town, and the Board of Cattle Commissioners, appointed by the governor of the state.

In neither case is there any mention of the qualifications of these individuals. The work of Dr. Thayer, of course, had forcibly demonstrated the merits of having a competent veterinarian as head of the Cattle Commission, and the Commission employed a large number of veterinarians in its programs. The scope of its duties makes it obvious that it could function well only under the direction of a veterinarian with broad vision, such as Thayer who began work with the Commission in 1859 and was a member of it for nearly twenty-five years, most of this time as its head.

The Commission was charged with:

power to make from time to time orders and regulations concerning the extirpation, prevention and suppression of contagious diseases among domestic animals, or concerning the destruction, care and treatment of animals af-

fectured with, or which have been exposed to, any contagious diseases.

In this the Commissioners had the same powers delegated to local boards of health, including:

regulation of inspection of animals and of carcasses, meat and its products; quarantine, killing, burial and disposal of animals or carcasses . . . [and] cleansing and disinfecting of districts, buildings or places.

This was to apply in cases of animals affected or exposed to contagious diseases. Local boards of health were required to "carry out and enforce all lawful regulations, orders and directions of the Board of Cattle Commissioners or any of its members."

How many "inspectors of animals" for local boards of health were veterinarians is unknown, but from the duties of these individuals it may be surmised that those towns were best served which sought a veterinarian for the post. While the remuneration — a maximum of \$500 annually — may not have been attractive, the opportunities for service were unlimited. Duties required the ability to determine the existence of contagious disease as well as, on a local basis, practically all those delegated to the Cattle Commission. The only specific mention of veterinarians, however, relates to the duties of citizens to report any suspicion of contagious disease among his or his neighbor's livestock, in which case:

such board of health shall forthwith cause such animal to be inspected by an inspector, or by a competent veterinarian appointed by them for that purpose.

And upon consent of the owner, tuberculin could be used as a diagnostic agent "upon any animals condemned as tuberculous upon physical examination by a competent veterinarian."

Livestock Sanitation in Maryland

The Maryland law of 1888 establishing the State Live Stock Sanitary Board, speci-

fied that the three Commissioners be “practically engaged in the breeding of live stock.” Together with a “Chief Veterinary Inspector,” the first appointed being A. W. Clement, the duties of the Board were similar to those of the Cattle Commission of Massachusetts. However, Maryland provided but \$3,000 annually plus \$5 per diem and expenses for the Board plus \$1,000 salary for the veterinary inspector; Massachusetts appropriated \$100,000 for its Commission in 1895. Thus it was with some prescience that the Maryland law made specific provision for cooperation with the BAI. A few features of the Maryland law worthy of mention include:

the duty of all persons practicing veterinary medicine in this State to report immediately to said Board all cases of contagious or infectious disease among live stock which may come to their knowledge.

Penalty for failure to report was a fine up to \$50. Also under penalty of \$100–500:

it shall be unlawful for any person to inoculate any animal in this State with the virus of any infectious or contagious disease incident to animals, without the consent of said Live Stock Sanitary Board.

A strong provision of the law was the prohibition against any person disposing of, or maintaining in other than a fenced enclosure, any animal:

which he knows, or has good reason to believe, is affected with any contagious or infectious disease, or has been exposed thereto within ninety days . . . [or] to wilfully expose any animal to others affected with a contagious or infectious disease . . . on any premises which have been declared to be infected.

Infractions carried a penalty of \$100–500, and slaughter without indemnity of all exposed animals.

Others in the Act

At this time, Montana probably had the most detailed laws regarding animal disease and related problems, and provided for a State Veterinarian at a salary of

\$2,500; he was appointed for two years, and had to post a bond of \$5,000. Before slaughtering animals only exposed to disease, “the Veterinary Surgeon must call in consultation with him two practicing veterinary surgeons or physicians,” and obtain written consent from at least one. Otherwise the duties and authority of the State Veterinarian were similar to those defined in the Massachusetts and Maryland laws. One provision of the Montana law — presumably difficult to enforce — was the prohibition of disposal by any means (including slaughter if any part was consumed by other than the owner) of animals:

affected with, or suspected of being affected with, contagious or infectious disease . . . or known to have been affected with or exposed . . . within one year prior to such disposal.

