

ANNUAL REPORT

OF

THE SUPERINTENDENT

OF THE

UNITED STATES MILITARY ACADEMY.

1890.

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U. S. MILITARY ACADEMY,
West Point, N. Y., September 8, 1890.

GENERAL: As superintendent of the U. S. Military Academy I have the honor to submit the following report for the year ending August 31, 1890:

The number of officers and instructors stationed at this post on September 1, 1890, was as follows: Eight professors, fifty-two commissioned officers, including one surgeon and one assistant surgeon, one acting assistant surgeon, one sword-master, and one teacher of music.

THE CORPS OF CADETS.

Section 1315, Revised Statutes, provides that the Corps of Cadets shall consist of one from each Congressional district, one from each Territory, one from the District of Columbia, and ten at large, making 346 in all.

This institution is perfectly capable of accommodating that number, but owing to the fact that many candidates appear before the Academic Board unprepared for the examination, and that cadets are discharged from time to time during the year for various causes, the battalion seldom exceeds three hundred in number.

On September 1, 1889, there were 294 cadets connected with the Military Academy. Since that date the loss has been 8 by resignation, 22 by discharge, 2 by death, and 54 by graduation. The gain has been 81 admitted as new cadets, making a present total of 289 belonging to the Corps of Cadets, 4 of whom were admitted September 1, 1890.

This number includes one cadet from Switzerland and one from Central America, who are receiving instruction at the academy by authority of joint resolutions of Congress.

As stated in previous reports, the candidates entering in September labor under many disadvantages. They have failed to gain the drill and instruction which their more fortunate classmates have acquired during the summer encampment; they are ignorant of the regulations and are new to everything connected with the academy; they must be drilled and disciplined while others are resting, and they immediately begin their academic duties and are obliged to keep up with their class in their studies.

Moreover, the drilling of these new men entails additional duties upon some of the older cadet officers, who must instruct them at hours which really should be devoted to their own studies.

Of the fifty-six candidates who presented themselves August 28, 1889, only sixteen were admitted, and only six of these remained in the class after the June examination in 1890. I attribute this greatly to the fact that the young gentlemen did not get an even start with their class.

On August 27, 1890, twenty candidates presented themselves for examination. Of these only four succeeded in passing, and were admitted to the academy September 1, 1890. These four young gentlemen, in addition to their regular academic duties, must be put through a rigorous course of drill until October 15.

It is hardly necessary to dwell further upon this matter, but it is earnestly urged that, except under extraordinary circumstances, no further September appointments be made, and that the June candidates may be notified a sufficient time in advance of reporting to permit them to prepare themselves for the examinations in arithmetic, geography, grammar, history of the United States, reading, writing, and orthography.

At the June examination in 1890 twenty-four candidates were pronounced physically disqualified, a large per cent. failing upon their eyesight.

I think candidates should be required, if possible, to report for physical examination to the nearest medical officer of the Army immediately after receiving their letters of appointment, and should they be pronounced physically disqualified, their appointments could at once be revoked and they would be spared further expense and mortification.

Several of those who failed in June, 1890, informed me that they were entirely unaware that there was anything the matter with them until the result of their medical examination was announced.

In case it is not possible to reach a medical officer of the Army, then it would be well for the candidate to appear before a civilian physician, who should be furnished with an exact statement of the method of physical examination as conducted by Army surgeons.

During the past year the condition of the Corps of Cadets, as regards drill, discipline, and instruction, has been excellent. This is shown by the fact that in the first three classes, aggregating one hundred and eighty-four men, but one cadet failed to pass the June examination, while of seventeen pronounced deficient in the fourth class, ten were recommended to be turned back and only seven discharged. I attribute this not only to the care and attention bestowed upon their duties by the distinguished professors and officers in charge of departments and their able assistants, but also to the careful manner in which the preliminary examination is carried on, whereby those not properly prepared are rejected.

HEALTH OF THE POST.

Attention is invited to the report of the Post Surgeon, transmitted herewith, marked A.

During the year the health of the command appears to have been less favorable than usual. During the night of November 11, 1889, a large number of the cadets were seized with cholera morbus. This was telegraphed throughout the country and magnified to so great an extent that much unnecessary alarm was created among the families of cadets at distant localities. I received numerous telegrams and letters from the parents of cadets on the subject.

The effect was only temporary, and within less than forty-eight hours had entirely disappeared.

I convened a board, consisting of the Commandant of Cadets, the Post Surgeon, and the Commissary of Cadets, to investigate the cause of the trouble.

The board reported as follows :

It is the opinion of the board that it was a combination of causes, viz : A hearty dinner of fresh roast pork ; acid fruit with milk at supper, at a time when the air was surcharged with moisture ; causing indigestion and abdominal pains.

The purging under the circumstances was the natural way of ridding the system of an offending material.

Based upon this report I directed that fresh roasted pork should no longer be furnished for dinner, and that great care be exercised in furnishing acid fruits for supper. No serious consequences whatever resulted from this temporary illness of the cadets.

Later in the season the disease commonly known as "La Grippe" appeared on the post and spread with great rapidity ; a number of officers and civilians residing at West Point, together with about two hundred cadets and a large number of enlisted men, were attacked. The first case appeared in the corps December 27, 1889, and many cadets were in the hospital from the disease during the semi-annual examination ; there were six very serious cases on the post, three officers, one cadet, one young lady, the daughter of an officer, and one enlisted soldier ; the last, an excellent man of high character, succumbed to the disease.

As a rule in the other cases those who were attacked rapidly recovered and were ready for duty in a few days.

On January 27, 1890, the mumps, which had been prevalent in the vicinity, appeared among the cadets and twenty cases followed.

During the winter scarlet fever broke out in the families of some of the officers and enlisted men. The usual precautions to prevent contagion were promptly taken, but in spite of every effort it appeared among the cadets on March 15, and five light cases occurred.

In the autumn of 1889, diphtheria, which was prevalent in the surrounding country, appeared at West Point, and during the winter and spring a number of the children of the enlisted men became the victims of this dread disease. But one case occurred among the cadets, that of Cadet C. B. Gose of the first class. His condition was pronounced very serious by the attending surgeon, but he fortunately recovered in time to go on with his class and was graduated in June, 1890.

Early in the spring of 1890 a light case of varioloid appeared in the family of one of the officers.

Throughout the entire period during which these various diseases were prevalent, the officers of the Medical Department on duty at this post were earnest, faithful, and indefatigable in the performance of their duties, spending day and night in their ceaseless efforts to save the lives of those who were dangerously ill from diphtheria.

The Post Surgeon was apparently impressed with the belief that the illness on the post was mainly due to defective sewerage and plumbing. As his views and my own were not fully in accord upon the subject, although I promptly approved every recommendation he made, I requested that a sanitary expert, familiar with the drainage and plumbing of large cities, might be sent here for the purpose of making a complete and thorough investigation of our entire system and recommending such changes and improvements as might be deemed necessary.

As there were no funds available for the employment of such an ex-

pert, an officer of the Quartermaster's Department was ordered here, and after an examination of the system recommended extensive improvements, both in sewerage and plumbing. I understand that an estimate for the necessary improvements will be submitted to Congress by the Quartermaster's Department at an early day.

During the latter part of the spring and early part of summer, when windows and doors could be left open and life out of doors became more agreeable, the general health of the post rapidly improved, and at the close of August there was no sickness at West Point worthy of mention.

During the entire year the post quartermaster used every effort within the limited means at his command to maintain both sewerage and plumbing in the best condition in his power.

MASTER OF THE SWORD AND INSTRUCTOR IN GYMNASTICS AND SWIMMING.

I beg to invite attention to the recommendation contained in the report of the Board of Visitors for 1889 in regard to the faithful, efficient, and capable sword-master. I heartily concur in the views of the Board that he should have the rank of a lieutenant, and I recommend that the following be added to the Military Academy bill :

Provided, That from and after the passage of this act, the master of the sword at the United States Military Academy shall have the rank and receive the pay and emoluments of a first lieutenant of infantry.

Mr. Herman J. Koehler, who at present occupies the position of sword-master, performs also the duties of instructor in gymnastics and swimming. He is faithful, energetic, and well qualified for his important work.

THE U. S. MILITARY ACADEMY BAND.

By the act of March 3, 1875, the Military Academy band consisted of one teacher of music and forty enlisted musicians. Of the latter, ten received \$34 per month and the remaining thirty received \$30 per month, together with the usual allowances of enlisted men.

By the act of March 3, 1877, the band was reduced to one teacher of music and twenty-four enlisted men, six of whom receive \$34 per month, six \$20 per month, and the remaining twelve \$17 per month, with the usual allowances of enlisted men.

