

ANNUAL REPORT
OF THE
BOARD OF VISITORS
TO THE
UNITED STATES MILITARY ACADEMY,
MADE TO THE
SPEAKER OF THE HOUSE OF REPRESENTATIVES,
FOR
THE YEAR 1895.



WASHINGTON:
GOVERNMENT PRINTING OFFICE,
1895.

BOARD OF VISITORS.

Hon. JOSEPH WHEELER (*President*).
Gen. THOMAS J. WOOD (*Vice-President*).
Hon. SIGOURNEY BUTLER (*Secretary*).
Capt. FRANK P. BLAIR.
Col. PETER HAIRSTON.
Dr. E. G. JANEWAY.
Hon. SETH L. MILLIKEN.
RICHARD M. VENABLE, Esq.
Hon. WM. F. VILAS.
Hon. JOS. E. WASHINGTON.
Maj. J. M. WRIGHT.

TABLE OF CONTENTS.

	Page.
Report of Board	5
Appendix A	19
Appendix B	21
Appendix C	97
Report of committees	115
Appointments and examinations	115
Discipline and instruction	120
Armament and equipment	129
Buildings, grounds, and lights	134
Supplies and expenditures	136
Fiscal affairs	137
Hygiene and athletics	154
Mr. Milliken's address	161

REPORT
 OF THE
 BOARD OF VISITORS
 TO THE
 UNITED STATES MILITARY ACADEMY
 FOR THE YEAR 1895.

The undersigned, the Board of Visitors to the Military Academy at West Point, for the examination held in June, 1895, respectfully present herewith the report of their investigations regarding the character and condition of the institution.

The law under which they were appointed is as follows:

SEC. 1327. There shall be appointed every year, in the following manner, a Board of Visitors to attend the annual examination of the Academy. Seven persons shall be appointed by the President, and two Senators and three Members of the House of Representatives shall be designated as visitors by the Vice-President or the President pro tempore of the Senate and the Speaker of the House of Representatives, respectively, at the session of Congress next preceding such examination.

SEC. 1328. It shall be the duty of the Board of Visitors to inquire into the actual state of the discipline, instruction, police administration, fiscal affairs, and other concerns of the Academy. The visitors appointed by the President shall report thereon to the Secretary of War, for the information of Congress, at the commencement of the session next succeeding such examination, and the Senators and Representatives designated as visitors shall report to Congress, within twenty days after the meeting of the session next succeeding the time of their appointment, their action as such visitors, with their views and recommendations concerning the Academy.

The persons appointed to constitute the Board were as follows:

APPOINTED BY THE PRESIDENT OF THE UNITED STATES.

1. Capt. FRANK P. BLAIR Chicago, Ill.
2. Gen. THOMAS J. WOOD Dayton, Ohio.
3. Maj. RICHARD M. VENABLE Baltimore, Md.
4. Dr. E. G. JANEWAY New York, N. Y.
5. SIGOURNEY BUTLER, Esq. Boston, Mass.
6. Maj. J. M. WRIGHT Washington, D. C.
7. Col. PETER HAIRSTON Martinsville, Va.

APPOINTED BY THE PRESIDENT OF THE SENATE.

8. Hon. WILLIAM F. VILASMadison, Wis.
 9. Hon. WILLIAM P. FRYELewiston, Me.

APPOINTED BY THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

10. Hon. JOSEPH WHEELERWheeler, Ala.
 11. Hon. JOSEPH E. WASHINGTONCedar Hill, Tenn.
 12. Hon. SETH L. MILLIKENBelfast, Me.

The Board met on June 1, 1895, at 10.30 a. m., all the members being present, except Hon. William P. Frye, United States Senator.

The Board organized as follows:

- General WHEELERPresident.
 General WOODVice-President.
 Mr. BUTLERSecretary.

At 4.20 p. m. a salute of seventeen guns was given to the Board and the Superintendent, Col. O. H. Ernst, Corps of Engineers, U. S. A., with the members of the academic board, the associate professors, and the military staff, called officially upon the Board of Visitors and conducted them to a review of the Corps of Cadets given in their honor.

On June 6 the Hon. Daniel S. Lamont, Secretary of War, visited West Point officially and reviewed the Corps of Cadets.

On June 12 the graduating exercises were held, attended by the entire Board, except Senator William P. Frye. The Hon. Seth L. Milliken delivered an eloquent and interesting address to the graduating class.

The Board instructed the committee on discipline and instruction to remain at or return to the Post and visit and inspect officially the encampment of the Corps of Cadets. This duty was performed by Messrs. Wright and Butler, of the committee.

The following committees were appointed by the president of the Board:

Appointments and examinations.—Messrs. Washington, Blair, and Venable.

Discipline and instruction.—Messrs. Wright, Venable, and Butler.

Armament and equipment.—Messrs. Blair, Washington, and Milliken.

Buildings, grounds, and lights.—Messrs. Milliken, Washington, and Janeway.

Supplies and expenditures for cadets.—Messrs. Hairston, Blair, and Wright.

Fiscal affairs.—Messrs. Vilas, Butler, and Milliken.

Hygiene and athletics.—Messrs. Janeway, Hairston, and Wright.

Miscellaneous.—Messrs. Venable, Vilas, and Janeway.

The examinations were conducted as set out in the following order:

ORDERS, } HEADQUARTERS UNITED STATES MILITARY ACADEMY,
No. 67. } West Point, N. Y., May 14, 1895.

I. The annual examination will begin on Saturday, the 1st proximo, and continue daily, Sundays excepted, from 9 o'clock a. m. till 1 o'clock p. m., and from 2.30 o'clock p. m. till 4.30 o'clock p. m., until finished.

II. The Academic Board will be divided into two committees:

The first committee will be composed of the professor of natural and experimental philosophy, the professor of chemistry, mineralogy, and geology; the professor of history, geography, and ethics; the professor of civil and military engineering, and the instructor of ordnance and gunnery.

The second committee will be composed of the professor of drawing, the professor of mathematics, the professor of law, the commandant of cadets, the professor of modern languages, and the instructor of practical military engineering.

The first committee will sit in room No. 202, Academy Building, and examine orally (1) the second class in chemistry, mineralogy, and geology; (2) the first class in engineering; (3) the first class in ordnance and gunnery; (4) the second class in philosophy.

The second committee will sit in room No. 201, Academy building, and examine orally (1) the third class in Spanish; (2) the first class in law; (3) the third class in mathematics; (4) the fourth class in French; (5) the first class in Spanish; by inspection of marks and practical work, (6) the first class in practical military engineering; by written examination, the first class in Spanish, at 8 a. m., June 1; the fourth class in mathematics, at 8 a. m., June 1; the third class in Spanish, at 8 a. m., June 3; the fourth class in French, at 8 a. m., June 3, and by inspection of marks and drawings, the second and third classes in drawing.

In all the classes the oral examinations will begin with the lowest sections, and the examinations will be so conducted as not to interfere with the usual hours for meals of cadets.

The written examinations of the first and third classes will be conducted in room No. 101, and of the fourth class in room No. 102, academy building.

The examination of the first class in practical military engineering will be conducted in Fort Clinton.

The Superintendent will preside in either committee in which he may be present.

The commandant of cadets is excused from attendance at the sittings of the second committee at such times as his duties as commandant of cadets require his presence at his office or elsewhere.

III. As each committee shall complete its labors of examination, its presiding officer will report the fact to these headquarters.

Either committee may in its discretion extend its labors not to exceed one hour each day, provided this does not interfere with any of the military exercises directed in Paragraph VI of this order.

IV. First Lieut. Samuel E. Allen, Fifth Artillery, and First Lieut. Daniel B. Devore, Twenty-third Infantry, are appointed the secretaries of the first and second committees, respectively. The record of each committee will be so kept as to show clearly the length of time occupied in examination by each department of instruction.

At the close of each day's proceedings, the secretaries will report to the adjutant of the Academy the progress of the examination, and they will transmit to the secretary of the academic board the records of the proceedings of the committees as soon as they are completed.