It may be surmised that at times convenient lapses of memory might have been invoked prior to wielding the poleax.

An Alabama law of 1887, “for the prevention and suppression of infectious and contagious Diseases of horses and other animals,” and consisting of only one paragraph, specifies no mechanism for its enforcement. Apparently it did give private citizens the right to redress “before any court of this State.”

The Pennsylvania act of 1895 establishing the State Live Stock Sanitary Board gave the Board, which included the State Veterinarian, broad powers “for the prevention, suppression, control or eradication of dangerous, contagious or infectious diseases among the domestic animals.” In 1898 breeding cattle imported into the state had to be proved negative to the tuberculin test.

A Virginia act of 1896 invested the Experiment Station of the Virginia A. & M. College with broad livestock sanitary powers, and specifically charged the Experiment Station veterinarian with the discharge of these. Of some interest is the proviso:

That the disease known as tuberculosis shall be classed as a highly contagious and infectious

disease, and such measures shall be taken by the Board and its authorized veterinarian as to them may seem necessary to eradicate and prevent the spread of said disease.

Twenty Questions

The Pennsylvania civil service examination for the position of meat inspector in 1896 included (in abridged form) the following questions:

State the influence of cold storage on quality and preservation of meats. Describe the alimentary canal of a cow. Define myocarditis, exostosis, ascites and septicemia. Give the cellular elements of the blood and their functions. What lesions simulate tuberculosis? Describe the condition of a slaughtered carcass of a healthy animal; of one suffering from an infectious disease; of one that died a natural death. Under the present law what disposition is made of diseased meat?

In the same year the civil service examination for the position of consulting veterinarian for the city of Philadelphia included the following:

What diseases are directly transmissible from animals to man through consumption of meat? What conditions render meat dangerous as food where disease is not directly transmissible. Describe the causes and lesions of actinomycosis. How may the approximate age of a veal carcass be determined? Give the method of examination for trichina. Mention seats of tubercles in cattle in order of frequency of infection. How may horse meat be distinguished from beef?

Some of the answers may have changed over the years, but the questions would appear to be still valid — at least some of the same ones appear on similar examinations today.

State Veterinarians

Coincident with efforts to establish a national veterinary bureau, legislation was proposed in several states for the creation of the office of State Veterinarian, such bills having been introduced in 1880 in Illinois, Kansas, and Connecticut. Several states, of course, earlier had appointed Commissioners to investigate and adopt measures to

eradicate animal diseases, the first instance being the appointment of E. T. Thayer in the 1850's as Cattle Commissioner of Massachusetts in connection with the outbreak of contagious pleuropneumonia.

Thayer's work had been notably successful; more so than was the case in some other states. In 1881 A. J. Murray, who was appointed one of three state commissioners in Michigan to prevent the spread of contagious diseases among animals, states:

I found that I was unable to prevent the conveyance of Texan cattle into the State, though the State law prohibits this being done, between the first day of March and the first day of November. . . . The laws of this State on this subject have evidently been framed by men who had little if any knowledge of the evils they were intended to remove . . . they frequently conflict with the Constitution of the United States.

Illinois to the Fore

In 1881 Liautard noted "with great satisfaction":

the act passed by the Legislature of Illinois creating such a [veterinary] bureau. This great breeding State has taken the lead in that direction. . . . The creation of veterinary bureaus is one that must soon be general all over the country.

This act called for the Governor to appoint:

a competent veterinary surgeon, who shall be known as State Veterinarian or Inspector, and whose duty it shall be to investigate any and all cases of contagious or infectious disease among domestic animals of the bovine species in this State.

Actually, the bill was a measure to suppress pleuropneumonia, rather than one expressly for creating the office of State Veterinarian, and thus the restriction of its scope to the bovine species. This was an unfortunate case of shortsightedness, for a short time later the appointee was placed in an embarrassing position in regard to his attempts to exercise control over glan-

ders in horses. Pleuropneumonia, however, was the scare-word of the hour, and thus the limited scope of the bill is at least understandable, however unfortunate. The State Veterinarian was empowered to order and enforce quarantine and slaughter of diseased animals, but exposed animals could be slaughtered only after consultation with two "reputable veterinarians or practicing physicians." A sum of \$8,000 was appropriated for carrying out all provisions of the act, including indemnity for slaughtered cattle.

