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R E P O R T

OF THE

HEALTH OFFICER

OF THE

ST. LOUIS BOARD OF HEALTH,

ON THE

TEXAS CATTLE DISEASE.

December 1st, 1868.



ST. LOUIS:

MISSOURI DEMOCRAT BOOK AND JOB PRINTING HOUSE.

1868.



St. Louis Health Dept.

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ST. LOUIS, *December 1, 1868.*

TO THE HONORABLE THE BOARD OF HEALTH:

Gentlemen — Although my resignation as Health Officer to the City of St. Louis has been tendered, and accepted by your honorable body (September 17), I feel that I still owe a duty in presenting to the Board some general report on that most important question, "*the cattle disease,*" the investigation of which came within my province while acting in the above capacity. I accordingly have the honor to transmit to you the following, embracing all points of interest found by me in said examination.

On August 13th I was directed by your honorable Board to proceed to an investigation of a disease affecting cattle within and around the city. In furtherance of the object of the Board, power was delegated me to employ whatever professional aid was needed. I accordingly engaged the assistance of Dr. T. F. Prewitt in holding *post-mortem* examinations, and of Dr. Gust. Baumgarten as microscopist. Their reports are appended, marked A. and B.

The first appearance of a markedly fatal disease was in a large dairy, a few miles beyond the city limits, about the second week in June. It was confined to some forty or fifty head of stock, just then purchased from Illinois, and nearly the whole number perished in a few days. By segregation of the sick, and the free use of carbolic acid, after some two weeks the disease disappeared. From information given to me, the malady did not attack any cows except the stock from Illinois, although for some days after its advent no means were taken to guard against contagion. The symptoms, as detailed to me, were unsatisfactory. The cows were apparently well in the morning and dead at night. No regular noting of symptoms seems to have been carried out, but all the employees united in saying that it was a fearfully rapid and fatal disease.

About July 1st it was noticed that a fatal disease was making its appearance among the milch cows within and immediately around the city. A gradual increase was observed, until, at the time the investigation was ordered, some sixty cows were dying weekly. No connection, however, could be traced between it and that which had prevailed at the dairy above mentioned. The dairy was so far from the city limits that no contact between the cows could have taken place; and it was reasonable to conclude that, if the diseases were the same, they were due to the same general causes, and not to contagion.

At the time this investigation was ordered, considerable excitement existed in both the East and West in regard to a disease among cattle; and consequently, the first point aimed at in the examination was the past as well as present condition of our stock-yards. These were found in a good and healthy condition, and, from the best information I could gain, no disease prevailed among the stock arriving and departing sufficient to warrant notice. Some animals had died and had been removed from the yards, but there had been nothing simulating an epidemic. Some died from injuries received in shipping, others from a surfeit of food after a long abstinence, while a few had died from a disease whose nature was unknown; but the latter were very few. During the whole of the summer no disease existed at any of our stock-yards similar in virulence or in extensiveness to that which prevailed at the New York yards, or other Eastern and some Western yards. I can state positively that after the 15th of August no disease appeared, as from that date to the 15th of September the yards were directly under the supervision of the Chief of Meat Inspectors and myself. Previous to that time the Chief or his deputies had visited each of the yards daily, and their reports indicated the usual healthy condition.

Our disease, whatever was its nature, was found to be confined exclusively to milch cows, of which from forty to sixty dead were reported per week, and the men and wagons of the contractors for their removal were busy night and day. Although many dairies, large and small, were scattered over the city, there was no extensive prevalence of the disease in any one. The dead were reported at various places—on streets and alleys, on the open prairies, and occasionally in stables and dairies. In some instances three or four

cows were removed, in the course of ten days or three weeks, from a few dairies, yet the vast majority of the dead were found isolated. The whole city was not equally affected; the extreme north and south were unaffected, the whole number of cows dying being confined to the central portion, from Eighth or Tenth streets, running west and beyond the city limits about a half mile. This was the second point gained in the investigation: the disease was confined to a certain district, beyond which it did not extend; that within this district animals were affected either singly or in small groups.