V. The instructors will report daily to the heads of their respective departments, and keep themselves informed as to the times when their services will be required.

VI. The following military exercises will take place during the examination:

Infantry.—Escort of the colors and review, June 1; school of the battalion, June 7; drill in extended order, June 11.

Artillery.—Heavy-artillery drill (seacoast guns), June 6; school of the battery (field artillery), June 8; heavy-artillery drill (siege mortars), 8 p. m., June 10.

Cavalry.—School of the troop, June 3; school of the trooper, June 5.

Practical military engineering.—Military bridge construction (ponton bridge), June 4.

Small arms.—Use of the sword and bayonet, military gymnastics, 8 p. m., June 7.

This order of exercises may be changed on account of the weather or for other causes.

VII. The members of the first class will be graduated June 12, 1895.

By order of Colonel Ernst.

J. M. CARSON, JR.,

First Lieutenant, Fifth Cavalry, Adjutant.

The members of the Board made as thorough inspection and examination of the Academy and Post and everything relating thereto as their twelve days' stay permitted. At all times they received from the Superintendent and all the officers every mark of courtesy and attention.

The Board joins with its predecessors in testifying to the great worth of the United States Military Academy, and in reporting its heartiest approval of the discipline, instruction, and general administration of all the affairs of the Academy.

The recommendations of the Board that follow summarize, in many instances, the reports of the various committees, which set out in full the reasons for the suggestions offered.

THE RESERVATION.

The grounds connected with the Military Academy consist of 2,500 acres. A portion of this, consisting of 1,460 acres, was settled by Charles Congrieve, who, on May 17, 1723, received a royal patent for the land. Twenty-four years later 332 acres were patented to John Moore.

During the Revolutionary war West Point became a military post, and on July 31, 1786, the Secretary of War, General Knox, in his report to Congress, spoke of it as of the most decisive importance to the defense of the Hudson River, and on September 10, 1790, both of the above-mentioned tracts, consisting of 1,795 acres, were deeded to the United States. The balance of the tract now owned was subsequently purchased by the Government.

THE WATER SUPPLY.

To this reservation should be added certain tracts of wild back land to complete the control of the sources of the water supply of the Post. These sources are in an uninhabitable, mountainous region, a portion of which is not owned by the Government, but can be obtained by purchase or condemnation proceedings more cheaply now, because the land has been in no way improved. The Board therefore suggests to Congress and to succeeding boards that it would be eminently wise to take measures looking to such purchase or condemnation at the earliest period possible.

The new reservoir is progressing satisfactorily in its construction, and when finished will add materially to the health and comfort of the Post.

NEW ACADEMY BUILDING.

The new Academy building is practically finished and gives great satisfaction. Appropriation should be made to complete the sidewalks and approaches thereto.

HYGIENE AND ATHLETICS.

The Board adopts the report of the committee and recommends appropriations for the following purposes: An operating room for the Cadet Hospital; new board flooring for the Cadet Hospital; siphon closets for both hospitals; new flooring for operating room; new tiled floor with drainage in water-closets for enlisted men's hospital; filtration of all water of the Post, in accordance with Captain Lusk's communication; the employment of a veterinary surgeon, when necessary, to inspect, under the direction of the Post surgeon, the cows furnishing milk consumed at the Post.

The Board further recommends that the Log Town buildings be torn down as soon as possible; that, when possible, appropriation be made to improve the barracks of enlisted men and the sanitary condition of the same, to improve the guardhouse for enlisted men, and to improve the sanitary condition of the bakery.

The Board also recommends that the game of football be continued as at present regulated.

FISCAL AFFAIRS.

The report of this committee contains much valuable data, showing the cost of the Academy, directly and indirectly. The total direct appropriation for the Academy for the year ending June, 1895, was:

For the payment of the instructional force	\$53, 226. 70
For pay of cadets.....	167, 000. 00
For the band and field music.....	12, 497. 78
Total	232, 723. 78
For current and ordinary expenses, regular repairs, improvements, etc. . .	175, 231. 30
Total	407, 955. 08
Of which amount there had not been disbursed to August 31, 1895.	20, 780. 54
Total disbursed to August 31, 1895.....	387, 174. 54

In addition, the Paymaster-General had paid from the army appropriation, as pay of officers and men at the Academy or Post, \$198,754.91; but it must be borne in mind that almost all of this \$198,754.91 is not chargeable properly to the Academy, but would be incurred if West Point were a Post without any Academy. It includes the pay of officers and men who, if not stationed here, would be stationed elsewhere under practically the same pay.

The Board supplements the committee's approval of Captain Spurgin's services as treasurer of the Academy and quartermaster and commissary of cadets. Captain Spurgin's system is shown in the report in detail, and it is certainly admirable.

SUPPLIES AND EXPENDITURES.

Here again Captain Spurgin deserves praise. The laundry and commissary are well run. The cadets are well fed, at the surprisingly low cost to them of about 50 cents apiece a day.

This committee recommends that the cold-storage room be enlarged and furnished with better cooling facilities. The Board approves the recommendation.

Further, the Board requests and urges the retention of Captain Spurgin at his present post.

ARMAMENT AND EQUIPMENT.

The Board recommends that the suggestions of the committee as set out in its report be followed:

MODELS, SAMPLE ORDNANCE, ETC.

To continue the construction of models; of work in the museum; of the purchase of sample foreign small arms and rapid-fire guns. To construct a butt to catch heavy projectiles, and platforms for the heavy ordnance.

FIFTY MORE HORSES FOR MOUNTED SERVICE.

Also, to buy 50 additional horses for use in cavalry or artillery drill. Now the horses that are used for cavalry are also used for light artillery drill. Obviously they are spoiled for either drill. There should be one detail of horses for cavalry drill and another for artillery. The propriety of this expenditure needs no fortifying argument.

EXTRA-DUTY PAY TO CAVALRYMEN.

Also, to pay extra-duty pay to the 28 enlisted men of the cavalry detachment while serving as artillery drivers. Apparently this was omitted from the last appropriation bill through an oversight.

INCREASE OF THE BAND.

Also, to increase the band from 24 to 40 pieces, as it was prior to 1874. This recommendation has been made frequently, and we join preceding boards in urging the increase.

BUILDINGS, GROUNDS, AND LIGHTS.

The committee and Board having carefully inspected the main buildings, requested the Superintendent to submit in writing such recommendations as he desired to make, which are shown in the report of the committee.

The expense of carrying out all the recommendations of the Superintendent being greater than perhaps could be appropriated for at this time, the committee has selected and the Board specially recommends, as being most urgent and requiring immediate action, the following:

The construction of the filter house and keeper's dwelling near the new reservoir, estimated cost to be submitted to Congress later.	
The guardhouse and gate near the south boundary.....	\$10,000
The reconstruction of the interior of the library building.....	50,000
Three sets of officers' quarters.....	30,000
Porch for cavalry barracks.....	4,200
Sidewalks and approaches for new Academy building.....	5,000

All of these the Board deems of the highest importance.

The Board's attention was called to the question of the furnishing of the Superintendent's house, where the receiving and entertaining of all persons visiting the Post officially must be held. The Board recommends that \$500 be appropriated yearly for furnishing and keeping in good condition the furniture of the quarters of the Superintendent.

MISCELLANEOUS.

SENIOR INSTRUCTOR OF ORDNANCE, ETC.

The Board recommends that the senior instructor of ordnance and gunnery receive the pay of a captain mounted, thus placing him on an equality with senior instructors in other departments.

THE MASTER OF THE SWORD.

The Board recognizes the splendid work done by Mr. Koehler, the master of the sword, and recommends that the suggestion of the Superintendent and of previous Boards be followed—that the master of the sword, while holding that appointment, shall have the local rank, pay and allowances of a first lieutenant of infantry.

PAY OF BAND LEADER.

The Board recommends that the band leader receive the pay and allowances of a second lieutenant of infantry while holding his appointment.

ENCYCLOPEDIAS IN BARRACKS.

The Board is impressed with the great advantage it would be to the cadets to have easy and frequent access to a first-class encyclopedia, and they recommend that an appropriation be made to furnish each hall in the cadet barracks with the latest and most complete encyclopedia.