This is the present status of the band, and it ought only to be necessary to invite attention to it and to the earnest appeals for its improvement by various Boards of Visitors to obtain the necessary legislation for its increase.

Many of the members of the band are excellent musicians and men with families, and as they improve in their profession and see their children growing up around them, it is natural that the temptation to better their condition in civil life affects them and they not only decline to re-enlist, but some endeavor to obtain their discharge, while occasionally one, I regret to say, forgetting the sanctity of his oath of enlistment, deserts the service of the Government.

I earnestly beg that something may be done for the band and ask that such action be taken as may be deemed best to urge upon Congress the passage of the bill for its reorganization, which has been favorably reported by the House Committee on Military Affairs.

THE ARTILLERY OF THE POST.

One battery of the new 3.2-inch field-guns has been furnished during the year, and another is absolutely necessary.

During the short period allowed each year for field-artillery drill, instruction as cannoneers must be given at the same time to both the third and fourth classes, aggregating usually about one hundred and fifty men. One battery is used for light artillery, the other for foot artillery. At present, in order to keep up the drills, one class must use the old 3-inch muzzle-loading guns while the other is being instructed with the new 3.2-inch breech-loader. I earnestly recommend that another battery of the 3.2-inch guns be furnished for this post at the earliest practicable day.

Attention is invited to the interesting report of First Lieut. J. D. C. Hoskins, Third Artillery, senior instructor of artillery tactics, transmitted herewith, marked B.

Lieutenant Hoskins very properly complains of the carriages used in the sea-coast battery and the guns of the siege battery. The former he describes as follows :

At the sea-coast battery the cadets use three 8-inch muzzle-loading rifles (converted 10-inch smooth-bore Rodman guns), two 15-inch smooth-bore Rodman guns, and one 13-inch mortar.

No two pieces in this battery are mounted on carriages of the same pattern, which fact renders a uniform system of instruction impossible.

For effective work here guns of the same class should be mounted upon modern carriages, uniform in construction.

I cordially concur in the views of Lieutenant Hoskins. It is high time that this important military institution, which annually turns out from fifty to sixty-five young officers, should be equipped with everything incident to a modern armament.

The condition of the siege battery is much worse than that of the sea-coast battery.

During the past few years three guns have burst at this battery, as follows: April 25, 1876, a 4½-inch rifled gun burst at the one hundred and sixty-second round; July 16, 1881, a 30-pounder Parrott gun burst at the two hundred and twenty-second round; April 11, 1889, a 30-pounder Parrott gun burst at the three hundred and twenty-second round.

Fortunately no cadets were struck by the fragments, although there were some narrow escapes and in some instances the drums of the ears were more or less injured.

After the last explosion the battery of 30-pounder Parrott guns was condemned, and the Ordnance Department, in October, 1889, supplied another battery of old 4½-inch rifled guns.

Upon calling for the history of these guns I was informed that it was unknown, but that they had been selected as the best of a lot on hand at the New York arsenal, sent there from the Washington arsenal some years before. I was further informed that some guns of this pattern had recently burst.

An examination of the guns showed that one of them was made in 1861 and the others in 1863, and they evidently had been used during the war of the rebellion.

By authority of the Secretary of War I directed that the guns should not be fired at drill, as I believed it would be absolutely criminal on my part to endanger unnecessarily the lives of cadets by practicing with these old and obsolete pieces.

I earnestly recommend that new 5-inch breech-loading steel guns be furnished for this battery at the earliest practicable moment.

MEN AND HORSES FOR THE LIGHT BATTERY.

For many years past the men of the cavalry detachment have acted as drivers at light battery drill, while the cavalry horses, generally too light for the purpose, have been used for hauling the pieces and caissons.

It is time that the battery instruction should be placed upon an independent footing, and I respectfully recommend that fifty draught horses be furnished as soon as practicable for use with the light battery and that a detachment of thirty artillerymen for similar purpose be ordered to this post at an early day.

This detachment should consist of two sergeants, two corporals, one blacksmith and farrier, one trumpeter, twenty-four privates.

It is believed that quarters for these men can be arranged in the new cavalry barracks about to be constructed, and that the present stables, with some minor changes and improvements, can be made available for the animals.

At artillery drills the chiefs of platoons, sections, line of caissons, etc., could be provided with horses from those now used for cavalry purposes, and when necessary the artillery horses could be used in the preliminary instruction of cadets in riding.

The artillerymen could also be used for post guard duty and for assisting in maintaining the heavy batteries in good order.

COMPANY E, BATTALION OF ENGINEERS.

This excellent company, composed at present of eighty-one men and commanded by Capt. Geo. McC. Derby, Corps of Engineers, is in a high state of discipline and efficiency.

Authority was granted over a year ago to increase it from fifty to one hundred men, but up to this date a sufficient number of acceptable candidates have not presented themselves for enlistment.

The company has charge of the repair and preservation of all forts and batteries and of the ponton train and assists in the instruction of the Corps of Cadets in practical military engineering and signaling. The attention given by the officers to the care and welfare of the men deserves special commendation.

The building occupied as quarters by the unmarried men is a model of neatness and comfort.

THE CAVALRY DETACHMENT AND HORSES.

The number of horses authorized for use in the instruction of cadets is eighty-six. At present there are only sixty-seven available. These, as heretofore stated, are not only employed at cavalry drill, but also in hauling guns and caissons at artillery drill. As a rule they are not well adapted to the purpose desired, owing to the fact that it seems almost impossible to obtain the most suitable horses for the price authorized to be paid.

To care for these horses and to aid in the instruction of cadets at cavalry and artillery drills, and instruction in riding in the riding hall during the winter, there are sixty-eight enlisted men, known as the U. S. Military Academy detachment of cavalry. These men have a

company organization and are under the immediate command of the senior instructor in cavalry, who has, however, heretofore had no other officer on duty with him to aid in the management of the detachment.

As a rule the men of the detachment are faithful and diligent in the discharge of their duties. When the new barracks are completed it is hoped their condition will be greatly improved.

THE DETACHMENT OF SERVICE MEN IN THE QUARTERMASTER'S DEPARTMENT.

The military post of West Point has a population of about thirteen hundred souls, consisting of officers of the Army and their families, the Corps of Cadets, the enlisted men stationed at the post with their families, and a number of resident civilians connected in a greater or less degree with the Military Academy.

For the general care and police of the post, care of gas, fuel, and water-supply, ordinary repairs of buildings, roads, fences, paths, etc., attendants in various academic departments, duty in the library and chapel, clerks in the adjutant's and quartermaster's offices, etc., there is a detachment of one hundred and seventeen men formerly known as the U. S. Military Academy detachment of artillery, but now known as the detachment of service men in the Quartermaster's Department.

These men are not soldiers in the ordinary acceptation of that term, but are clerks, overseers, mechanics, watchmen, janitors, and laborers. They are neither armed nor equipped as soldiers, nor until recently had they ever been drilled as such. They are constantly engaged in their duties as janitors in the various departments of instruction, as clerks in the offices of the post adjutant and post quartermaster, and as carpenters, masons, stone cutters, painters, glaziers, plumbers, blacksmiths, laborers, etc.

It is impossible at this large post for these men to become drilled soldiers and at the same time perform the duties for which they were enlisted. Many of them have served from ten to thirty years at West Point, and one of them, Private André Freis, the assistant librarian, now seventy years of age, is in his twelfth enlistment, having been about fifty years in the service and forty-five years connected with the U. S. Military Academy library. Private Freis is a man of the highest character, and has enjoyed the respect and esteem of every graduate of the academy for nearly a half century.

PUBLIC BUILDINGS, ETC.

1.—NEW ACADEMIC BUILDING AND GYMNASIUM.

By the act of Congress approved March 3, 1889, an appropriation was made for a new academic building and a new gymnasium at the U. S. Military Academy.

Upon assuming command of this post I found the subject had received the careful consideration of the Academic Board and that general plans of a very satisfactory character had been prepared by the professor of drawing under the direction of the board.

The sites for the new structures had been selected by the Secretary of War, in accordance with the terms of the law, the new academic building to occupy that of the present one, necessitating the demolition of the latter, and the gymnasium to be situated just west of cadet barracks.

The important character of these new structures demanded, in the opinion of the Academic Board, the attention of an expert architect, as every officer at the academy was fully engaged with his own important duties.

By authority of the Secretary of War Mr. Richard M. Hunt, of New York, an architect of the highest reputation, was at once employed and by March, 1890, satisfactory plans and specifications were completed for the gymnasium and had received the approval of the Secretary of War.

Proposals for constructing the building were invited March 26, but upon opening the bids on April 26 it was found that no satisfactory offer had been received.