Desiring to have as much material as possible upon which to operate during the investigation, and material in the best possible form for experiments, I took occasion to issue numerous copies of the resolutions passed by your honorable Board regarding sick cattle. These resolutions, in substance, requested all owners of sick cows to report the fact at the office of the Board of Health as soon as discovered. They were printed both in English and German, and distributed by handbills everywhere throughout the city. I expected the most ample material from this course, but I am sorry to report that my efforts were misinterpreted and misunderstood, and in consequence but few cases of sick were reported. Those engaged in selling milk were fearful that if any sick were reported among their stock their whole supply of milk would be confiscated and a prohibition passed against a continuance of their business. The owners also of private cows showed no disposition to have the disease investigated by reporting cases as they occurred, and thus seconding the efforts of the Health Officer. By the efforts of the Sanitary Ward Police—who were directed to visit daily all dairies or cow-stables within their respective districts, and report sick animals at this office—a sufficient number was obtained to study the disease in the living, although not to the extent that I wished. The communicability of the disease from the sick to the well was not so thoroughly studied as to lead me to form authoritative opinions on the subject, as no experiments were employed to prove or disprove this point. Consequently, whatever opinions I may entertain and report to you on this point were formed not from direct experiment, but from general observation.

From a history of the progress of the disease, as it was gained by careful investigation, the first evidence of the epidemic was shown in the vicinity of the Pacific stock-yards. From this point

it seemed to have gradually extended itself until it embraced the locality above mentioned; and even when the disease prevailed to the greatest extent, the greater number of cases still occurred in a semi-circle of eighteen or twenty blocks around the yards. The country surrounding the city was as healthy as usual. From extensive examinations and inquiries, I could find no evidence of a prevailing disease, or any propagation of the epidemic into the country. Both to the north and south of the city there were many dairies, often kept in a bad sanitary condition, yet they were free from disease.

Many circumstances seemed to point to contagion as the means of spreading, and the idea was continually before me until I found what I conceived to be good grounds for abandoning it. In all the cases of sick animals reported, and all dead ones when the owners could be found, a thorough examination was made into the surroundings of the animals — their food, water, stabling, general attention, cleanliness, etc. There was but one circumstance in which all agreed, viz: that all cows affected were permitted to run at large during the day, and housed only at night. There was no exception to this in all the cases coming under my observation.

It may be well to state that in the western portion of the city population is scanty, and large tracts of land are in open prairie. During the summer a plentiful crop of grass springs from these places, and furnishes food not only to cows, but horses and goats. Many dairies are scattered over this region; a few large, but the great majority small — from two to eight cows each. Many of the families keeping the smaller number are poor, and aid considerably in paying expenses by selling milk. It is a consideration with them to save as much feed as possible; and thus during the whole summer their cows run at large and gather good sustenance from the open prairies. It is thus that the prairies become the feeding-ground for large numbers of cows, gathered principally from the central portion of the city.

In no instance did I find the disease attacking cows that were kept up during the summer or permitted to run in their own pastures. Cases came under my observation of animals that had been confined to their stables remaining perfectly healthy, although others occupying adjoining stables, but permitted to run out during the day, were attacked and died by the disease. So, also, in the outskirts

of the city, where cows in numbers were dying around, small dairies, or individual animals that had private or inclosed pastures, remained perfectly well.

These facts pointed to a germ of infection procurable in some manner in the daily walks of the animals. What was this germ, and in what manner were the animals infected? The suburbs of the city—the pastures frequented by the animals—were in all respects the same that they had been the year previous. The grass was as well grown and the water as pure. Where was the difference sufficient to cause a reasonable deduction? I was unable to detect any difference, except that these pastures and the roads and streets passing through them had been traversed frequently by herds of Texas cattle.

As explanatory, I may remark that the great entrepot for Texas cattle, from which they are shipped East or sold to traders here, is the Pacific stock-yards. These are located just within the western city limits, and about midway between the northern and southern boundaries. From this point they are driven in herds through the city to the river, to be shipped by railroad from the Illinois shore, or distributed to other stock-yards to which they may have been assigned for sale. The latter yards are situated near the river, some to the north and others to the south of the Pacific yards, and to reach them the herds must pass through a good portion of the city. The line of transit necessarily pursued by these herds is, for many reasons, as much as possible through the least-inhabited portions of the city. Thus they are thrown, in passing to the Broadway yards particularly, through those western outskirts of the city where numbers of cows owned in the city proper are accustomed to graze. Furthermore, scattered around the Pacific yards and extending to the west are numerous large inclosures used as resting and feeding places for the cattle in transit. Some of these are at a distance of one-half to three-quarters of a mile from the receiving yards, and numerous spots of grass on either side of the route are open and frequented by cows from the city. The passage to and from these yards constitutes another track of infection.