DISCIPLINE AND INSTRUCTION.

The Board took great pains to make investigation regarding the standard of honor maintained by the cadets, and are gratified to find that it is of a very high order.

The Board gave much attention to the various courses of instruction, and believes generally that the subjects are well chosen and well taught, and that the results attained are most satisfactory. It accepts, however, the recommendations of the committee on discipline and instruction that no changes in the curriculum be made pending the raising of the standard of admission.

APPOINTMENTS AND EXAMINATIONS.

The Board renews the recommendations of previous boards, and urges upon Congress the passage of an act which will permit of the appointment of the following number of cadets: Twenty for the President, one for each Senator, one for each Representative or Delegate. The total would thus be increased from 371, as now authorized, to 469. The average maximum strength of the corps now is 296; in that proportion the average maximum strength of the increased corps would be 377. There is ample room for this increase. The plant is there in full running order, and can handle 400 as easily as 300. There would be little extra cost except the pay of the extra cadets.

The Board calls especial attention to the communication of the Superintendent, of June 12, 1895 (which follows this report and is marked Appendix A), for a comprehensive statement of the added cost of such an increase of cadets.

PLACE OF HOLDING EXAMINATIONS.

The Board recommends that the system of holding examinations for admission at various points be continued for a time, in order to test it sufficiently.

STANDARD OF ADMISSION.

The Board lays the utmost stress on the report of the committee on appointments and examinations which favors the raising of the standard of admission. It can not urge too strenuously this all-important change.

The Board was furnished by the Secretary of War with very valuable data relating to the military schools of Europe. All this is published with this report (being marked Appendix B). Furthermore, the Board was furnished with the copy of a paper by Lieutenant Willcox, Second Artillery, U. S. A., which contains so many valuable facts bearing on this point that the Board has printed long extracts therefrom, and has added the same to this report (being marked Appendix C).

The Board makes the following recommendation: That Congress pass an act repealing the present law relating to the subjects of examination for admission to the Military Academy, viz, section 1319 of the Revised Statutes, and in place thereof enact the following:

SEC. 1319. Appointees to the Academy shall be examined under such regulations relating to time, manner, place, and subjects of study as may be prescribed from time to time by the Secretary of War.

As the Board gave much of its time to this subject, it submits the following statement of its views:

The requirements for admission to the United States Military Academy are fixed by statute. In 1812 an act of Congress provided that candidates, in order to be admitted, must be "well versed in reading, writing, and arithmetic." To these requisites an act, passed in 1866, added English grammar, United States history, and general geography.

To test the proficiency of the candidate, preliminary examinations are held on these subjects. Prior to 1870 these examinations were oral, but since that time they have been written.

There are many considerations which constrain the Board of Visitors to believe that both the standard of admission and the method of fixing it should be changed. The standard should be raised, and some method of regulating it other than by act of Congress should be adopted.

The considerations which lead to the conclusion that the standard should be raised are quite numerous, and we need enlarge only on a few of them.

The prime object of the instruction at West Point is to produce professional soldiers. The nature and extent of this education are to be determined by the duties imposed on officers in war and peace. The armies of the United States have come in conflict to a very limited extent with the disciplined armies of foreign countries, officered by professionally trained soldiers. In no case has there been such a conflict with an army officered, disciplined, and equipped as the present armies of Europe are. Fortunately the remoteness of our situation relieves us from the burden of maintaining an army equal, on a sudden emergency, to such a conflict. What we have wisely attempted to do has been to maintain a small army and educate a relatively small number of officers, with the design of extending our military establishment when the necessity arises. The consequence has been and must be that the officers of this small army may, at a moment's notice, become the general, field, and staff officers of large armies.

Their training must to a considerable degree be determined by this possibility. It should at least be equal as far as practicable to that of the officers of the best European armies.

War has constantly tended to become a more highly scientific profession. Nearly all of the inventions, discoveries, and scientific knowledge of the world are appropriated and used by the soldier. He must deal with the old problems of tactics, strategy, supplies, transportation, and communication under novel and changing conditions. He must deal with the problems of fortification, arms, and ammunition under still more novel and changing conditions.

If four years of instruction to one well versed in reading, writing, and arithmetic were sufficient in 1812 to train an officer, the presumption is that they are now insufficient.

It is to be borne in mind that the standard of education in the United States was comparatively low in 1812, when the requisites of admission to the Academy were fixed, and this was done with reference to the training of applicants at that time. Since that time the primary, sec-

ondary, and high schools, public and private, have greatly increased in number and in efficient work; and vastly more applicants for admission could now be found prepared to pass a much higher preliminary examination than could then be found prepared to pass an elementary one. It seems strange, with the present development in mathematical instruction in all our schools, that a knowledge of arithmetic should still be a sufficient evidence of proficiency in mathematics to enter West Point, where mathematics is the principal study.

A comparison of the standard of admission to West Point with that prescribed in the more prominent colleges and scientific schools in the United States, and with that of the military schools of Europe, is instructive.

The comparison of West Point with the technical schools in the United States and with the United States Naval Academy shows that the requisites for entrance to the Military Academy are less than in the case of any of these schools. This is especially true in mathematics. If a similar comparison were made between West Point and the collegiate (undergraduate) departments of Harvard, Yale, Princeton, the Johns Hopkins University, or any of the better colleges of the United States, the lowness of the requisites for entrance to West Point would probably be still more apparent.

The comparison of West Point with the military schools of Europe shows that the standard for admission into those schools is much higher than at West Point. But we are not to infer from this circumstance alone that the graduate of West Point is less trained than the graduates from some of these schools. The course of study at West Point is four years, while that of the European schools varies from eighteen months at Sandhurst to four years in one of the military schools of Belgium. The most prevalent course is two years. Instruction at these schools is more specialized than at West Point. The course of instruction in schools for artillerymen and engineers is longer than that in the schools for infantry officers.

All of these European military schools are, strictly speaking, professional schools. The preliminary examinations are designed to ascertain whether or not the applicant has sufficient technical and general training to begin the study of the military art, and the course of instruction is devoted primarily to teaching military science and art.

On the other hand, the preliminary examination at West Point is designed to test the capacity of the applicant to enter on a course of study, the larger part of which is not training specially designed for the soldier, but a preparation for that training. The first three years at West Point are devoted to what may be called mental training, and the fourth more especially to military subjects. Undoubtedly during these three preparatory years the student has the benefits of military discipline, and the course of study is specially designed as a preparation for the military education. The fact remains, nevertheless, that

more time is devoted to military studies proper in European schools than at West Point. By advancing the standard for admission two years of this preliminary training might be sufficient, and there would then be two years to devote more exclusively to military studies; and possibly greater specialization might be introduced into the Academy by reducing the course of study to three or two years for infantry officers and possibly extending it to five for engineer and ordnance officers.

There are two evil effects springing from the low standard of admission to West Point; one is the character which it gives to the preliminary examination, and the other is the influence it has on the course of instruction.

A low standard of admission does not by any means secure an easy admission. Everything depends on the preliminary examination. It may be so framed and conducted as to reject more applicants than an examination on more or higher requisites. In other words, it may not be the subjects of examination, but the character of the examination, which determines the percentage of rejections.

An inspection of the statistics of the Academy¹ shows that the percentage of candidates rejected on preliminary examination increased, although with fluctuations, from 1838 to 1870, and has since 1870 been very large. This may be attributed to two causes: First, the examinations may have been more severe; and, second, the candidates may have been not so well prepared. Manifestly the greatly increased percentage of rejections during the last twenty years can not be attributed to this latter cause. It would hardly be contended that while the schools of the country and the education of the young had steadily improved, appointees from 1870 to 1890 were not so well prepared as those from 1838 to 1870. Furthermore, it is impossible to believe that some of the sharp fluctuations in the percentage of rejections were produced by differences in the qualifications of the candidates. The nature of this examination may be inferred from the fact that 52.89 per cent were rejected in 1870; 42.58 per cent in 1874; 45.9 per cent in 1877; 41.37 per cent in 1881; 41.46 per cent in 1889; and the lowest per cent of rejections from 1870 to 1890 was 25.78, in 1885. Some of the fluctuations are startling, such, for example, as the rejection of 52.89 per cent in 1870 and 29.63 per cent in 1871.