New proposals were immediately invited, and at the opening of bids on May 26 the contract was awarded to Mr. John Sheehan, of New Rochelle, N. Y., for a cut-stone masonry structure, complete, for the sum of \$87,800. Work was commenced June 17 and is now progressing quite satisfactorily.

The architect supervises the construction of the building and the United States is also represented upon the work by Capt. Geo. McC. Derby, Corps of Engineers, who makes daily inspections to see that the specifications are strictly carried out.

Under the terms of the contract this building must be completed by June 15, 1891.

Various plans for the new academic building have been submitted by the architect from time to time, but one of which has met with the approval of the Board. The rough estimate for the approved plan, submitted by the architect, exceeded the amount of available funds, but with the hope that the estimate might be reduced by more accurate calculations and a bid received for building the structure which could be accepted, the Academic Board directed the architect to complete the drawings and estimates for the plan which was acceptable, preparing at the same time alternative plans for a building which it seems probable can be constructed for the amount available.

The architect is now engaged upon this work, the new building to occupy the site of the present academic building.

It is hoped that the plans will be prepared and approved at an early day in order that proposals may be invited and the contract awarded during the coming autumn.

2.—NEW BUILDINGS AUTHORIZED BY THE ACT OF JUNE 20, 1890.

During the coming year it is proposed to erect at this post a hospital for enlisted men, new cavalry barracks, a new store-house for quartermaster supplies, a band-practice room, two sets of quarters for commissioned officers, ten sets of quarters for enlisted men, and quarters for a watchman at the south dock.

The cavalry barracks will be located near the riding hall, the officers' quarters between the cadet hospital and the south gate, the quartermaster store-house on the site of the old frame building near the quartermaster's shops, the band-practice room just west of band barracks, the new hospital on the site of the cavalry garden at the western extremity of the post, the enlisted men's quarters on high ground in the vicinity of the post school-house, and the quarters for the watchman near the south dock. Plans and specifications for these new buildings have been prepared and the work will be pushed forward as rapidly as circumstances will permit.

THE BATTLE MONUMENT.

In 1863, during the progress of the war of the rebellion, a subscription was raised for the erection of a monument at West Point, N. Y., in memory of the officers and enlisted men of the regular Army who were killed in action or died of wounds received in action during the war.

Upon assuming command of the Military Academy I found that this fund had accumulated so that the sum of about \$50,000 was available for the monument.

Action was at once taken and, after a careful consideration of the subject, committees were appointed, and it was finally determined to erect a monument upon the plain southwest of and about 100 yards from Trophy Point. Competitive plans were invited from four firms of architects, eminent in the profession. These plans will probably be presented during the month of October, and will be submitted to a committee consisting of four professors of the Military Academy and three distinguished architects or sculptors, who will select that deemed best for the object in view. It is hoped that the monument will be completed before the close of the present fiscal year.

SURVEY OF THE RESERVATION.

At such time as could be spared from his other duties, First Lieut. John Biddle, of the Corps of Engineers, has been engaged during the past year in marking the boundary lines of the reservation.

He has located the corners, measured the boundary lines, and determined their azimuths by connecting with a secondary triangle of the U. S. Coast and Geodetic survey; he has surveyed the boundary lines of the Kinsley addition, replaced the stone monuments at corners of the reservation by old iron guns sunk in the ground to their trunnions, and completed a slashing about 20 feet wide through the woods around the entire reservation.

THE KINSLEY ADDITION.

By the act of Congress approved March 2, 1889, an appropriation was made for the purchase of 225 acres of land directly south of the West Point reservation, known as the estate of the late Edward V. Kinsley. The purchase was finally consummated in the fall of 1889, and the land is now a portion of this military post. There is a large house upon it which is in very poor condition, but which, whenever funds are available, can be made comfortable as quarters for officers, or it might be rented for hotel purposes.

THE CEMETERY.

The West Point cemetery contains not only the remains of officers, cadets, enlisted men, and resident civilians who have died in past years at this post, but is also honored with being the final resting place of some of the most eminent soldiers of the Republic.

I have recently extended its limits by transferring the cadet vegetable garden to the Kinsley addition and including the former site thereof within the cemetery grounds, now containing about 14 acres. Much labor will be required to improve the new portion and make it correspond with the old cemetery, which was highly improved some years since through the energy and skill of Maj. Tully McCrea, of the artillery, who, at the time, was acting as post quartermaster.

It is earnestly hoped that sufficient funds for the work may be obtained at an early day.

WATER-SUPPLY.

The source of the water-supply of the post of West Point is the rainfall on the hills and valleys surrounding the reservoirs.

There are five reservoirs, with capacity as follows :

	Gallons.
1. Round Pond.....	48,000,000
2. Delafield Pond.....	9,000,000
3. Sinclair Pond.....	1,300,000
4. Crow-Nest Pond.....	300,000
5. Cascades Dam Pond.....	500

Only the second, fourth, and fifth are ordinarily used, the other two being held in reserve for emergencies, as they can not be made available without filtering, and even then are not very satisfactory.

Measurements made about two years ago showed the daily consumption to be 359,000 gallons in winter, 247,000 gallons in the spring, and 296,000 gallons in summer. The excess in winter is due to the fact that the supply is ample, and faucets are left open to prevent freezing of the pipes.

During the past month a careful measurement was made of the amount used between 6 p. m. August 7 and 6 p. m. August 14. The result was 1,890,000 gallons, or 270,000 gallons per diem, an average per capita of about 225 gallons.

The reservoirs and the water house are under the direct control of the instructor of practical military engineering, whose jurisdiction ends at the valves outside the water-house; the post quartermaster assumes charge at the valves and is responsible for the distribution of the water throughout the post.

A description of the water-pipes connecting the various reservoirs and of the various supply-pipes, valves, and hydrants will be found in the interesting report of Capt. George McC. Derby, Corps of Engineers, dated January 17, 1890, submitted herewith, marked C.

During the past year the water-supply has been ample and of excellent quality. It has only been necessary on one occasion to draw upon the reserve at Round Pond, and then only for three days during the latter part of July, 1890.

No extensive repairs were required during the year. The Crow-Nest reservoir was emptied and cleaned and the water was drawn off from Sinclair Pond and a small leak in the dam repaired.

In December, 1889, at my request, careful analyses were made of the drinking water by Prof. S. E. Tillman, of the department of chemistry, mineralogy, and geology, assisted by First Lieut. John P. Wisser, First Artillery, with most satisfactory results.

Professor Tillman concluded his report as follows :

In conclusion I may state that the results of the analyses of the water at this time, considered as a whole and taken in connection with the developments during the analyses, which should always be considered with the results, show that the waters are of excellent quality.

In the spring of 1890 analyses were made by Assistant Surgeon S. Q. Robinson, U. S. Army, of the water of the various springs in the vicinity of the quarters of the enlisted men of the post.

The result of these analyses showed that while the water was not as good, by any means, as that from the reservoirs, it was still good enough for drinking purposes, and Dr. Robinson reported that it was unnecessary to prohibit its use.

PROPOSED ELECTRIC-LIGHT PLANT.

Complaint has been made from time to time of the light furnished for the use of the cadets of the Military Academy, and more or less trouble has occurred in the last few years from injury to eye sight in studying at night. In order that I might have a plan for a complete electric light and power plant for the Military Academy, Lieut. John Millis, of the Corps of Engineers, a well-known electrical expert, kindly agreed to make a study of the subject and to prepare the necessary plan, specifications, and estimates.

At his own expense Lieutenant Millis visited West Point and spent several days in a careful examination of the locality.

His report, submitted herewith, marked D, is replete with useful and important information, and his estimates are the result of careful investigation.

He very properly states as follows:

The first considerations are, of course, the advantages and the adaptability of the proposed system to the requirements of the cadets and to what may be termed the academy proper.

Of the importance to the Corps of Cadets, a selected class of students, undergoing training and instruction for the military profession, little need be said, particularly when it is remembered that the greater portion of the study which the exacting course of the academy requires must be done by artificial light and that notwithstanding the rigid examinations regarding eye-sight to which candidates are subjected, failures in the course are not infrequent, which are directly attributable to impaired vision.

Lieutenant Millis further reports that—

The plan contemplates a system of electric lighting which, while being adapted to the peculiar conditions now existing, will admit of extension as future needs may require, which will eventually, if not when first established, replace all other methods of illumination in the academy buildings and grounds, and which will also, as a secondary consideration, be adapted to such requirements for the distribution of power as now exist or may arise in the future.

The plan proposes a complete set of electric lights for the cadet barracks and other buildings of the institution, including the academic building, Grant Hall, library, chapel, hospital, riding-hall, gymnasium, observatory, officers' quarters, etc.; also the soldiers' barracks, quarters, reading rooms, and hospital; the hotel, head-quarters building, shops, store-houses, guard-houses, laundries, stables, academy grounds, and the cadet camp.