Looking, then, at the position occupied by the Pacific yards—the center of the infected district—and the tracks of infection leading from them through that portion of the city to which the mortality seemed to be almost exclusively confined, the deduction is reasona-

ble, I think, that the mysterious poison left on the trail or in the pastures visited by Texas cattle was the source of the disease prevailing among our milch cows.

MORBID LESIONS.

The whole number of *post-mortem* examinations made by me was fourteen, from which number I selected portions of different organs of the best-preserved cases, and forwarded them to Dr. Baumgarten for his examination. For his results I refer you to his report, marked B.

It is to be regretted that the only cases examined, except one, were at the rendering establishment of Messrs. Busby & O'Neil, as all animals there were more or less advanced in decomposition. The weather was so hot that in twelve or fourteen hours after death signs of decomposition were always present in the animals. But as persons objected to having the bodies of their dead animals opened on their premises, the rendering establishment offered the only available place where such examinations could take place. Those in which putrefactive changes had taken place to much extent were not examined, or simply opened. Those in which the least changes were perceived were reserved and examined, with the following result:

Upon the removal of the skin there was nothing very remarkable to be observed in the subcutaneous or muscular tissue. The latter preserved the natural red color of muscular tissue. The former in many cases contained large spots in which hypostatic congestion had taken place, the blood-vessels being filled to repletion with dark venous blood, partially coagulated. The position usually occupied was one or other side, extending from the head to the flank. This was evidently the result of gravitation, and the side affected was that on which the animal died. The fatty tissue in the majority of cases was normal, yet in a few a tinge of deep canary-color was perceived.

From the conversation of two gentlemen who had witnessed *post-mortem* examinations of what was called "Texas fever," as it appeared in a herd of native cattle here some six years ago, I learned that the animal always presented an exsanguine appearance. There was not only less blood in the carcass, but that found was thin and watery, scarcely so much colored as to soil the hands. The opposite condition was presented in all the *post-mortem* exam-

inations made by me. The animal was always full of dark and partially-coagulated blood, shown not only in the spots of congestion in the subcutaneous tissue, but every internal organ presented a greater or less portion in the same condition; and it was an easy matter to decide from the lungs alone on which side the animal was lying just before and after death.

LUNGS.

I found no indication of true pneumonia. In some cases both lungs were a mass of disorganized tissue, filled from base to apex with blood, yet floating in water, softened, and the lobules so separated that they stood apart like a bunch of grapes. In other cases the engorgement was not so universal—a part, and often but a small part, of the lungs being in this condition. In such cases the lungs generally contained less air than normal, and were of a darker hue, often grayish and mottled, with here and there spots of ecchymosis varying in size from a pin-head to a split pea. Upon incising, a thin, bloody and frothy liquid exuded, but no true solidification was found in any case. No change was observed in the bronchial mucous membrane. The pleuræ were natural, no signs of inflammation being perceived in any case. In a few cases serum to the amount of several ounces was present in the cavity.

HEART.

Within the pericardium there was most frequently a small amount of serum, but the membrane was smooth and apparently perfectly normal. Tissue of the heart unchanged, except a less degree of firmness, though not to an extent to which the term “softening” would be applicable. The left side of the heart was uniformly empty, while the right side was as uniformly filled with partially-coagulated blood—the coagula sometimes filling the vessels leading from the right ventricle to the extent of six or seven inches in length.

BRAIN.

In three instances the brain was affected. The vessels of the pia mater were congested and enlarged, and on cutting into the substance of the brain numerous red points indicated the position of the vessels. There was no exudation on any portion of the serous membrane, and no effusion of serum.

The esophagus, first, second, and third stomachs, were healthy. In many cases the food contained in the latter (for they were never empty) was dryer than normal, but no other change was perceived. The true stomach was particularly examined in three cases. In these it was found reddened, more or less profusely studded with ecchymoses, and with one to three small, irregularly-shaped spots of erosion, situated more particularly about or near the pyloric orifice. The intestines, both small and large, presented nothing unusual beyond the scattered spots of ecchymosis.

S P L E E N .