The appended tables of statistics seem to show that while the standard of admission to the Academy has been apparently unchanged, except by the act of 1866, it has in reality been changed by making the preliminary examinations more severe, and that the preliminary examinations are far from being of uniform difficulty. That the examinations should become more difficult was natural and possibly unavoidable. The examiners must feel that with the continually increasing educa-

¹See the tables prepared by Professor Bass contained in the paper of Lieutenant Willcox, published as an appendix to this report.

tional facilities more severe tests of admission should be applied. Possibly, in increasing this severity, they have to a considerable extent acted unconsciously, and were moved by the general trend which has found expression in raising the standard of admission to nearly all of the high schools and colleges of the country. The schools and colleges had also one strong inducement to keep down the admission requisites, as the rejection of applicants meant to them diminished numbers and revenue. But the examiners at West Point were untouched by these influences.

Furthermore, the fluctuation in the severity of the examination is a natural result of this increasing severity. This fluctuation need not necessarily be in the character of the questions; it may be in the greater or less strictness in valuing the answers. A large percentage of rejections one year would produce in the examiners the feeling that they had been too severe, and this would influence them to less severity for a time thereafter.

These evils are incident to all preliminary examinations and indeed to all examinations; but it is believed they exist in a special degree where the examination is made severe by the character of the examination and not by the number and difficulties of the subjects.

But the worst effects produced by a standard created by the severity of examinations rather than by the subjects of the examination are its influence on applicants and its failure to select the best material for admission to the Academy. Such examinations produce a peculiar and vicious system of coaching and cramming, and are a test of memory and of a certain quickness and alertness of mind rather than of more sound and staying qualities; and as a test of originality of mind or of reasoning capacity they are almost a complete failure. These again are defects inherent in any system of examinations; but they exist in an exaggerated degree in the peculiar kind of examinations we are discussing.

Turning from the preliminary examinations to the course of instruction in the Academy, we find that the evils of the low standard of admission perpetuate themselves through the whole four years of academic life. The instructors at West Point have the natural and proper ambition to make the graduates of that institution the representatives of a training equal or equivalent to that of the graduates of the more prominent colleges and technical schools of this country and of the military schools of Europe. And this ambition is not a thing engendered by mere rivalry. As has been already said, that degree of training is needed to produce the scientific soldier.

To do this they are compelled to compress into four years a course of instruction corresponding in other schools, where higher admission requirements exist, to five, six, and even seven years of training. And this, too, is exacted of students subjected to all of the demands on their time made necessary by military drill and discipline.

This explains why the percentage of graduates shown in the accom-

panying tables is not greater. There need be no wonder that many fall by the way.

The inevitable effect on the student is to foster a vicious system of cramming, and to cultivate the memory, alertness, and perceptive faculties, rather than reason, originality, and self-reliance in new conditions. The acquisition of knowledge, rather than the cultivation of faculty, becomes an object; and the knowledge gained is acquired under circumstances which make it peculiarly liable to evaporate.

The system of high pressure to which the cadet at West Point is subjected, with its attendant evils, seems to be a more proper subject for criticism than any other thing connected with the institution, and for this high pressure the low standard of admission is, more than anything else, responsible.

With that standard raised, we feel confident that the preparation for the preliminary examination will proceed on more catholic lines, that examination will result in fewer rejections and will be a better test of qualifications to enter the Academy, the strain of the course of instruction can be measurably relieved, the character of the training can be elevated, the results of the training improved, and there can be a larger percentage of graduates.

Something may be said in reference to the sentiment which has kept down the standard of admission at West Point, while it has been raised almost everywhere else.

It is the natural feeling that it is the people's college, sustained by and for the people, and that to raise the standard too high is to exclude from it the sons of the poor, who are unable to give their children a high preliminary training. It would certainly be a misfortune to the Academy and the country to do anything to make it in any sense or degree the school of any section or class.

But it is to be borne in mind that the multiplication of and improvement in public schools have given opportunities of education to numbers who formerly did not have them. The standard of 1812 would then have excluded more than a higher standard would now.

The courses of study in all the public high schools of the country are far in advance of the admission qualifications of the Academy as now set by Congress. The age of admission to the Academy is not younger than 17. Congress could surely work no injustice to the boys educated in our public schools by demanding that at least part of the curriculum of the higher public schools should be included in the entrance examinations to the Academy. If a boy can not enter the Academy until at least 17 years of age, why not make him pass an examination in some of the studies which he must be presumed to have followed before 17, in addition to reading, writing, arithmetic, English grammar, United States history, and general geography?

There seems also little likelihood that West Point will lose its popular and national character so long as appointments to it are made on

recommendation of Members of Congress. The cadets thus come from all parts of the country, and the power that recommends is directly from the people and in contact with the people.

Another argument sometimes used against raising the standard of admission is that with its present standard West Point has produced some great soldiers, and some of these did not graduate with high grades.

This argument may be turned in so many ways that it is of little worth. If extended, it would make the existence of self-made men an argument against education.

By the law as it now stands the requisites of admission to the United States Naval Academy are fixed by the Secretary of the Navy, and the standard of admission to that institution is now higher than that at West Point.

There seems to be no reason for committing this power to the Secretary of the Navy which could not be urged in favor of committing an analogous power to the Secretary of War. It would undoubtedly be exercised on consultation with army officers and on recommendations of the academic board of the Military Academy.

Indeed, the subject seems to be one that can not be well regulated by statute. However competent legislative bodies may be to regulate such a subject, the mass of public business thrown on them leaves them little time to deal with the shifting adjustments of the standard required by changes in the quality and subjects of education. This is sufficiently evidenced by the fact that notwithstanding the great changes made in the subjects taught in the schools since 1812 and the continued improvement made in the training of the young since that date, only one change has been made in the requisites of admission to the Academy since 1812; and this, made in 1866, only added some new subjects to the examination without raising the standard of requirement in the old subjects, which included mathematics. The educational improvements of the country should be reflected in the training given at West Point, and to do this the standard of admission should receive an impress from those improvements. It can hardly be claimed that statutes have done this in the past, or will do it in the future.

JOSEPH WHEELER, *President.*

THOMAS J. WOOD, *Vice-President.*

SIGOURNEY BUTLER, *Secretary.*

FRANK P. BLAIR.

PETER HAIRSTON.

E. G. JANEWAY.

SETH L. MILLIKEN.

RICHARD M. VENABLE.

WILLIAM F. VILAS.

WM. P. FRYE.

JOSEPH E. WASHINGTON.

J. M. WRIGHT.

APPENDIX A.

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
West Point, N. Y., June 12, 1895.

SIR: By direction of the Superintendent, I have the honor to submit the following estimate of the increase in the annual appropriations for the support of the Military Academy that would be caused by providing for ten additional cadets "at large" and one for each Senator, as requested in your letter of the 10th instant.

The total number of cadets now authorized by law is 371. The increase contemplated would raise this total, based upon the present number of Senators, to 469. The average maximum strength of the corps for the past five years has been 296, but the average maximum has been 83 per cent of the total number of cadets authorized. This apparent discrepancy is due to the fact that in 1893 the total number of cadets was increased from 347 to 371, due to the increase in the number of Congressional districts in that year.

Assuming that the average maximum attendance would continue to be 83 per cent, the proposed increase would add some 81 cadets, raising the average maximum attendance to 377.

The average number of cadets in the corps for the past five years has been about 80 per cent of the total number authorized. With the increase proposed the average number that would be borne on the rolls would be about 375—an increase over the present average strength of 81.

The pay of each cadet is \$540 per annum. An increase of 81 would add \$43,740 to the annual appropriation for the pay of cadets. As the pay of the cadet is made to cover all of his expenses for subsistence, clothing, books, and other supplies for his personal use, this amount represents the permanent increase in the annual appropriation for this purpose.