It will be necessary to construct a central-station building, complete, to contain engine-room, boiler-room, store-room, etc. It is proposed to locate this building near the north end of the tunnel of the West Shore Railroad Company.

The plant will be arranged for 3,500 incandescent lamps of 16 candle-power and 10 arc lamps of 2,000 candle-power each.

The estimated cost of the entire plant is \$69,000 and the cost per annum of running it is placed at \$11,000.

Attention is specially invited to this subject. The plan is brought forward in the interest of the cadets at the U. S. Military Academy, and it is earnestly recommended that Congress may appropriate the necessary funds for the purpose at an early day.

DATE OF ASSIGNING AND RELIEVING OFFICERS AT THE MILITARY ACADEMY.

It has been the custom in years past to make the changes in the details for duty at the U. S. Military Academy so that they may take effect on August 28, four days before the commencement of academic

work. The result has been that the officers, as a rule, do not vacate their quarters until the day they are relieved, while their successors are obliged to quarter their families at considerable expense at the hotel for a short time, and while trying to get settled are also very busy in their efforts to prepare themselves for their duties as instructors.

I recommend that hereafter, except in the department of tactics, the officers whose tours of duty are drawing to a close shall be relieved on August 8 of each year and that the new details be required to report not later than August 15. This will give at least two weeks to get settled before the commencement of the academic year.

CLERKS IN THE OFFICE OF THE POST ADJUTANT AND THE POST QUARTERMASTER.

I respectfully invite attention to the recommendation contained in the report of the Board of Visitors for 1889, in regard to the retirement on three-quarters pay of Mr. Francis Newlands and Mr. William Ward, the clerks in the office of the post quartermaster and the post adjutant.

Mr. Newlands has given the best years of his life to his duties, having served as clerk at the academy for over forty-five years. He is now quite infirm, and it will be an act of simple justice to an old and faithful employé to permit him to retire at once on a pension of \$1,125 per annum, three-fourths of the pay he now receives.

Mr. William Ward has served about forty years at the academy and has rendered valuable service to the institution. He should be accorded the same privilege.

It is recommended that the following be inserted in the Military Academy appropriation bill:

Provided, That Mr. Francis Newlands and Mr. William Ward may each, upon his own application, be retired from active service upon a pension of three-fourths of the pay now drawn by them.

In case Congress deems it best not to permit such retirement or pension, then I earnestly recommend that one additional clerk each be allowed for the adjutant and the quartermaster to assist them in their laborious duties, at a salary of \$1,200 per annum. Provision was made for two such clerks in the Military Academy appropriation bill for the present fiscal year as it passed the House of Representatives, but it was not in the bill when it became a law.

I desire to invite special attention to the estimates submitted for the next fiscal year. They have been prepared under my personal supervision, and there is not a single item that is not deemed by me absolutely necessary for the welfare and prosperity of the Military Academy. I feel justified in urging that they all may receive favorable consideration.

In conclusion I have to express my high appreciation of the earnest, faithful, and intelligent assistance I have received in the discharge of my official duties during the past year from every professor and officer connected with the Academy, and my gratification at being able to report the Corps of Cadets in excellent condition as regards health, discipline, drill, and instruction.

Very respectfully, your obedient servant,

JOHN M. WILSON,

Colonel of Engineers, Superintendent U. S. Military Academy.

The ADJUTANT-GENERAL, U. S. ARMY,
Washington, D. C.

A.

CADET HOSPITAL, U. S. MILITARY ACADEMY,
West Point, N. Y., September 1, 1890.

SIR: In compliance with instructions from your office that I "prepare and submit a statement of the condition and work of the Medical Department of the U. S. Military Academy and Post of West Point, N. Y., during the past year," ending June 30, 1890, I have the honor to submit the following report:

The following medical officers have been on duty during the year, viz:

Maj. H. R. Tilton, surgeon, U. S. Army, post surgeon from beginning of year (July 1, 1889), to February 22, 1890.

Maj. Henry McElderry, surgeon, U. S. Army, post surgeon from February 22, 1890, to end of year (June 30, 1890).

Capt. William L. Kneedler, assistant surgeon, U. S. Army, from beginning of year (July 1, 1889), to March 17, 1890.

Capt. Samuel Q. Robinson, assistant surgeon, U. S. Army, on temporary duty from March 4, 1890, to end of year (June 30, 1890).

Maj. Robert H. White, surgeon, U. S. Army, on temporary duty as post surgeon from April 27, 1890, to June 7, 1890, during the temporary absence of Major McElderry on detached duty in New York City and seven days leave.

Acting Assistant Surgeon William Penn Compton, U. S. Army, from March 18, 1890, to end of year (June 30, 1890).

The duties of the medical officers have been divided as follows, viz: The post surgeon has charge of the Cadet Hospital and sick-call and general administrative affairs of the Medical Department of the Academy and Post and of such officers and their families as may call on him for professional advice. The first assistant has charge of the Soldiers' Hospital and such officers and their families as may call on him for treatment. He also personally examines all recruits enlisted at this post. The second assistant has professional charge of the families of enlisted men and employes living on the reservation.

The following table shows the average strength of the command for the year:

Officers	49
Cadets	254
Enlisted men	333
Civilians (738 Soldiers' Hospital, 367 Cadet Hospital)	1,105

The following table shows the number of cases treated during the year:

Officers (1 wounded, 31 sick)	32
Cadets in hospital (58 wounded, 382 sick)	440
Cadets, approximate number treated not on sick report but excused from some duty	1,854
Cadets treated in quarters, not excused	2,340
Enlisted men (86 wounded, 448 sick)	534
Civilians on reservation, men, women and children, treated	2,292

The appended tables, marked A and B, show the character of the cases of disease for the year, respectively, among officers and cadets.

Of the total number of cases among civilians on the reservation 466 are recorded at the Cadet Hospital as having occurred among officers' families, the prevailing diseases among whom are recorded as miasmatic diseases, diseases of the respiratory and digestive systems, sewer-gas poisoning, diphtheric scarlitina and varioloid, as shown by table appended marked C. There was one death among this class of patients, an infant thirteen days old.

There were 1,826 cases of disease treated among civilians at the Soldiers' Hospital, and of this number there were 74 cases of contagious disease as follows, viz:

Diphtheria	20
Meningitis	1
Mumps	6
Scarlet fever	47
Total	74
Deaths	19

The other prevailing diseases among this class of patients were miasmatic diseases, diseases of the respiratory and digestive systems, as indicated in appended table marked D. The character of diseases among soldiers is shown in appendix marked E.

There were no deaths during the year among the officers, and but one among the enlisted men.

Two deaths are recorded as having occurred during the year among the Corps of Cadets, viz, one from malarial fever and one from apoplexy.

Twenty-seven births are recorded as having taken place on the reservation during the year.

Two thousand six hundred and twenty-five prescriptions are recorded at the Cadet Hospital as having been put up during the year, 250 for officers and 2,375 for others.

Four thousand and thirteen prescriptions are recorded at the Soldiers' Hospital as having been put up during the year.

One hundred and ninety-six recruits were examined at the Soldiers' Hospital during the year.

One hundred and forty-four vaccinations were performed on the reservation during the year.

The clerical work, dispensing of medicines, cooking and nursing, in the Cadet Hospital and Soldiers' Hospital during the year have been satisfactorily performed by members of the Hospital Corps.

Besides the regular monthly sanitary reports and recommendations forwarded at the end of each month to the post adjutant by the post surgeon and assistant surgeon in charge of Soldiers' Hospital, as required by paragraph 1642, A. R., the following special sanitary reports were forwarded during the year to the post adjutant, viz: August 12, 1889, by Assistant Surgeon Kneedler, regarding overcrowding of certain married soldiers' quarters, and specifying three families as especially overcrowded and deserving of consideration (condition much improved). March 5, 1890, by post surgeon regarding old plumbing fixtures and defective plumbing arrangements in Cadet Hospital (\$2,500 appropriated for the purpose—being \$1,600 less than originally estimated for).

The following sanitary recommendations were made by the medical officers of the post during the year in the regular monthly sanitary reports, viz:

July 31, 1889, by Assistant Surgeon Kneedler: Need of proper water-closet facilities for soldier's families. (Remedied.)

July 31, 1889, by Assistant Surgeon Kneedler: Need of repairs to bath-house in Logtown, for use of soldiers' families. (Remedied.)

July 31, 1889, by Assistant Surgeon Kneedler: Need of extension of water-supply pipes of post to Rugertown for use of families of enlisted men. (Remedied in a great measure.)

January 31, 1890, by Assistant Surgeon Kneedler: Reports concerning bad sanitary condition of privy in rear of cavalry stables. (Remedied.)