The spleen was always and markedly enlarged, its surface smooth and dotted with numberless minute white dots. It was of a dark-red color, exceedingly soft, and an incision into its substance showed nothing but a mass of bloody pulp that the slightest pressure would force out in a jelly-like mass. Of all the organs, the spleen was the only one invariably altered, and to the eye the morbid changes seemed always of the same character, although a difference existed as to the stage of advancement.

L I V E R .

In milch cows, and indeed in cattle generally, the liver is often found with evidences of disease in its structure, although the animal may have enjoyed good health. The usual surroundings of dairy cows, within the limits of a large city, are such as to provoke the occurrence of disease in this organ, and consequently it is rare to find a healthy liver among them. I do not think that, in the cases examined by me, a natural and healthy condition of this organ was found in a single instance. Many of the lesions were old, a few were recent, but all depended either directly or remotely on inflammation. These lesions affected parts of the organ, and were not of sufficient magnitude to destroy life. Those that seemed to be connected with the epidemic affected the color and consistency of the organ. The color varied from a grayish to a bistre brown, and pervaded the whole organ uniformly. The peritoneal coat was smooth and shining. The parenchyma was much softened, the finger readily passing through it. These alterations in consistency and color were not due, in my opinion, to *post-mortem* changes, as other cases were examined in which these changes were not present, although decomposition had progressed to a greater

degree. The *gall-bladder* was usually full to repletion of a greenish-brown liquid; its coats normal.

With one exception, the *kidneys* were found materially changed. They were deeply congested, of a dark mahogany color—sometimes of a prune-juice color—soft and friable. In some the softening had progressed so far that the organs were like masses of plum-jelly, and structureless—a condition increased, no doubt, by *post-mortem* changes. In others the consistency was but little less than natural, but they also presented a darker hue than normal, and hyperæmic to a marked degree. The *ureters* were unaltered. The *bladder* occasionally presented spots of ecchymosis here and there over the mucous coat, but otherwise it was unchanged. It was always filled, sometimes almost to bursting, with a dark-red or bloody clear urine.

The *post-mortem* of cow No. 5 (Dr. Baumgarten's report) I made in connection with Prof. Gamgee, of London, who had been for some weeks investigating the disease in Illinois and Kansas. The cow was killed by bleeding, and the examination immediately made. This was the only case examined by me in which the kidneys—to the eye—were unaltered. They seemed to be so healthy, indeed, that, taken in connection with the clear and normal appearance of the urine, I forwarded no specimen to Dr. Baumgarten for his examination. I regret this now, as his examination of the urine (a specimen of which was sent) showed the presence of a few tube casts and albumen.

The lungs were found normal in color, but marked freely and irregularly by ecchymoses. The interlobular tissue was emphysematous to a slight degree, more particularly in the posterior lobe of the right lung, which also contained less air in the cells than normal. It was on this side that the animal had been lying for some hours previous to her death.

The heart was normal, except some blood-spots on the endocardium. The alimentary tract was also normal, except the fourth stomach, which was somewhat reddened and ecchymosed; and near the pyloric orifice three or four small patches of erosion were found. The liver was enlarged, but otherwise healthy, except from the presence of numerous spots of fatty degeneration—an old condition.

The spleen was very much enlarged, much darker than normal, very soft, and dotted with numerous minute white spots beneath the

serous covering. The kidneys seemed perfectly healthy; and the urine was clear and but little darker than natural.

The brain was congested throughout; the veins of the pia mater were full; and a section of the substance showed very fairly the "sanded" appearance found in inflammation — slight effusion, but no exudation.

In this case death might have taken place from the lesions found in the brain, but in no other organ was there present sufficient disorganization to have produced a fatal result.

SYMPTOMS.

The symptoms presented by the sick were not always uniform; that is, there was no regular train of symptoms appearing in each case. Indeed, in some there was little to be observed, and in others the disease proved so rapid that the animals seemed struck down at once, and never rose again. I am not able to give a description of the various symptoms from a personal observation of *many* cases. A few I saw before death; but owing to the difficulties I encountered, and the reluctance of owners to report the sick, the best I could do in many cases was to visit the owner, after the death of the animal, and learn from him the most prominent symptoms presented. This, in connection with what I observed myself, is the basis of the following description:

The first symptom observed is a loss of appetite and a diminution in the flow of milk. The animal becomes listless, and shows a reluctance to moving about; and, when moving, goes slowly, not apparently from pain, but from debility. Her ears droop, her head hangs down, and her eyes lose their natural lustre, presenting a stupid, dull, sick expression. The pulse is usually small and frequent. The temperature, in all cases in which I used the thermometer, was always high, ranging from 102° to 103°. The bowels are frequently constipated, although not always, and the urine is dark-colored or bloody, and free. This stage may continue two or three days before other and more marked symptoms present themselves. In one case six days elapsed, the animal presenting nothing to be particularly observed other than that just related. In other cases a few hours only is sufficient to develop more characteristic symptoms, that are rapidly followed by death. The gait gradually

becomes more uncertain and tottering, with a dragging of the hind legs; the animal shows a disposition to lie down, and when once down, it is difficult to make her rise again. The urine, if not already bloody, becomes so, and is voided less freely and easily. The temperature of the body rises—most frequently reaching 107° , and in some cases as high as 112° . The pulse becomes quickened and more feeble, often imperceptible in the extremities; the respirations rapid; the urine ceases to pass; and, by position and movements, the animal shows evidences of intense prostration. In many cases nothing more was observed, death soon taking place.

In others—with the symptoms of depression, increased temperature, constipated bowels, and bloody urine—marked frequency of respiration, with a very slight cough, was observed, along with a rapid and feeble pulse. The cow, when made to rise, would knuckle over on both hind-fetlocks, and stand with depressed head, drooping ears, arched back, hollow flank, and hind-legs drawn under her, with a tremulous jerking of the muscles of the flanks and thighs. She would soon lie down again; respiration more rapid, pulse more feeble and fluttering until her death, which soon came.

In still others, during the latter stage, respirations are less frequent than in health, often slow and deep; the pulse is rapid, the head, horns, and ears are hot; and while lying, the head is stretched backward as far as she can get it, and fixed in that position. In these cases it is said that convulsions often appear, but I have never seen them take place. The animal, under my observation, seems rather to sink into a more or less complete comatose condition, in which she dies. The constipated bowels, though a frequent condition, did not always exist, and the dejections presented no abnormal appearance. The bloody urine, with arched back, hollow flank, and knuckling over on both hind-fetlocks, were the most characteristic symptoms and the most usual, together with depression, feeble pulse, and high temperature. In them the kidneys were afterward found markedly changed. Some cases proved very rapidly fatal, with few or none of these symptoms, and in these the kidneys were found less affected, but the lungs were more or less engorged, the heart was in a softer condition than normal, or the liver was altered in color or consistency. In all cases where stupor or a semi-comatose condition existed, with hot horns and ears, the brain was found congested.

These were the symptoms that were presented under my observation, or were gathered from a cross-examination of the owners. It is probable that a more extended observation than I enjoyed would have revealed others. Sufficient, however, has been presented to characterize the disease.

NATURE OF THE DISEASE.

This portion of the subject I approach with great reluctance, as I have nothing beyond bare hypothesis or conjecture to offer. I have thus far presented facts, or what I believe to be facts, viewed without bias or preconceived ideas. It would be indeed remarkable if, in the narrow limits of my observation, an explanation of the mysteries attendant on this disease could have been found. I have found none, and consequently have none to report. The interest attached to the disease as it appeared in various parts of the country, culminating in the efforts of several distinguished and scientific gentlemen to study it, will result in many reports on the subject, showing the course, symptoms, and morbid changes observed within the respective localities of the different observers. It is only from a careful analysis of these various reports, from a comparison of the facts observed in all that relates to the disease, that any true deductions can be made as to its nature and cause. No individual report can succeed in making deductions that will stand the test of time. Indeed, the narrow limits of observation in the power of any single individual would detract much from the theories advanced. I therefore simply offer, through your honorable Board, the foregoing to add to the many reports at present being prepared, as a contribution to the general fund. It is a description of the disease as it prevailed in our city, and as such can be used to compare with the disease as it prevailed elsewhere.

Hitherto there has been but little literature on the subject. The present year is the first in which regular and systematic efforts have been made to comprehend the laws and nature of the disease. Long complained of through the Southwest, with laws in operation to curtail or prevent the supposed origin, no positive knowledge has ever been presented as to the poison that is supposed to infect the native stock. I trust sincerely that the present extended series of observations, the thorough sifting of the testimony offered, and the use of the many valuable adjuncts to medical research at present in

use, may result in the discovery not only of the laws governing the disease, but its nature and the means of prevention or mitigation.