Later in the year (1881), Liautard mentions:

One of our exchanges brings us the news of the appointment to the position [of State Veterinarian] of one of the assistant editors of the *Review*, N. H. Paaren, M.D., who has for years been prominent in the State of Illinois by his veterinary works.

Paaren, who more frequently identified himself as M.D., V.S., had been a full-time (nongraduate) veterinary practitioner for 20 years or more, and had edited the Veterinary Department of the *Prairie Farmer* after George Dadd had left that post.

In April, 1883, Paaren investigated an outbreak of glanders, and ordered that the animals be confined, apparently without the necessary legal authority, for it was not until six weeks later that the pleuropneumonia act was amended to include glanders. Paaren states that he had met with considerable resistance, apparently in the form of doubt as to his authority, and a five-page opinion of the Attorney General was required to clarify his status, which in effect was that the authority of the State Veterinarian with regard to glanders was exactly the same as with pleuropneumonia. The *Prairie Farmer* at this time notes:

The State Veterinarian of Illinois seems to be vigorously enforcing the glanders act . . . he last week had four horses shot and burned.

In 1886, however, the *National Live-Stock Journal* noted the removal of Paaren as being long overdue:

in view of his very evident unfitness for the position of State Veterinarian, the general criticism of his course while holding that office, and the lack of harmony between him and the State Board of Live-Stock Commissioners.

Contention in Connecticut

Agitation for creation of the position of State Veterinarian in Connecticut evoked strong comment from the *New England Homestead* in 1882 to the effect that so long as there was a state cattle commission:

There would be about as much sense in asking the Legislature to appoint a State physician, giving to such person exclusive medical privileges over the mass of practicing physicians. The State does appoint its Board of Health, whose duties may be said to be similar to those of the cattle commission. . . . Why not appoint a skillful physician of the soul to look after the moral diseases of the people?

Without disparaging the work of the cattle commissions, Liautard urges the greater utility of State Veterinarians, for:

their labors would not only touch this or that peculiar form of diseases . . . [but] glanders, farcy, anthrax, hog cholera, foot and mouth disease, &c., &c. And besides that, they could also exert their professional influence in one direction of our general laws of health, in the inspection of abattoirs, or markets, of meat, which we all know are yet in the hands of men entirely ignorant of the first principles they ought to possess.

The western states took the lead in establishing the office of State Veterinarian; in 1882 the position of Territorial Veterinarian of Wyoming was tendered Liautard, who declined, and J. D. Hopkins was appointed. In 1883, A. A. Holcombe, Veterinary Inspector, U.S. Army, noted the failure of such a bill in Kansas two years earlier:

With \$60,000,000 worth of live stock in the State, we have, I am informed, but one graduated veterinarian in civil practice, and yet I am aware of large yearly losses from glanders, farcy, anthrax, hog cholera, tuberculosis, cerebro spinal meningitis, scab, Texas fever, contagious ophthalmia, and — so report says — hydrophobia. Of course, the veterinarian who

must depend on private practice for a living can do but little for the sanitary policing of the State. . . . Practically there are no reliable statistics in the State of the losses from the various diseases, nor will there be until educated veterinary surgeons have the opportunity to investigate their frequency, extent and mortality.

Dr. Holcombe was appointed State Veterinarian of Kansas in 1884, and his first report indicated that glanders, Texas fever, hog cholera, and blackleg were the major problems. There were 162 deaths of animals from rabies. Earlier an outbreak of what was feared might be foot-and-mouth disease was investigated by D. E. Salmon and James Law, who determined it to be ergotism.

By the end of 1885 the list of State Veterinarians had grown to 15, five of whom were located on the eastern seaboard: J. F. Winchester, Massachusetts; F. E. Rice, Connecticut; James Law, New York; Francis Bridge, Pennsylvania; and Robert Ward, Maryland. Those in the more western states included: V. T. Atkinson, Wisconsin; J. S. Butler, Ohio; G. C. Faville, Colorado; Julius Gerth, Jr., Nebraska; A. A. Holcombe, Kansas; J. D. Hopkins, Wyoming; G. Keefer, Montana; N. H. Paaren, Illinois; Paul Paquin, Missouri; and M. Stalker, Iowa. Other states had State Veterinary Inspectors who served many of the functions of a State Veterinarian.