An addition of 81 cadets would involve an increase in the number of instructors, probably from four to six. As the accommodations for officers are at present barely adequate for those now required at the Academy, additional quarters would be necessary, at an aggregate cost of \$20,000 or \$25,000. The increase in the number of instructors would probably be made gradually from year to year, as the larger classes

would enter, so that this amount could be spread over several years' appropriations, and would cease to be an item of expense when sufficient quarters were obtained.

The instructors would be officers of the Army, and there would be consequently no additional expense for their salaries.

The cadet barracks will to-day accommodate 336 cadets—two in a room. The "angle" of barracks and an adjoining division are now used for officers' quarters—chiefly officers of the tactical department—trunk rooms, storerooms, and operating rooms for the cadet dentist. Were all of these rooms available, 384 cadets could be provided for in the barracks, and thus ample accommodations could be furnished for the estimated increased average strength. Should the number of cadets present exceed 384, three could be placed in some of the rooms, as has been necessary on occasions heretofore, until the number present was reduced, which would occur during the first four months of the period in barracks, through resignation and discharge.

The occupation of the entire barracks for the use of cadets would require the erection of additional quarters for the tactical and other officers now living there, and would also require that provision be made for the cadet dentist and for the storage and safe-keeping of ordnance and other property.

From the foregoing it will appear that the only permanent increase in the annual appropriations for the Academy would be that necessary to provide payment for the additional cadets, which would amount to about \$43,000.

The expenditure for extra quarters, etc., would be incidental, and would cease when these were provided.

Very respectfully,

J. M. CARSON, Jr.,

First Lieutenant, Fifth Cavalry, Adjutant.

Hon. SIGOURNEY BUTLER,

Secretary Board of Visitors, West Point, N. Y.

APPENDIX B.

CONDITIONS OF ADMISSION AND COURSE OF INSTRUCTION IN THE NATIONAL MILITARY SCHOOLS OF EUROPEAN POWERS.

BELGIUM.

The school which corresponds most nearly to the United States Military Academy is the École Militaire, or Military Academy at Ixelles.

The object of this school is to supply officers to the following arms: (1) The infantry, (2) the cavalry, (3) the artillery, and (4) the engineers.

The length of the course of instruction is two years for the infantry and cavalry section, and four years for the artillery and engineer section.

All students, on commencing the second year's course, must contract to serve for eight years.

There are no admissions to the school except by competition.

CONDITIONS OF THE COMPETITIONS.

I. The names of all candidates must be entered on the lists of the Military Academy.

These lists are closed one month before the opening of the examinations. No one can be admitted to the competition unless he has previously shown: (1) That he is a native or naturalized Belgian; (2) that he is over 17 and less than 21 years of age on the day of the opening of the competition.

Youths of less than 18, who under the laws in force in Belgium have at this age the right of choosing Belgian nationality, may also be admitted to the competition. They will not, however, be allowed to commence the second year's course unless they have made their declaration of election according to the forms prescribed by the law.

Exceptionally, the following may be admitted to the competitions: (1) Soldiers of the active army, up to the age of 25 years; (2) university graduates who have obtained one or more academic degrees, up to the age of 23 years.

II. Each candidate on entering his name on the list at the Military Academy must furnish:

1. A copy of his certificate of birth.
2. A copy of his father's certificate of birth.

The documents must be attested in proper form by the president of the tribunal of first instance.

3. A declaration of the father or guardian of the candidate, certifying that the father of the latter was born of Belgian parents or that he has obtained full naturalization by the law of ———.

This declaration must be legalized by the burgomaster of the place where the affiant is domiciled.

If the father of the candidate had acquired the status of Belgian nationality by fulfillment of the formalities prescribed in article 9 of the Civil Code, the person so admitted to citizenship must produce the attestation of competent authority to that effect.

* * * * *

4. Candidates who are not from the army and who are more than 19 years of age on the 1st of January of the year of the examinations must produce a certificate stating that they have taken part in a drawing of lots for the militia.

Candidates must besides, at the time of entering their names, declare: (1) The language (French or Flemish) with which they wish to prove that they are thoroughly familiar, from a grammatical and literary standpoint; (2) the language (Latin, Flemish, French, German, or English, other than that chosen for 1) on which they wish to be questioned.

When they present themselves for the oral examinations, candidates must deliver to the president of the examining board: (1) A certificate of vaccination signed by a physician and legalized by the communal authority; (2) a certificate of the communal administration of the place of the domicile testifying to their good conduct.

III. The examinations for admission are held annually before an examining board appointed by the King. These examinations are both oral and written.

Separate competitions are held (*a*) for artillery and engineers, (*b*) for the infantry and cavalry. Candidates may have their names entered for both competitions, or for each of them separately.

There are for each competition two series of examinations: The first series is the same for both sections; it hinges upon (*a*) a thorough acquaintance with French or Flemish; (*b*) Latin, Flemish, French, German, or English; (*c*) history; (*d*) geography, and (*e*) drawing.

The different examinations of this series are either oral or written, and extend over several sessions.

The second series deals with the mathematical branches; it is distinct for the two sections.

The examinations for the first series commence on the 1st of August.

The examinations in mathematics are held as follows: (*a*) For the artillery and engineer section, toward the 1st of September, and (*b*) for the infantry and cavalry section toward the 1st of October, after the admissions to the first of the sections mentioned have been decided upon.

The examinations to be undergone for the artillery and engineer section can not secure for a candidate a place on the list of admissions to the infantry and cavalry section.

IV. For the different branches the following number of points will be allotted:

(a) For admission to the infantry and cavalry section:

Mathematics—	Points out of 100.
Written examination.....	17
Oral examination.....	16
Thorough acquaintance with the French or Flemish language.....	25
History.....	12
Geography.....	12
Latin, Flemish, German, or English.....	15
Drawing.....	3
Total.....	100

(b) For admission to the artillery and engineer section:

Mathematics—	
Written examination.....	25
Oral examination.....	25
Thorough acquaintance with the French or Flemish language.....	20
History.....	9
Geography.....	9
Latin, Flemish, French, German, or English.....	9
Drawing.....	3
Total.....	100

Every candidate who in the first series of examinations does not obtain in the examination to test the thorough acquaintance with the French or Flemish language one-half the maximum number of points assigned to this branch, or in any of the other branches two-fifths of the maximum, will be excluded from the competition and will not be admitted to the examinations of the second series.

No candidate can be included in the final classification list, whatever be his general average, who does not obtain one-half of the maximum number of points assigned to all the mathematical branches if he is competing for the artillery and engineer section, and two-fifths of this number if he presents himself for the infantry and cavalry section.

V. PROGRAMME OF THE ATTAINMENTS REQUIRED.

A.—THOROUGH ACQUAINTANCE WITH THE FRENCH OR FLEMISH LANGUAGE.

The programme of this examination is that of the Latin or modern classical courses of the Royal Athénées (high schools) up to and including rhetoric.

Special stress is laid upon the following parts:

Style.—Principles, figures, and tropes.

Fundamental principles of the narrative and descriptive style, of the epic, of the dramatic style, and of eloquence.

Literary analysis of an address, of a piece of prose or poetry.

Composition.—Narration, description, letter, address.

B.—LATIN, FLEMISH, FRENCH, GERMAN, OR ENGLISH.

Latin.—The candidates will execute a theme and a translation (the translation without dictionary). They should be able to translate at sight one of the classic authors studied in the second-class year¹ or in rhetoric.

Flemish, German, and English.—The examination will include a theme and a translation (without a dictionary). The candidates must, besides, be able to explain at sight a prose selection, and reply in the language that they offer to a few questions that will be put to them in that tongue.

French.—The candidates who have undergone the searching examination in Flemish will have an exercise in grammatical analysis and an exercise in composition.

C.—HISTORY.

The subjects taught in the royal high schools up to and including rhetoric. Stress will be laid on the subjects detailed below.

General history.—The questions cover ancient history as far back as the reign of Alexander the Great, mediæval history, and modern history of the principal European and American nations down to the Russo-Turkish war of 1877–78.