In conclusion, permit me to offer the following as my present convictions :

1. The disease is a non-contagious zymotic fever, with an incubative period of from ten to twenty days.

2. That the germ exists among Texas cattle, not *per se*, but developed similarly to "crowd poison" in man, by scanty food, continued exertion, close crowding, animal exhalations, and the usual concomitants of large masses of animals in transit.

3. That the germ is inoperative in the systems of the Texas cattle—owing to what cause I cannot surmise—but is highly poisonous to native cattle, or Texas cattle acclimated here by a residence over winter.

4. That close proximity is not sufficient to infect the native cattle, but actual contact with some of the excretions of the Texas cattle is necessary. The occupation of pens, boats, or stables previously used by them *may* be sufficient, but the co- or after-occupancy of pastures, or mingling with them in their route, will certainly infect native stock.

5. That the period of time during which the poison remains active is unknown, beyond the fact that severe cold destroys it effectually.

6. That the blood of the infected animals is primarily affected and its vitality soon destroyed; and that, secondarily, the spleen, kidneys, and liver become diseased, either through ineffectual efforts to eliminate or alter the poison, or through a stasis of the blood in their structure, owing to its diminished vitality.

7. Pathological evidence, particularly the microscopical condition of the fibers of the heart, points to the continued presence of a depressing agent in the blood, whether that agent be the zymotic germ itself circulating, or the continued influence of a low grade of morphological changes.

8. That native cattle, although dying from the disease, do not infect other native cattle, either by actual contact or by the influence of the secretions.

9. That the remedies known to have anti-zymotic powers are the only ones possessing any influence over the disease.

Very respectfully, your obedient servant,

JAMES W. CLEMENS, M.D.,

Late Health Officer.

(A)

St. LOUIS, October 25, 1868.

Dr. J. W. CLEMENS, Health Officer:

Sir—In accordance with your request, I visited, on different occasions, the factory for dead animals beyond Cheltenham, with the view of ascertaining by *post-mortem* what pathological changes characterized the disease proving so fatal among the cows of the dairies in and about the city, and respectfully submit the following report.

Aside from the fact that no history of the case was known from the time the animals were attacked with disease until death, a considerable time usually elapsed between the occurrence of death and the delivery of the carcasses at the factory. I have had an opportunity of examining eight dead animals. In none of these was there any record of the time of death, and it could only be conjectured from the appearance of the body and the progress of decomposition. In some of these the changes in the organs examined were so considerable as to present some difficulty in determining what was pathological and what *post-mortem*. The condition of the lungs, liver, spleen, and kidneys, as also the peritoneum and pleura, was examined in all. In one the brain was examined; and in one, in which the *post-mortem* changes were not such as to render it useless, the mucous membrane of the true stomach, intestines, and bladder. In five the animals had been dead long enough for

considerable *post-mortem* changes to have occurred. In these there was the most marked alteration in structure of the principal viscera—the lungs, liver, spleen, and kidneys.

The lungs were dark, in parts gorged with blood, the parenchyma disorganized and breaking down upon the slightest touch. The liver was about the color of burnt umber, its consistency greatly altered, breaking down readily under the finger, and in some instances advanced to a pulpy state. The gall-bladder was filled with bile about the color of plum-juice. The kidneys were very dark and very much disorganized. The spleen was more or less enlarged and pulpy.

While these changes were evidently in great part *post-mortem*, they seemed disproportioned to the general evidences of decomposition. In other words, these organs seemed to have undergone more rapid disorganization than would have been anticipated from the probable period of death as indicated by the general condition of the body. In the three remaining cases death had evidently taken place more recently, and the indications of *post-mortem* changes were slight. In two there was great engorgement of the lower and posterior portions of the lungs, seemingly of a purely passive character—probably *post-mortem*—as there were no indications of inflammatory exudations in any case, and the lung tissue floated readily in water. In the remaining case the lungs were normal. The liver in these cases was but little altered in structure—its substance, in two cases, tinged almost an orange color. The bile contained in the gall-bladder was of a dark-green color. The kidneys were highly congested, of a dark-red color, with but little alteration in consistency. In all the cases the spleen was more or less enlarged, and in two very much so. In none of the cases was the pleura or peritoneum found to be involved. The bladder was usually found distended with urine of a deep-red color, evidently colored with blood. Upon the application of heat and nitric acid, albumen was precipitated in abundance, three-fourths of the fluid being seemingly converted into coagulated albumen. Under the microscope, however, no tube-casts were discovered. In the only instance in which the brain was examined it presented a healthy appearance. The mucous membrane of the stomach, intestines, and bladder, examined in but one instance, as stated above, presented ecchymosed spots here and there.