March 31, 1890, by post surgeon: Reports concerning the bad sanitary condition of the cadet sinks and officers' quarters from bad plumbing arrangements and old style pan water-closets, without cisterns, the water for flushing being derived direct from the water-pipes; refers to the danger of contaminating the water supply of the post thereby; calls attention to there being no means to properly and systematically flush the sewers of post, and recommends automatic flushing tanks; calls attention to the report and recommendations of the Board of Visitors of 1884, regarding these matters, and recommends that their recommendations be carried out. (Estimates ordered to be prepared for next annual estimate to cover these recommendations.)

The present Superintendent has uniformly approved the recommendations made by the medical officers on duty at the post, and has done all in his power to carry them out. The sanitary condition of the families of enlisted men as to a better water supply and as to overcrowding in their quarters, better privies, etc., has been very materially improved since he assumed charge of the post, and it was by his prompt action that the appropriation for the improvement of the plumbing of the Cadet Hospital was obtained. Much, however, remains to be done to put the post of West Point in a first-class sanitary condition. With this view, estimates have been ordered prepared by the Superintendent to carry out the various sanitary recommendations of the post surgeon for the action of higher authority, and of Congress; and it is hoped that the necessary funds may be promptly provided for this purpose.

When the new Soldiers' Hospital shall have been built, for which \$30,000 has been already appropriated by Congress, and the improvements to the plumbing arrangements in Cadet Hospital shall have been finished as recommended by the post surgeon, and as originally estimated for by the post quartermaster, and with three medical officers stationed at the post, the condition of the Medical Department of the Army at West Point will be in every way satisfactory.

Very respectfully, your obedient servant,

HENRY McELDERRY,
Major and Surgeon, U. S. Army, Post Surgeon.

The POST ADJUTANT,
Present.

Official copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant.

HEADQUARTERS U. S. MILITARY ACADEMY,
September 4, 1890.

APPENDIX A.

Summary of diseases treated in quarters among officers stationed at U. S. Military Academy, West Point, N. Y., from July 1, 1889, to June 30, 1890, both inclusive.

Diseases.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
Acute tonsillitis	1				1					1			3
Acute bronchitis				2									2
Acute indigestion					1								1
Sub-acute rheumatism	1	1								1	1		4
Malarial fever			1			1							2
Influenza						3	7	4					14
Contusion						1							1
Neuralgia						1		1					1
Intestinal colic									1				1
Anorexia										1			1
Lumbago										1			1
Acute urethritis												1	1
Total	2	1	1	2	2	5	7	5	1	4	1	1	32

No deaths during the year.

HENRY McELDERRY,
Major and Surgeon, U. S. Army, Post Surgeon.

CADET HOSPITAL, U. S. MILITARY ACADEMY,
West Point, N. Y., July 31, 1890.

Official copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant.

HEADQUARTERS U. S. MILITARY ACADEMY,
September 4, 1890.

APPENDIX B.

Summary of diseases treated in hospital among the Corps of Cadets, U. S. Military Academy, West Point, N. Y., from July 1, 1889, to June 30, 1890.

Diseases.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.	Deaths.
Acute catarrh	2	2	1	1	1	1	1	1	1	1	1	1	10	1
Acute tonsillitis	1	1	1	1	3	1	1	4	14	8	1	2	36	8
Acute bronchitis	3	1	1	3	1	1	1	4	14	8	1	2	36	8
Acute indigestion	2	7	3	1	5	3	1	1	1	1	4	1	24	8
Intestinal colic	3	3	2	1	1	2	1	1	1	1	1	1	8	1
Acute diarrhoea	7	1	1	1	6	1	1	2	2	1	1	1	17	1
Malarial fevers	5	8	8	4	1	2	1	3	2	1	1	4	39	1
Mumps	1	1	1	1	1	1	6	8	6	2	3	1	20	1
Scarlet fever	1	1	1	1	1	1	1	1	1	1	1	1	5	1
Diphtheria	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rheumatism	3	2	1	1	1	1	1	1	1	1	1	1	9	1
Headache	3	1	1	1	2	3	2	3	7	1	7	6	34	1
Syncope	1	1	1	1	1	1	1	1	1	1	1	1	3	1
Apoplexy	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rhus poisoning	1	1	1	1	1	1	1	1	1	1	1	1	3	1
Conjunctivitis	1	1	1	1	1	1	1	1	1	1	1	1	8	1
Odontalgia	1	1	1	1	1	1	1	3	1	1	3	1	9	1
Boils	4	3	2	2	3	3	7	2	2	2	4	2	32	1
Exhaustion	2	2	1	1	1	1	1	1	1	1	1	1	6	1
Piles	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Vaccina	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Neuralgia	2	2	2	2	2	2	2	2	2	2	2	2	9	1
Skin diseases	2	2	2	2	2	2	2	2	2	2	2	2	4	1
Hemoptysis	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Influenza	21	50	5	5	5	5	5	5	5	5	5	5	76	1
Insomnia	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ulcerated sore throat	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enlarged glands	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Phtisis pulmonalis	1	1	1	1	1	1	1	1	1	1	1	1	2	1
For disinfection	1	1	1	1	1	1	1	1	1	1	1	1	3	1
Vertigo	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Orchitis	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	31	35	18	17	26	38	68	92	41	24	32	20	382	2
Injuries	8	5	5	5	8	3	5	3	6	3	7	5	58	1
Total	39	40	18	22	34	41	73	35	47	27	39	25	440	2

HENRY MCELDERRY,
Major and Surgeon, U. S. Army, Post Surgeon.

CADET HOSPITAL, U. S. MILITARY ACADEMY,
West Point, N. Y., July 31, 1890.

Official copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant.

HEADQUARTERS U. S. MILITARY ACADEMY,
September 4, 1890.

APPENDIX C.

Summary of cases treated among civilians attached to the command recorded at the Cadet Hospital, U. S. Military Academy, West Point, N. Y., from July 1, 1889, to June 30, 1890, both inclusive.

[Prevailing diseases were: Miasmatic diseases, diseases of respiratory and digestive systems; sewer gas poisoning, 13; diphtheretic scarletina, 1; varioloid, 1.]

July	61	February	42
August	40	March	27
September	33	April	16
October	59	May	14
November	34	June	12
December	58		
January	70	Total	466

One death occurred during the year, on April 28, 1890, age thirteen days; child of Lieutenant Rowan, U. S. Army.

HENRY MCELDERRY,
Major and Surgeon, U. S. Army, Post Surgeon.

CADET HOSPITAL U. S. MILITARY ACADEMY,
West Point, N. Y., July 31, 1890.

Official copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant.

HEADQUARTERS U. S. MILITARY ACADEMY,
September 4, 1890.

APPENDIX D.

List of diseases occurring among civilians who received medical treatment from the Soldiers' Hospital, West Point, N. Y., during the fiscal year ending June 30, 1890.

Contagious diseases.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
Diphtheria .....	.....	.....	.....	.....	6	.....	.....	13	1	.....	.....	.....	20
Meningitis	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Mumps .....	.....	.....	.....	.....	2	1	1	2	.....	.....	.....	.....	6
Scarlet fever.....	.....	3	.....	3	4	7	17	1	2	10	.....	.....	47
Total	1	3	.....	3	12	8	18	16	3	10	.....	.....	74

Number of deaths occurring among diseases enumerated above, 19.

Prevailing diseases were: Miasmatic diseases, diseases of the respiratory and digestive systems, and contagious diseases. The latter, although separately given, are included in the total. (See No. 5.)

Respectfully submitted.

WM. FITZHUGH CARTER,
Captain and Assistant Surgeon, U. S. Army.

SOLDIERS' HOSPITAL,
West Point, N. Y., August 9, 1890.

Official copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant.

HEADQUARTERS U. S. MILITARY ACADEMY,
September 4, 1890.

APPENDIX E.

List of diseases occurring among enlisted men treated in hospital and quarters, at Soldiers' Hospital, West Point, N. Y., during fiscal year ending June 30, 1890.