History of Belgium.—The questions cover the whole subject of the history of the Netherlands from the time of Julius Cæsar down to the separation of Belgium from Holland in 1830, and include the events which immediately followed this revolution.

D.—GEOGRAPHY.

The subjects taught in the royal high schools up to and including the rhetorical course.

Stress will be laid upon acquaintance with the following subjects:

Principles of cosmography and of general geography.—Form and dimensions of the earth; diurnal revolution of the earth; terrestrial circles; zones; astronomical seasons; inequalities in the lengths of the days and nights; lunations; mean radii of the ecliptic and of the moon's orbit; longitudes; latitudes; division of the globe between continents and oceans; cartographical figure and division of the continents; principal divisions of the oceans, straits, lakes.

Physical, political, and statistical geography of Europe.—Comprises a very thorough examination on this subject, with particular reference to the geography of Germany, France, the Netherlands, Austria-Hungary.

General geography.—Asia, America, Africa, Oceanica; boundaries; principal coasts, seas, islands, gulfs, etc.; nomenclature, situation, and development of the great mountain chains; principal rivers; population; political divisions and important cities.

¹Of the Athénées Royales.

Geography of Belgium, physical, political, and administrative.—Comprises a very searching examination, descending to small details. Among the problems is to draw a somewhat detailed map of each of the Belgian provinces, with scale, etc.

E.—DRAWING.

Candidates will have to draw from nature, and will also shade, a few objects of simple form, approximating in shape to the polyhedrons of solid geometry.

SUBJECTS OF THE SECOND SERIES OF EXAMINATIONS.

F.—MATHEMATICS.

(a) ARTILLERY AND ENGINEERING.

Programme of the scientific section of the royal high schools, up to and including the rhetorical course.¹

(b) INFANTRY AND CAVALRY.

Programme of the section of the Latin classical course of the royal high schools up to and including rhetoric, besides the part that treats of surfaces and of the volumes of round bodies.

The programme gives very fully the subjects of the examination, in which the parts that pertain only to the artillery and engineer examination are given in italics. As this programme is extremely long the subjects will be mentioned only in a general way, and the matters peculiar to the artillery and engineer examination will be indicated in italics:

Arithmetic.—The programme also includes the higher arithmetic.

Characteristics of divisibility of numbers written in the system whose base is B by the divisors of B^m and $B^m \pm 1$.

Theory of periodic fractions in any given system of notation.

Extraction of the fourth, eighth, and sixth roots within a known degree of approximation.

Fundamental principles of numerical approximations.

Algebra.—Includes also higher algebra.

Properties of trinomials of the second degree.

Questions of maximum and minimum depending on the second degree.

Arrangements, permutations and combinations, etc.

Development of the entire and positive powers of a polynomial. Extraction of the m th root of a number or a polynomial, m being a whole number and positive.

Indeterminate equations of the first degree.

Theory of continued fractions.—Reduction to continued fractions of the roots of an equation of the second degree.

¹Commencing with 1895 a slightly different mathematical programme will go into effect.

Summation of the like powers of the terms of a progression by differences; summation of piles of balls with triangular, square, and rectangular bases.

Exponential equations.

Construction of logarithmic tables.

Use of indeterminate coefficients.—Fundamental theorem; application of the method of indeterminate coefficients to the theory of division, to the determination of the m th root of a polynomial, to the determination of the relations which must exist between the coefficients of an algebraic expression in order that it may satisfy certain conditions.

Elementary geometry.—Through plane and solid geometry.

Plane trigonometry.—Through the subject.

Spherical trigonometry.—Through the subject.

Analytical geometry of two dimensions.—Through the subject.

Descriptive geometry.—Theorem and problems relating to the point, the right line, and to plane surfaces.

Candidates will have to solve graphically a problem and submit accurate drawings of the same.

* * * * *

The works specially recommended (being those submitted to the Government by the council for the advancement of education in the middle schools) for the teaching of the scientific course of the first class year in the high schools of the Kingdom are the following:

Arithmetic.—Gelin: *Traité d'arithmétique élémentaire, à l'usage des élèves des cours professionnels, des candidats aux écoles spéciales des universités, et à l'École militaire de Bruxelles.* Bertrand: *Traité d'arithmétique.*

Algebra.—Falisse et Graindorge: *Traité d'algèbre élémentaire.* Bertrand: *Traité d'algèbre.*

Geometry.—Cambier: *Éléments de géométrie, d'après A. M. Legendre.* Blanchet: *Éléments de géométrie, par A. M. Legendre; avec additions et modifications.*

Trigonometry.—Cambier: *Leçons de trigonométrie rectiligne et sphérique.* Gelin: *Éléments de trigonométrie plane et sphérique, à l'usage des cours professionnels, des candidats aux écoles spéciales des universités et à l'École militaire de Bruxelles.*

Analytical geometry.—Falisse: *Cours de géométrie analytique plane.* Briot et Bouquet: *Leçons de géométrie analytique.*

Descriptive geometry.—No work is specially recommended, but among the seven works authorized the one which gives the best preparation for the present course of instruction at the military academy is the following: Chome: *Cours de géométrie descriptive de l'École militaire, 1^{re} partie, livre 1, seconde édition.*

ADMISSION OF CANDIDATES.

VI. The minister of war decides upon the persons who are to be admitted to the military academy, in accordance with the results of the competitions.

* * * * *

Every candidate admitted as a scholar who does not report within four days after the date fixed for the opening of the course of studies * * * is considered as having resigned.

On their arrival at the school the scholars are subjected to a medical examination. * * *

VII. Relates to the sums to be paid for maintenance and outfit. Scholars admitted from the ranks receive the pay and allowances of their former grade while present at the academy.

VIII. Relates to scholarships and half scholarships, which are granted principally to those whose parents are unable to pay for their education. These aids are, as a rule, only granted during the first year of the course, except when a scholar greatly distinguishes himself, when the same aid may be granted for the second year.

REMARKS.

In the examination of 1893 there were 384 candidates for 60 vacancies.

After finishing two years of the course the scholars of the infantry and cavalry section who pass the final examinations successfully are commissioned second lieutenants. The scholars of the artillery and engineer section who pass at the end of the second year are also commissioned second lieutenants, but they remain at the academy for two years longer to finish the remainder of their course. They are called "Élèves sous-lieutenants" (student second lieutenants).

There is a preparatory school called the "Cours central de préparation à l'École militaire," the object of which is to prepare noncommissioned officers of the army for the competitive examination to enter the military academy. About 20 noncommissioned officers are admitted to the course by a competitive examination.

Any noncommissioned officer who fulfills the required conditions of age and length of service, and who is recommended by an examining board of the regiment, may present his application to his commanding officer, who, if he considers the applicant to be worthy of a commission, will forward the application through the regular military channels to the minister of war, with the necessary legal papers in each case.

The course is for one year, and no person is allowed to remain more than this length of time at the school.

The subjects of examination for those who wish to compete for the "cours central" correspond to the programme taught in the second year of the night school course for noncommissioned officers.

These branches are as follows:

French or Flemish language.—Reading, writing, and grammar.

Arithmetic.—Through extraction of the square root.

Algebra.—Through solution of equations of the first degree, with one or more unknown quantities.

History.—Belgium: History of Belgium from the House of Burgundy to the present time. General: From the peace of Westphalia to the present time.

Geography and cosmography.—Particular attention is to be paid to the geography of Belgium; a less particular study of the geography of the other European states, and an outline of the geography of the rest of the world.

Writing.—Principles of writing. (Instruction in writing is begun in the first and finished in the second year).

Drawing.—Up to and including the drawing of the simple geometrical figures, plane and solid.

Physics and chemistry.—A few elementary ideas on these subjects.

ÉCOLE MILITAIRE DE BELGIQUE.—PROGRAMME OF THE COURSE OF INSTRUCTION.

Artillery and engineer section.

FIRST YEAR.

Higher algebra (22 lessons): Commencing with the theory of determinants, through the solution of equations of the fourth degree, and the subject of imaginary quantities.

Analytical geometry (16 lessons): Through equations of surfaces of the second order.