Of all the organs, the spleen and kidneys have been most uniformly involved in pathological changes. The congestion of the kidneys I am disposed to regard as the result of an attempt at elimination of the *materies morbi* through that organ — an effect, therefore, and not an essential part, of the malady. Should observation, however, show that great congestion of the kidneys is a uniform condition, the retention in the blood of the renal excretions might prove to be the proximate cause of death. Upon this point the history of the disease and the mode of death should throw some light.

Upon the whole, the anatomico-pathological lesions scarcely seem sufficient to account for death. The essence of the disease, no doubt, is the empoisonment of the blood through the introduction of a specific poison, and the fatal result dependent upon those more subtle changes to be discovered only by the microscope, by chemical re-agents, or perhaps defying all research.

Respectfully,

T. F. PREWITT.

(B)

ST. LOUIS, *October 25, 1868.*

Dr. J. W. CLEMENS, Health Officer :

Sir — I have the honor to report below the results of the histological examinations of morbid specimens, which you submitted to me, of the organs of cattle affected with the so-called "Texas fever." (The specimen of lung from cow No. I. does not belong to this class, the animal having died of traumatic pneumonia. The lung was found in a state of splenisation; capillaries gorged with blood; no solid exudation in the infundibula or terminal bronchi.)

Cow No. II. — Aug. 16th; twelve hours after death; specimen somewhat altered by putrefaction.

Liver — Of a uniform grayish-brown color; peritoneal covering smooth and unchanged. Microscope showed secreting cells of liver more darkly granulated than normal, and almost devoid of fat globules.

First stomach—No change perceptible.

Second stomach—Mucous coat normal; its epithelium separating in large flakes, which are slate-colored, owing to pigmentation of the epithelial cells.

Lung—Dark slate-colored; very completely collapsed; contains almost no air. Not hyperæmic. Bronchioles contain some mucus abounding in cells.

Heart—A little pale, very friable. Muscular structure almost destroyed by molecular degeneration. The primitive fibre is everywhere found separating into fibrils and “sarcous elements.” *No fat.* (See fig. 1.)

Cow No. III.—Aug. 16th; specimen very putrid, so that none of the organs were in a state of preservation suitable for examination, except the

Kidneys—These exhibited, aside from *post-mortem* alterations, traces of degeneration far advanced. Tubules so friable as to appear only in fragments; secreting cells almost wholly destroyed; the tubules filled with a molecular debris.

Cow No. IV.—Aug. 19th; twelve hours after death.

Trachea—Normal appearance; its walls covered with a light-brown mucus, containing ciliated epithelium and various kinds of mucous and formative cells in abundance, most of them in various stages of fatty degeneration. (See fig. 2.)

Lungs—Fawn-colored, with a tinge of green; crepitates, but contains less air than normal, and is pretty firm under the finger. Section emits a dirty, bloody fluid which contains many cells; the latter are mostly round or oval, nucleated, and have an average size of .009—.012 millimetres diameter; their contents are granular. On scraping a section of lung, clumps of these cells are found in great numbers, frequently moulded in the shape of the infundibula. (See fig. 4.)

Kidneys—Both alike; hyperæmic, soft, friable; surface not granular; serous covering normal, shining, and smooth. Glomeruli appear normal under the microscope, but rather large. Extensive granular (molecular) degeneration of the secreting cells; the contents of *all* the urinary tubules, both convoluted and straight, in

the cortical portion as well as in the medullary, are found in various degrees of degeneration—slight in some, in others to such extent that the forms of the individual cells can no longer be recognized. Among this debris there was little or no fat (as I convinced myself by exhausting a large portion of the kidney with ether.) (See fig 3.)

Urine—Dark-red; contained no morphological elements but the kidney debris, as above described; cells far advanced in degeneration; and very few extremely small oil-globules. Contains albumen. No red blood-corpuscles.

Cow No. V.—Aug. 22d; pronounced by Prof. Gamgee to be well-marked Texas fever. Animal *killed*.

Blood—No morphological abnormality detected.

Urine—Clear, yellow. No morphological constituents except a *very few* casts of urinary tubules in cloudy swelling. Contains some *little* albumen.