Diseases.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
Abscess.....					1	1	2		1	1		6	13
Amblyopia, and hypermetropia.....											2	1	3
Acute bronchitis.....		1	5	6	5	4		2	4	5	1	3	36
Acute catarrh.....			2	1									3
Acute conjunctivitis.....	1								1	1	4	2	9
Acute cystitis.....	1						1					1	4
Acute diarrhœa.....	3		1			1		3	3			1	17
Acute dysentery.....	1							1					2
Acute dyspepsia.....		1			2							3	6
Acute gastritis.....	1	3							2				6
Acute orchitis.....		1							2				3
Acute pharyngitis.....												1	1
Acute rheumatism.....	1	3	2	5		4		3	1	1	2	4	26
Acute tonsillitis.....		2	2	1	2	3	1	1	4	1	2	1	20
Carbuncle.....					1								1
Cholera morbus.....	6	2											8
Colic.....	7	2	4			1			2	1	1	4	22
Constipation.....					1					1			2
Coryza.....				1									1
Dermatitis (rhus).....	1										3	1	5
Epilepsy.....							1						1
General debility.....					1						1		2
Gonorrhœa.....										1	1		2
Headache.....			1		1				2			6	10
Hemorrhoids.....	1					1						2	3
Hyperidrosis.....												2	2
Inflammation, lachrymal canal.....									1			1	1
Inflammation, spermatic cord.....													1
Influenza.....							120	7	1				136
Lumbago.....			2		1			2				2	7
Malarial fever.....	10	9	3	2	1	3				4	1	4	37
Neuralgia.....			1		1	1			1				4
Otitis.....	1											1	2
Pleurisy.....										1	1		2
Pleurodynia.....									1				1
Pneumonia.....				1						1	1		3
Poisoning by sewer air.....		1											1
Remittent fever.....			1	1									2
Sclerotitis.....				1									1
Skin diseases.....	1	1	1	3		3	2	2	4		4		21
Torticollis.....				3				1				1	2
Vaccina.....										2	17		19
Vertigo.....									1				1
Total diseases.....	35	26	25	22	17	23	134	19	37	23	41	46	448
Injuries.....	3	6	5	7	4	4	5	6	2	13	6	25	86
Total treated.....	38	32	30	29	21	27	139	25	39	36	47	71	534

Number of deaths occurring among diseases enumerated above, 1.
Respectfully submitted.

WM. FITZHUGH CARTER,
Captain and Assistant Surgeon, U. S. Army.

Official copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant.

HEADQUARTERS U. S. MILITARY ACADEMY,
September 4, 1890.

B.

WEST POINT, N. Y., *October 22, 1889.*

SIR: Agreeably to a verbal invitation of the Superintendent, I have the honor to submit a few facts and suggestions regarding artillery matters at the Military Academy.

The artillery equipment used by the cadets belongs exclusively to the instructor of ordnance. As far as quantity is concerned it is ample, but its pattern is obsolete.

At the sea-coast battery the cadets use three 8-inch M. L. rifles (converted 10-inch S. B. Rodman guns), two 15-inch S. B. Rodman guns, and one 13-inch mortar. No two of the pieces in this battery are mounted on carriages of the same pattern, which fact renders a uniform system of instruction impossible. For effective work here guns of the same class should be mounted on carriages modern and uniform in construction.

At the siege battery instruction is entirely suspended this month, for the reason that the present armament of 30-pounder Parrott rifles was, in April last, condemned, and new 4.5-inch cast-iron siege rifles recommended to replace it have but just been supplied.

At the mortar battery the armament consists of three 10-inch and three 8-inch mortars. Were all the pieces at this battery uniform in caliber (10-inch) the instruction would be more systematic and satisfactory.

The field artillery consists of two batteries of 3-inch M. L. rifles (six guns each) and one battery of six 12-pounder (Napoleon) guns. One of the 3-inch batteries, when manned and horsed by cavalry soldiers and horses, is used in the instruction of cadets, as a mounted battery. The harness for this battery is under the exclusive care and control of the instructor of cavalry tactics.

All of these batteries, together with the implements and equipments pertaining thereto, should belong exclusively to the tactical department.

The enlisted men who act as drivers at mounted artillery drill belong to the cavalry detachment. They are totally uninstructed in all that pertains to artillery, and it is impracticable to so instruct them. As artillery soldiers they are negative quantities and entirely beyond the control of the instructor of artillery in the matter of progressive instruction and continuous discipline.

The horses used at the drill are purchased with an exclusive view to their adaptability to cavalry purposes. They are too small and light for battery work aside from the fact that for the greater part of the year they are promiscuously ridden by two hundred inexperienced boys.

The various uses to which they are, sometimes daily, subjected tends to, and to a great extent does, unfit them for satisfactory work as either artillery or cavalry horses, the training for the one purpose undoing the labor expended on them to make them efficient for the other. A fair degree of efficiency must be attained on the part of drivers and horses before the instruction proper of the cadet can begin, and much time is lost at each season's drill in an endeavor to approximate to this point.

This is all the more important because of the limited time allotted for the instruction of cadets in the practical duties of artillerymen. In the spring and fall of the year (April and October), leaving out Saturday and Sunday, the maximum number of drills in either does not exceed twenty-three, and on account of the variability of the weather rarely as many can be had. The first class attends in squads of eleven each drill-day. In the present class there are fifty-five members, so that at most each member will attend four drills during the month. Each must in turn occupy and be instructed in the duties of "platoon," "section," and "line" commander and "guidon." A very simple calculation will here serve to demonstrate the amount of knowledge attained by the cadet in the duties of any one of these positions at the end of the season's drill. The summer season (a part of July and August) of six drills a week is slightly more favorable during the last; the maximum number of drills attended by any one cadet of the first class was eight, the minimum two.

This, I think, will suffice to make clear the necessity for a radical change in the status of the artillery as a co-ordinate branch of instruction at the Military Academy. Its status should be an independent one in all respects and not, as now, dependent on two departments, one remotely the other in no way related to practical artillery. To put the mounted battery on an independent basis I would suggest a distinct detachment of artillery soldiers and horses, having the same status as the company of engineers and detachment of cavalry now attached to the Academy, sufficient in number to man and horse a six-gun battery and to perform such other artillery duties as may be necessary at the batteries of position. This would, of course, necessitate the erection of barracks, stables, gun-sheds, etc., for which the recently acquired land on the south may be available.

Another idea has frequently occurred to me, that is, the stationing at this post of one of the regular batteries (mounted), but the practicability and advisability of

this are questions in my mind. The commander of a regular mounted battery is a fairly independent officer. He would bring with him a full complement of subaltern officers, themselves attached to his battery for instruction. The introduction of this body of officers remotely, if in any degree, feeling themselves a part of the institution, would it be conducive to the best interests of the Academy? The colonel to whose regiment such battery belonged might feel his prerogatives endangered. All things considered, I favor the independent detachment; to belong exclusively to the Military Academy.

It may not be amiss to mention here the fact that a new light artillery drill-book is now in the hands of the Public Printer, the issue of which, by authority of the War Department, may be reasonably expected before the close of the year. This will relegate our antiquated field guns and carriages to oblivion, and deal only with the new 3.2-inch B. L. steel rifle mounted on a steel carriage. In anticipation of this, I would suggest that requisition be made on the Ordnance Department for two batteries of the new rifles at once, to replace the two old 3-inch batteries. The battery of 12-pounders should be retained for saluting purposes.

Very respectfully, your obedient servant,

J. D. C. HOSKINS,

First Lieutenant, Third Artillery, Senior Assistant Instructor of Artillery Tactics.

The ADJUTANT U. S. MILITARY ACADEMY,
West Point, N. Y.

[First indorsement.]

HEADQUARTERS UNITED STATES CORPS CADETS,
West Point, N. Y., October 24, 1889.

Respectfully forwarded to Headquarters U. S. Military Academy. The views herein expressed are approved. The subject has been advanced time and again.

So much as refers to the horses and enlisted men of the mounted detachment accords with representations repeatedly made by the senior assistant instructor of cavalry, to whose communications on this and kindred subjects, probably on file at post headquarters, attention is respectfully invited.

Considering the amount of hard work required of the enlisted men of the mounted detachment, it is thought highly creditable to them that they should be found as capable as they are at light battery drill. A separate artillery detachment, composed of soldiers and not laborers, is much needed, and it is desirable that they be not a part of any regiment, thus doing away with the necessity of providing quarters for additional officers and their families.

H. S. HAWKINS,

Lieutenant-Colonel Twenty-third Infantry, Commandant of Cadets.

A true copy.

J. M. CARSON, JR.,

Second Lieutenant, Fifth Cavalry, Adjutant U. S. Military Academy.

C.

WEST POINT, N. Y., *January 17, 1890.*

SIR: In accordance with instructions contained in your letter of the 31st ultimo, I have the honor to submit the following answers to your inquiries in regard to the water supply of this post:

I.—*Length, character, and dimensions of pipes connecting Round Pond, Sinclair reservoir, Cro' Nest reservoir, and Cascade reservoir with Delafield reservoir.*

	Cast-iron pipe.	Dimensions.
	<i>Feet.</i>	<i>Inches.</i>
Round Pond to Delafield reservoir.....	20, 698	6
Cascade to point on Round Pond pipe-line 7,558 feet from Delafield reservoir.....	150	6
Cro' Nest reservoir to water-house.....	4, 125	6
Sinclair reservoir to Cro' Nest pipe.....	150	4
From Delafield reservoir to filter-house.....	390	12
From point 160 feet above water-house on the Cro' Nest pipe, to filter.....	90	6
From point 400 feet above Delafield reservoir to filter-house.....	246	4

About 60 feet from filter-house the 12-inch pipe, leading thereto from Delafield reservoir, is divided into two branches, one of which (a 6-inch cast-iron pipe) runs into

the filter-house, and the other (a 4-inch cast-iron pipe) is fitted with valves and connections to carry water either to the water-house or direct to the post in case of fire.