Differential calculus (28 lessons): Commencing with fundamental principles, through the study of plane curves with both rectilinear and polar coordinates, and the study of curves and surfaces of double curvature.

Descriptive geometry (70 lessons): Commencing with fundamental principles, through the subject of shades and shadows, etc. Commencement of the subject of perspective.

Cinematics (14 lessons): Motions of points and solid bodies.

Physics (40 lessons): Commencing with fundamental principles, through thermodynamics and acoustics.

Chemistry (40 lessons): Through the study of metals and their principal combinations.

French literature (25 lessons): History of literature up to the eighteenth century. Compositions.

Flemish (35 lessons): There is a superior course for pupils already acquainted with the language, and a lower course for the other pupils.

German or English (35 lessons): Fundamental principles of the language. Practical exercises in conversation. Themes and translations.

Hippology (16 lessons): Elements of, and elements of veterinary hygiene.

Drawing: Drawing of the figure (25 lessons). Pen and ink (geometrical solids) (15 lessons).

Military regulations (40 lessons): Interior service. School of the soldier. School of the company. Firing regulations.

Exercises: Military exercises and drills. Gymnastics. Fencing. Riding. Swimming.

SECOND YEAR.

Integral calculus (37 lessons): Through the subject.

Theory of probabilities: Through the subject, including the method of least squares, and applications to questions arising in firing.

Descriptive geometry: First part (19 lessons)—Surfaces generated by the motion of a rectilinear element. Second part (23 lessons)—Applications of descriptive geometry to stonecutting, and to the representations of framework and parts of buildings. One plane descriptive geometry. Drawing (42 days).

Mechanics: First part (24 lessons).—Statics. Second part (24 lessons).—Dynamics. Hydrostatics and hydrodynamics.

Astronomy (24 lessons): Through the subject, including celestial mechanics, physics of the earth; terrestrial magnetism, meteorology, and stellar astronomy.

Construction of maps (7 lessons): Perspective constructions. Conventional projections. Projections formed by the method of development, including the method of Mercator.

Gnomonics (1 lesson): The different kinds of sun-dials.

Physics: First part (20 lessons).—Optics, geometrical and physical, including the theory of wave motion. Second part (20 lessons).—Electricity and magnetism.

Chemistry (25 lessons): Organic chemistry.

French literature (25 lessons): History of French literature in the eighteenth and nineteenth centuries. Exercises in composition and elocution.

Flemish (35 lessons): Programme similar to the course of the first year.

Hygiene (24 lessons): Anatomy and physiology of the human body; military hygiene. Surgical guide; medical guide.

Drawing: Drawing from reliefs (20 lessons). Landscape drawing (30 lessons.)

Military regulations (35 lessons): Field service and garrison service. School of the battalion and regiment. Mounting and dismounting of arms.

Exercises: Military exercises and drills. Gymnastics. Fencing. Riding. Swimming.

THIRD YEAR.

Applied mechanics (37 lessons): Hydraulics properly so-called. General theory of machines.

Topography (16 lessons): Map-making and map-reading. Planimetric methods. Leveling. Hasty topography. Topographical reconnoissances. Telemetry. Practical applications.

Applied physics (26 lessons): Thermodynamics. Electrical physics. Electric lighting.

Chemistry (20 lessons): Explosives. Lighting by gas. Water; classification of different kinds of water from the hygienic point of view and filtration of water.

Geology (16 lessons): Elements.

Civil engineering (41 lessons): Strength of materials. Knowledge of materials. Roads and railroads.

Military art (55 lessons): First part—Recruiting; organization; mobilization; applications. Second part—Strategy (with applications on the map). Third part—Tactics (with practical operations of small units, and applications on different kinds of ground).

Artillery (50 lessons): Preliminary ideas, including elementary ballistics. Artillery material; laying and firing.

Fortification (75 lessons): Permanent fortification. Temporary fortification. Attack and defense of fortresses. Instruction journeys and practical work.

Languages (one lesson per week in each language): Flemish, German, or English; continuation of the studies of the first two years.

Exercises: Riding.

FOURTH YEAR.

Applied mechanics (25 lessons): Steam engines and other motors depending upon the conversion of heat into mechanical energy. Principles of engine construction.

Geodesy (16 lessons): Instruments employed in geodesy. Triangulation, etc. Latitudes, longitudes, azimuths. Leveling, mechanical geodesy.

Applied chemistry (25 lessons): Combustibles. Iron and steel and various metals. Materials of construction. Manufacture of glass. Oils, colors, paints, and dyes.

Photography (6 lessons): Elements and practical applications.

Civil engineering, etc.: (a) Course of both sections (15 lessons)—Elements of graphical statics; trusses. (b) Course special to the engineer section (45 lessons)—Trusses; stability of masonry; execution of masonry. (c) Course special for the artillery section (6 lessons)—Resistance of tubes; hooping of guns.

Architecture: (a) Course for both sections (16 lessons)—Composition; decoration, orders, and styles of architecture; ogival architecture; medieval architecture; military architecture; modern architecture. (b) Course special to the engineer section (12 lessons)—Construction of buildings.

Military art (30 lessons): Fourth part—Military geography. Fifth part—Military history, including the Franco-German war as far as the capitulation of Sedan.

Legislation (8 lessons): Elements of military justice, discipline, the law of nations, and military instruction and education.

Artillery: (a) Course for both sections (13 lessons)—Service and tactics of artillery in sieges and in fortified places; construction of batteries. (b) Course with a common programme for both sections, but more detailed for the artillery than for the engineers (25 lessons for the artillery section and ten for the engineer section)—Theory of the construction of carriages; machines for mechanical maneuvers; pontoon and temporary bridges (including foreign bridges); foreign artillery. (c) Course special to the artillery section (35 lessons)—Service and tactics of artillery in the field; ballistics, exterior, interior, and penetration.

Fortification: (a) Course for both sections (20 lessons)—History of fortifications; connection of fortifications with strategy; defense of States; Belgian defensive system. (b) Course special to the engineer section (14 lessons)—Mines; military bridges; plans of fortification.

Administration (25 lessons): Preliminaries; service of administration in the units of the troops; allowances, etc. Arms, ammunition, clothing, camp and garrison equipage. Funds kept up in the different corps, etc. System of accountability of corps, etc. Practical exercises.

Languages (one lesson per week in each language): Flemish, German, or English; continuation of studies of the first three years.

Practical exercises: Visits to the principal military establishments, polygons, powder works, gun shops and arsenals, battlefields, etc. Practical exercises in fortifications, etc., on the terrain. Riding.

Infantry and cavalry section.

FIRST YEAR.

Geometry (10 lessons): Properties and graphical constructions of such curves as the ellipse, hyperbola, parabola, and the helix.

Descriptive geometry (33 lessons): Through the elements of perspective.

Mechanics (16 lessons): Cinematics, statics, and dynamics, elements of each, with a short course on steam, hydraulic, gas engines, etc.

Topography (24 lessons): Same course as in the sections of artillery and engineers (third year).

Physics (36 lessons): Elements of, and elements of heat, optics, acoustics, electricity, and magnetism, with practical applications.

Chemistry (45 lessons): Elements of inorganic chemistry.

Artillery (40 lessons): Elements of the science of gunnery, and description of Belgian and foreign small arms and artillery; also bridges constructed with the Belgian bridge equipages.

French literature (25 lessons): Same programme as in the sections of artillery and engineers (first year).

Flemish (35 lessons): Same programme as in the sections of artillery and engineers.
 German or English (35 lessons): Same programme as in the sections of artillery and engineers.

Hygiene (24 lessons): Same programme as in the sections of artillery and engineers (second year).

Drawing (65 lessons): Picturesque drawing and pen and ink sketching.

Military regulations (55 lessons): Same programme as in the sections of artillery and engineers (first year).

Exercises: Military exercises and drills. Gymnastics. Fencing. Riding. Swimming.

SECOND YEAR.

Cosmography (14 lessons): Elements of.

Military art (97 lessons): First, second, and third parts—same programme as in the sections of artillery and engineers (third year). Fourth part—military geography; elements of the military geography of Europe. Fifth part—military history; same programme as in the sections of artillery and engineers (fourth year).