Many of this group, of course, had been prominent in the veterinary profession for some years; others were to become important through their new official positions. Concerning Julius Gerth, Jr., formerly a private practitioner of Newark, New Jersey, Liautard notes that he was the first veterinarian ever appointed by a City Board of Health (Newark) as a meat inspector. Moreover: "His appointment then was followed by a regulation of the Board, making it obligatory for candidates for the said position to be veterinarians." Gerth was perhaps better known for his successful control of an outbreak of glanders in Newark — probably a factor in his securing the appointment as State Veterinarian

of Nebraska. He was also the first Secretary of the Veterinary Medical Association of New Jersey.

Five of this group were graduates of the American Veterinary College, four were Canadian and three were British graduates, one (Faville) from Iowa State College, and two (Paaren and Bridge) were nongraduates. In conjunction with the national convention of the Cattle Growers of the United States, to be held in Chicago in 1885, Hopkins addressed a letter "To State Veterinarians and Members of Sanitary Boards," inviting them to meet with this group inasmuch as:

the most important subject for consideration will be Contagious Diseases of Domestic Animals. . . . The expressions of these gentlemen will have great weight in shaping future legislation in this matter.

Empathy vs. Apathy

Earlier, Hopkins had submitted a report to the Committee on Diseases of the USVMA, in which he had noted:

The application of sanitary science, as applied to the prevention of disease among domestic animals, has made an immense advance in this country within the past five years.

He attributes this advance to the numbers of graduates of veterinary colleges becoming widely distributed throughout the country, but urges that continued progress can be hoped for only by the creation of veterinary bureaus "with competent veterinarians in charge, with full authority for the investigation and control of all outbreaks of disease." Further, he considered:

It is proper that at this time this Association should take an active part in shaping legislation for the control of contagious diseases of domestic animals . . . instead of allowing a few veterinarians to represent themselves in legislative halls.

His report apparently stirred up little discussion at the meeting of the USVMA, like a number of other reports the only action taken was that it was "ordered to be published." This occasioned a letter to Liautard, in which Hopkins states:

I am deeply mortified at the apathy displayed by the Association . . . when the whole country is becoming sensible of the necessity of wholesome sanitary laws and their enforcement for the protection of domestic animals. . . . Had the Association considered the questions and given expression to their conclusions, then the hands of the few veterinarians engaged in official work would have been strengthened, and the public enlightened as to the exact status of the different plagues which afflict our domestic animals.

As reported by C. B. Michener, the Cattle Grower's Convention stressed the necessity of national legislation, "as States have in almost every instance failed to eradicate or even control outbreaks of communicable diseases, without aid from the general government." Apparently some of the veterinarians present did the profession a disservice, for Michener states:

It is a matter of regret that a few veterinarians present advocated the practice of inoculation for contagious pleuro-pneumonia. . . . Inoculation is not to be seriously thought of in any country where extermination is possible. . . . In dealing with purely exotic plagues, veterinarians who are influenced by such opinions are certainly not those to be trusted during the present crisis.

The official report of the Veterinary Committee of the National Cattle Growers' Association, however, puts the veterinary

profession in proper perspective. This comes as no surprise, considering the makeup of the committee: J. D. Hopkins, C. B. Michener, L. McLean, D. E. Salmon, R. S. Huidekoper, and J. L. Brush, the latter being president of the Sanitary Board of Colorado. Noting the alarming spread of contagious diseases, for most of which no cure was known:

It behooves us to urge the necessity for immediate, prompt and forcible action to suppress the existing causes of disease, and to prevent their future spread. State laws are excellent, but insufficient. . . . It is necessary that we should have uniform and general laws, rigidly enforced, which will protect all alike. This can only be done through the general government of the United States, and while costly, will prove the most economical in the end. . . . Other countries have procrastinated as we now are doing, and have paid for it in immense losses, and the ruin of their cattle trade.

This was in 1885. The Bureau of Animal Industry had been founded a year earlier, but had not yet had the opportunity to assert itself on a national scale — through lack of funds, personnel, and authority. Once these were provided, the advantages of a centralized frontal attack upon animal plagues was evident, and the accomplishments of the BAI in two decades stand in stark relief from the futility of the two centuries or more preceding.