II.—Number, length, and dimensions of all supply pipes running from Delafield reservoir or any other distributing reservoir for actual supply purposes.

(1) From water-house to northwest angle of cadet barracks, 3,559 feet cast-iron pipe, 12-inch.

(2) A 7-inch cast-iron pipe is connected by a coarse joint with the 12-inch pipe from water-house at a point near Lieutenant Dodds' quarters; the side of the cross towards the cemetery being connected with a 4-inch cast-iron pipe running in that direction.

The 12-inch main pipe turns and runs down the road parallel with the 7-inch main from cross joint until the northwest corner of the cadet barracks is reached, where they are again united.

From opposite northwest corner of cadet barracks to a point opposite Mr. Newland's quarters, 2,325 feet cast-iron pipe, 7-inch.

Camptown is supplied on the side next the river, except the hospital buildings, by a 1-inch lead pipe running from a well opposite the soldiers' hospital. The other side of the street and the hospital are supplied by a 1½-inch iron pipe tapped on a 4-inch branch from Professor Michie's quarters, near cavalry barracks.

A 2-inch cast-iron pipe tapped on 7-inch main near Lieutenant Dodds' quarters supplies water to the engineer barracks. The 4 inch pipe to the cemetery is tapped in two places, near the top of Laundry Hill by a 2-inch pipe to supply water to Logtown and the laundry, and a few feet east of that point by a 1½-inch pipe to supply the new quarters east of Logtown. The houses at the north end of Logtown are supplied by a 1-inch galvanized-iron pipe from near the quarters occupied by Sergeant Malone of the artillery detachment.

Each of these supply pipes is fitted with a stop-cock of appropriate size to shut off the water in case of need.

A 4-inch pipe (cast-iron) from 7-inch main at academic building to northwest corner of chapel, and running thence to West Point Hotel, 1,500 feet.

Cadet and artillery gardens are supplied by a line composed of pipe of sizes from 4-inch to 1½-inch, running from Cro' Nest pipe near magazine. Engineer garden is supplied by 2-inch wrought-iron pipe, tapped on Cro' Nest pipe 100 feet from dam. Each of these pipes has a stop-cock near point where it taps the supply pipe.

III.—The number of valves, dimensions and locations, Round Pond pipe, including Cascade and filter-house connections.

	Valves.	Inches.
At Cascade dam	1	6
On 4-inch pipe connecting Round Pond pipe line with filter at a point 400 feet above Delafield dam	1	4
Below this connection on Round Pond pipe	1	6
Cro' Nest and Sinclair:		
At a point 50 feet from Cro' Nest dam	1	6
At a point 50 feet from Sinclair dam	1	4
At "Y" where Cro' Nest and Sinclair pipe separates into two branches 160 feet	2	6
Above water-house:		
Waste pipe from filter	1	6
Waste pipe from water-house	1	6
In valve-house between Delafield reservoir and the filter-house	1	7
On 6-inch branch of 12-inch pipe from Delafield reservoir to filter	1	12
On 4-inch branch of 12-inch pipe from Delafield reservoir to water-house close to water-house wall	1	6
On above 4-inch branch to control direct supply to post 10 feet from center of west wall of water-house	1	4
On same branch where it turns to connect with 12-inch supply pipe from water-house about 40 feet southeast of house	†1	4
On 12-inch pipe (main) about 40 feet from end wall of water-house	1	4
On 4-inch pipe to cemetery, about 40 feet above cross-joint, near Lieutenant Dodds' quarters	1	12
Twelve feet below turn near cross-joint on 12-inch main	1	4
At northwest corner of cadet barracks, to close 12-inch main where it connects with 7-inch main through a short length of 8-inch pipe	1	12
On 7-inch main opposite interval between Lieutenant Biddle's quarters and northwest corner of cadet barracks	§1	8
Opposite north end of cadet mess-hall	1	7
Opposite north end of old hospital	1	7
On 4-inch main to hotel, from chapel at northwest corner of chapel	1	4

* The 7-inch valve is for letting off waste from Delafield reservoir.

† Stop.

‡ Closed except when water-house is empty or in case of fire.

§ This valve is closed.

IV.—Number of hydrants and location.

	Hydrant.
On 4-inch pipe to cemetery :	
Near Lieutenant Dodds' quarters	1
On upper road above laundry	1
On upper road near junction of road from laundry	1
On road to cemetery, opposite Sergeant Malone's quarters in Logtown	1
On sidewalk opposite Professor Andrews' quarters	1
At Colonel Wilson's quarters	1
At Captain Williams' quarters	1
Near east end of cadet barracks	1
Between east door and northeast corner of academic building	1
Between officers' mess and new hospital	1
At Colonel Winthrop's quarters	1
At Mr. Newland's quarters	1
On 4-inch pipe from chapel connecting with 7-inch main at corner of academic building :	
At West Point Hotel	1
On 4-inch pipe connecting with 7-inch main at Professor Michie's quarters :	
Between soldiers' chapel and artillery barracks	1
At southeast corner of cavalry barracks	1
On 12-inch main :	
At Professor Andrews' quarters, crest of slope	1
At Colonel Wilson's quarters	1
At Captain Williams' quarters	1
Total	18

The exact point where my jurisdiction ends and that of the quartermaster commences has never been officially determined by orders from headquarters. My understanding of it is, however, and I believe Captain Williams is of the same mind, that I bring the water on the post and he distributes it, and that my jurisdiction ends at the valves around the water-house.

All of the information herein given relating to mains and hydrants for the distribution of the water supply after leaving the water-house has been compiled from statements made by Mr. Richards, who was directed by the quartermaster to furnish me the data called for in your letter of the 31st ultimo, his office not having time to make the compilation.

Very respectfully, your obedient servant,

GEO. MCC. DERBY,

Captain of Engineers, in charge of Water Supply.

THE ADJUTANT OF THE ACADEMY.

A true copy.

J. M. CARSON, JR.,

Second Lieutenant, Fifth Cavalry, Adjutant U. S. Military Academy.

D.

UNITED STATES GENERAL LIGHT-HOUSE DEPOT,
OFFICE OF U. S. LIGHT-HOUSE ENGINEER, THIRD DISTRICT,
Tompkinsville, N. Y., May 31, 1890.

SIR: In compliance with your request, I have the honor to submit the following outline plan, estimates, and specifications for an electric light and power-plant for the U. S. Military Academy at West Point, N. Y.

The plan proposed contemplates a system of electric lighting which, while being adapted to the peculiar conditions now existing, will readily admit of extension as future needs may require; which will eventually, if not at first established, replace all other methods of illumination in the Academy buildings and grounds, and which will also, as a secondary consideration, be adapted to such requirements for the distribution of power as now exist or may arise in the future.

With the above objects in view, the estimates comprise, first, a complete system of electric lamps for cadet barracks and other buildings of the Academy where artificial lights are used, including the academic building, the cadet mess-hall, the library the chapel, the cadet hospital, the riding hall, the gymnasium, the observatory, and the bath room, sinks, etc.

There are also included electric lamps for the soldiers' barracks, quarters, reading and amusement rooms, and soldiers' hospital; for the officers' mess-hall and quarters, for the quarters of civil employes, for the hotel and headquarters building, for the various shops, store-houses, guard-houses, laundries, stables, etc., and for lighting the Academy grounds and the cadet camp.

The electric plant necessary to operate such a system of lights would, in addition, furnish a very advantageous and economical method of distributing mechanical power by means of electric motors to the various work-shops, laboratories, etc., where steam-engines or other motors are now employed or where power may be eventually required.

The first considerations are of course the advantages and the adaptability of the proposed system to the requirements of the cadets and to what may be termed the Academy proper. Of the importance to the Corps of Cadets—a selected class of students undergoing training and instruction for the military profession—of the most perfect known method of artificial illumination little need be said, particularly when it is remembered that a greater portion of the study which the exacting course of the Academy requires must be done by artificial light, and that, notwithstanding the rigid examinations regarding eye-sight, to which candidates for admission are subjected, failures in the course which are directly attributable to impaired vision are not infrequent. It is now generally conceded that the incandescent lamp is the most perfect known device for interior illumination and particularly for purposes of reading and study. Its great superiority over gas, oil, or other lamps as regards safety from fire, the favorable color of the light, and particularly its freedom from heat and unhealthy products of combustion, are now too well known to require detailed explanation here.