Fourth stomach—The mucous membrane of the folds shows many small ecchymoses, from the size of a pin-head to a quarter-inch in diameter. The blood is effused between the tubular glands.

Liver—In general, normal. Presents yellow spots of various sizes under the peritoneal covering. A section of these spots shows the alteration to penetrate to a certain depth, embracing wedge-shaped pieces of tissue, the largest of which was of about the size of a hazel-nut. They are of a yellow, opaque color; the individual acini are still distinguishable with the aid of a lens—the central zone appearing yellowish-white or sometimes nearly white, the middle and external zones buff or light-brown. The secreting cells of the central zone have disappeared, fat taking their place—*i. e.*, they are no longer individually distinguishable; those of the more external parts of the acinus are far advanced in fatty degeneration. These fatty spots are remarkable for their strict limitation to circumscribed localities, but they seem to me to have no connection whatever with the disease in question.

Spleen—Soft, very dark-red, full of blood. I can discover no structural change. The white spots seen externally are fatty deposits in and below the serous covering.

Lung—Somewhat congested; no structural lesion.

Heart—Endocardium of ventricles and valves shows slight ecchymoses; otherwise normal. Muscular fibres *all* and invariably show fibrillation to an extent otherwise unobserved in recent muscular structure, such as this is. The transverse striation at the same continues distinct. There are only traces of the molecular decay noted in Cow No. II. No separation into sarcous elements.

You will understand that the limited number of cases observed will not permit me to draw general conclusions. At the same time I must regret that, even in these cases, not all organs were submitted for examination, but only such as *seemed* diseased on inspection with the naked eye. The points to which I may venture to call attention, as appearing to me of more than merely accidental import, are the lesions of the kidneys and heart. The changes which the muscular structure of the heart had undergone in Cow No. II., I have satisfied myself, were not due to *post-mortem* alteration alone; and the microscopic appearances found in the heart of Cow No. V., which had been killed some time before her death was expected, confirmed me in this opinion. The well-marked catarrhal pneumonia of Cow No. IV. deserves remark.

I am, very respectfully,

Your obedient servant,

J. G. BAUMGARTEN, M.D.

EXPLANATION OF FIGURES.

FIG. 1. [Cow No. 2. *Heart, R. V.*]—Muscular fibres showing longitudinal striation, separating into fibrils, and ultimately into a molecular detritus. Magn. 300.

FIG. 2. [Cow No. 4. *Trachea.*] Elements from the mucus covering the trachea. Magn. 330.

FIG. 3. [Cow No. 4. *Kidney.*] Fragments of uriniferous tubes; epithelial cells in various stages of granular degeneration. *a*—portion of a straight tube only slightly affected; *b*—isolated cells of the same, granulated; *c d*—convoluted and straight tubes, the contents of which are far progressed in degeneration. (The majority of tubes were found in this condition.) *e e*—portions of narrow communicating tubules (naturally devoid of secreting cells), showing a great increase of nuclei.

FIG. 4. [Cow No. 4. *Lung.*] Exudative plugs or casts, scraped from the cut surface of the lung.

FIG. 1.
300



FIG. 2.
300

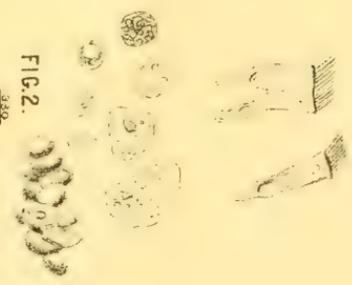
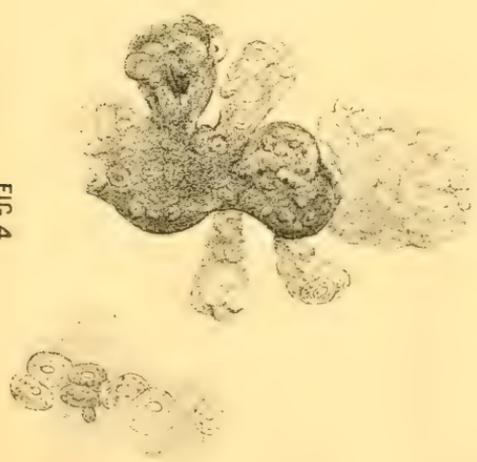


FIG. 3.
300



FIG. 4.
300





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