Since the majority of the lamps to be established are for interior illumination, the proposed plant will of course consist mainly of the incandescent system, and the conditions are such as to render the "central-station" plan best adapted to the requirements, as the buildings to be lighted are considerably scattered and there are not sufficient number of large separate buildings to justify establishing several separate or "isolated" plants.

A single station for all the generators and the steam power being decided upon, its location is determined by the following considerations: It should be easy of access from the river and from the railroad, in order to facilitate the delivery of machinery, coal, and other materials and supplies, and it should also be placed where there is a supply of water, where ashes may be readily disposed of, and where the unavoidable dirt, smoke, and noise of the machinery will not be objectionable. A central location with respect to the buildings to be lighted is of course desirable.

An examination shows that there is no existing building on the reservation fulfilling these conditions which is also of sufficient size and adapted to the other requirements of a central station, and it is therefore proposed to erect a new building on a site west of the railroad track and near the northern end of the tunnel. It is believed that this location offers a better combination of favorable conditions and fewer unfavorable ones than any other site available.

With the central station at this point, the cadet barracks and Academy proper will be at a distance of about half a mile. The hotel and the "center of distribution" for the officers' quarters north of cadet barracks will be about a quarter of a mile distant. The center of distribution for the officers' quarters south of cadet barracks will be at a distance of three-quarters of a mile, while that for the soldiers' barracks and quarters, the soldiers' hospital, etc., will be only an eighth of a mile from the station.

The most distant lamps will be those at the south guard-house and in the officers' quarters near by, which are about 1 mile from the site proposed for the central station.

For a large incandescent plant, where the lamps are so widely scattered and where conductors of such varying lengths are required, the "direct" or continuous current system is not well adapted, since for the long circuits very heavy conductors would be necessary in order to insure uniformity in the brightness of the lamps and economical working, a number of generators would have to be employed, each adapted to a group of lamps requiring about the same length of circuit. It has therefore been decided to adopt the "secondary" or alternating current system throughout, in which the above objections are mainly obviated. The secondary system will afford sufficient flexibility to meet the requirements of the service, while for long circuits it is more economical in first cost of line construction and in expense of operation.

The estimate of the total number of lamps required is based upon the number of gas-burners now in use, which is 2,745. Besides the gas-burners there are also employed in the soldiers' barracks and other buildings a considerable number of oil lamps, which it is proposed to replace by electric lamps, and in the cadet barracks it is proposed to put two lamps in each room where only one gas-burner has been furnished heretofore. The new academy and gymnasium buildings will also require additional lights, and a number of the existing gas-lamps, particularly those used for

lighting the grounds, will be replaced by electric lamps of greater power than the standard 16 candles. It is also probable that in establishing the new system more efficient lighting will be called for in other localities where gas or oil is now used, requiring more burners than are now employed, so that the estimate is made for a total of 3,500 16-candle lamps, of which it is calculated that the greatest number that will be in operation at any one time will not exceed 2,000.

The central station building is to be a plain brick structure with brick chimney and metal or slate roof, and while not intended to be fire-proof it will not be easily combustible. It is to have a room for the engines and electric apparatus, a separate boiler-room, rooms for oil, stores, etc., and a coal-shed. Owing to the great irregularity of the service required, both the steam-power and the electric generators will have to be designed for unusual "flexibility." During the summer encampment the lamps in cadet barracks and in many other of the academy buildings, as well as a large portion of those in the officers' quarters, will not be used, while the demand for lights at the hotel and in the cadet camp will of course be greater than at other times of the year. In the winter season, when the total number of lamps in use will be greatest, the number in operation at different times of the night will be exceedingly variable.

The maximum "load" will begin soon after the return of the cadets from supper and will continue till "taps," when a large number of lamps are extinguished and the load will be greatly diminished. A considerable number will be required in officers' quarters, etc., until midnight, but comparatively few, including those used for lighting the grounds and in certain hallways in hospitals, etc., will be operated all night. For a service of such a variable nature a number of generators with engines and boilers to correspond are evidently preferable to one or two generators of large capacity with large power units, and for this reason the high-speed, non-condensing type of engine with direct belting to the dynamos is recommended; though, for a plant of this size where the service is more regular, compound condensing engines or engines of the Corliss type would be the more economical, as the greater first cost would be overbalanced by the saving in cost of fuel and other operating expenses.

For cadet barracks the importance of an uninterrupted service is such that this circuit should have its special generating apparatus, which should be in duplicate, but it will not be necessary to provide special duplicate engines, since there will always be a reserve of power, and interruptions due to accidents to the steam apparatus are not so liable to occur. Three boilers are provided for, one of which is ordinarily to be held in reserve. Should it be necessary other less important circuits could be shut off in order to keep the lamps at cadet barracks in operation.

For the generators to operate the other circuits, duplicate armatures only are contemplated.

For the outside circuits in general overhead wires supported on poles will be used, since it is not believed that the requirements are such as to justify the increased expense of underground conduits, except perhaps in a few special localities. Conductors are to be covered throughout with best gum insulation, and poles, cross-beams, brackets, etc., are to be smoothly finished and painted. The very best methods and machinery known for overhead line construction will be required in order to insure safety and reliability in the circuits.

All interior wiring is to be "concealed work" wherever practicable, and where not, molding strips are to be used to cover the wires. No "cleat work" or exposed wires is to be permitted, except in basements and other special localities where the conditions may render this method of wiring preferable. For each cadet-room it is proposed to supply two portable adjustable table lamps with flexible conducting cords and shades. This will give each cadet a light for his individual use and under his individual control, and in case one lamp becomes extinguished no great inconvenience will result.

In other cases where practicable the lamps are to be placed on existing gas-fixtures without interfering with the use of the gas. In the new buildings to be erected and in certain other cases, new fixtures adapted to the electric lamps alone will be required.

A small arc light plant for lighting the riding hall and for other uses where arc lamps may be required is included and a number of motors are provided for.

A complete outfit of measuring and test instruments will also be furnished with the apparatus.

Assuming that the work is to be done by contract, it is recommended that separate advertisements be issued for the station building, for the steam-power apparatus, and for the electric plant complete, respectively. The specifications conform to this recommendation, and they prescribe the methods of inspection and test of all material and apparatus during construction, and the final test of the completed plant in operation before acceptance.

The estimates of cost are based upon the best information obtainable, from the experience of this office in similar work, and from consultation with reliable companies

engaged in the business. These estimates are necessarily somewhat general in their nature, but they are believed to be at least approximately correct, and it is probable that the actual cost will fall within the amounts given if competition is secured by the usual advertisements inviting proposals.

I desire to acknowledge the many courtesies extended to me by Capt. C. W. Williams, quartermaster of the Academy, who has supplied complete information concerning the present gas plant, and in many other ways facilitated the preparation of this report.

Very respectfully, your obedient servant,

JOHN MILLIS,
First Lieutenant of Engineers, U. S. Army.

Col. JOHN M. WILSON,
*Corps of Engineers, U. S. Army,
Superintendent U. S. Military Academy, West Point, N. Y.*

Estimate for electric-light plant for the U. S. Military Academy, West Point, N. Y.

Total number of lamps of 16 candle-power to be established	3,500
Total number of arc lamps of 2,000 candle-power to be established	10
Greatest number of incandescent lamps to be operated at any one time	2,000
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For brick central station building complete, to contain engine-room, boiler-room, coal shed, store-rooms, etc., to have brick chimney and non-combustible roof covering, and including grading and filling, construction of necessary road-piping for water supply, etc	\$7,500
For three 100 horse-power boilers and setting, with pump, heaters, chimney connections, piping, and all fixtures complete	6,000
For two 100 horse-power and one 60 horse-power engines, with foundations complete, steam and exhaust connections and piping, belting, and all fixtures and accessories	7,500
For two 750-light and two 500-light alternating current dynamos with exciters, regulators, switch-board and switches, cut-outs, safety apparatus, test instruments, and all wiring, connections, and electrical apparatus of all kinds connected with the incandescent plant at the central station	8,500
For ten-lamp arc-light plant complete	1,100
For outside conductors and pole lines complete	6,500
For all incandescent lamps, shades, and fixtures, and all interior wiring, convertors, and connections for 3,500 lamps	28,000
For motors and contingencies	4,000
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Total	69,100
Estimated operating expenses, total per year, \$11,000.	

A true copy.

J. M. CARSON, JR.,
Second Lieutenant, Fifth Cavalry, Adjutant U. S. Military Academy.