Legislation (8 lessons): Same programme as in the sections of artillery and engineers (fourth year).

Fortification (60 lessons): First part—Permanent fortification. Second part—Temporary fortification. Third part—Attack and defense of fortresses and the defense of states.

Administration (25 lessons): Same programme as is in the sections of artillery and engineers (fourth year).

French literature (25 lessons): Same programme as in the sections of artillery and engineers (second year).

Flemish (35 lessons): Same programme as in the sections of artillery and engineers.

German or English (35 lessons): Same programme as in the sections of artillery and engineers.

Hippology (16 lessons): Same programme as in the sections of artillery and engineers (first year).

Drawing (18 lessons): Landscape drawing, drawing from nature.

Military regulations (45 lessons): Field and garrison service; schools of the battalion and regiment; mounting and dismounting arms.

Exercises: Military exercises and drills. Gymnastics. Fencing. Riding. Swimming.

As a result of the high standard of admission to the *École Militaire* and the keen competition for admission thereto, there are very few failures to complete the course of instruction. At the examinations for entrance in the year 1890-91, the total number of candidates was 246, of whom 115 were from the army and 131 from civil life. The total number successful at this time was 79, of whom 44 were from the army and 35 from civil life. At the school examinations at the end of this year the total number of cadets examined was 329 of all classes, of whom only 5 failed to pass.

The same year the number of competitors for entrance to the "*Cours central de préparation à l'École militaire*" was 42, of whom 27 were admitted. Two of these were sent back to their regiments in the course of the year, leaving 25, who all passed successfully at the end of the school year. Only 14 of these, however, were successful in the competition for the "*École Militaire*."

TEXT-BOOKS EMPLOYED AT THE "ÉCOLE MILITAIRE."

The official programme does not give any of the text books employed, but a few of them are mentioned in the list of works recommended to persons preparing for the entrance examinations. Many of the text-books are peculiar to the school, being only issued in lithographed form, and intended solely for the use of the students and instructors of the school.

ITALY.

At the present time—April, 1895—the military schools of Italy are divided into three classes, viz:

1. The "collegi militari," or military preparatory schools, of which there are five, established in the following cities: Naples, Florence, Milan, Rome, and Messina.
2. The military schools for the training of officers and noncommissioned officers, of which there are four, viz: (a) The military school of Modena; (b) the military academy of Turin; (c) the military sanitary school of application in Florence; and (d) the noncommissioned officers' school in Caserta.
3. The "scuole militari complementari," or the military schools of application proper, for officers, of which there are three, viz: (a) The war school ("Scuola di Guerra"), in Turin; (b) the school of application of artillery and engineers, in Turin; and (c) the school of cavalry, in Pinerola.

There are, in addition to the schools mentioned above, schools for artillery and musketry practice, a school of fencing, and batteries and platoons of instruction for training noncommissioned officers in their duties.

Circular No. 3 of the 5th of January, 1893, published in the *Giornale Militare Ufficiale* for that year, stated that the minister of war would not promise that after the school year 1893-94 there would be any more admissions to the lowest classes of the *collegi militari*. This order foreshadowed a gradual winding up of these schools. Accordingly it appears that there were no admissions to the *collegi militari* during the past year, and none are indicated in the orders for this year.

Indeed, a royal order of the 6th of November, 1894, decreed the abolition of these schools. Before this decree takes effect, however, it must be approved by Parliament, and it is now considered doubtful whether this approval will be given or whether the *collegi militari* will be allowed to continue.

SCHOOLS FOR THE TRAINING OF OFFICERS.

Of these, the schools which correspond most nearly to the United States Military Academy are the *Scuola Militare*, of Modena, and the *Accademia Militare*, of Turin.

I.—THE SCUOLA MILITARE, OR MILITARY SCHOOL, OF MODENA.

The object of this school is to furnish officers to the infantry and cavalry arms and to the commissariat corps of the royal army.

The course of study is completed in two scholastic years, at the end of which those students who pass the prescribed examinations are appointed second lieutenants in the infantry or cavalry or in the commissariat as fast as vacancies occur.

Admission to the military school.—The number of admissions yearly to the lowest class of the military school is fixed by the minister of war, and published, generally in the month of January or February, in the *Giornale Militare Ufficiale* (Official Military Journal). These places are granted (a) to the boys who have passed successfully through the fifth and last class of the "collegi militari"; (b) by competitive examination, to such boys as show themselves to be the best qualified, the examination being based upon the programme of admission; (c) by award based upon the ratings shown in school diplomas or certificates, to such boys as have obtained the diploma of a classical school (liceo), or of a technical school (istituto tecnico). Diplomas more than a year old are not admitted, unless the candidate has been prosecuting his studies in some higher institution of learning. Only the diplomas of the following courses of the technical schools are accepted: Physics and mathematics; land surveying; commercial course, and bookkeeping.

When the number of qualified candidates is greater than the number of places to be awarded, then preference is given first to the graduates of the collegi militari, then to students showing certificates of courses of study higher than those of the classical schools, next to the students showing the diploma of the classical school, next to the students showing the diploma of the technical school, and, lastly, to those who have undergone the competitive examination, in the order in which they pass.

Boys who are Italian citizens, and soldiers with the colors or on unlimited leave, are eligible to compete for places in the military schools, provided they possess the following qualifications:

1. They must be between the ages of 16 and 20 on the 1st of August of the year of admission.

2. They must have reached the height of 1.55 m. if they are over 18 years of age. For those who are under this age, the height may be less; but in this case they must give promise of reaching the minimum height by the time they attain the age of 18.

3. They must be well developed and of robust constitution and free from defects that would be a ground for discharge from the army. The chest measurement, for competitors who have not reached the age of 20, may be less than 800 mm, but it should correspond to the physical development of the subject, and should give promise of reaching the minimum by the time the subject is 20 years of age.

4. They must, if they are minors, have the consent of their fathers. In any case where the father is not living the consent of the mother is necessary, or, if both parents are deceased, the consent of the guardian must be had.

5. Their moral character must be good, and they must not have been expelled from any military or civil school.

The graduates of the *collegi militari* and the other successful candidates for admission to the military school are subject to a medical examination on their arrival at the school, and those found to be physically unfit are rejected.

However, graduates of the *collegi militari* who do not pass this physical examination may nevertheless be admitted; but if such boys do not qualify physically before finishing the course at the military school, they are forthwith discharged from the school and are not commissioned in the army.

Requests for admission to the competitive examinations must be made between the 1st of May and the 15th of June of the year in which the admission to the school takes place; requests to be allowed to present diplomas for competition must be made between the 1st of July and the 5th of August. All the requests are eventually transmitted to the minister of war.

The minister reserves the right of excluding from admission such boys as, for any reason whatever, he decides to be unworthy of holding a commission in the army.

Examinations for admission.—The subjects of the examination for admission to the military school are given in the following table; the programmes in each subject will be given later:

Group of subjects.	Subjects.	Method of examination.	Duration of examination.	Coefficients.
1	Italian language and literature	{ Written	4 hours	} 7
2	History, geography, elements of natural sciences.	{ Oral	20 minutes	
3		Oral	50 minutes, altogether....	5
3	Arithmetic and algebra; geometry, trigonometry.	Oral	50 minutes, altogether....	5
4	French language	{ Written	4 hours	} 3
		{ Oral	15 minutes	

The written examination in the Italian language and literature will precede all the others, and in order to be admitted to the other examinations it is necessary to qualify in this.

The examinations are made by committees, each of which is divided into four subcommittees (one for the oral examination in Italian language and literature; one for the examination in history, geography, and natural sciences; one for that in mathematics, and one for that in the French language). Each subcommittee consists of a president and two members.

In the oral examination, questions, drawn by lot by the president of the subcommittee, are put to the candidates, one question in each subject, except in the examination of history, when three questions are put (one in Greco-Roman history, one in mediæval history, and one in modern history), and in arithmetic and algebra, where two questions are put (one in arithmetic and one in algebra).

However, additional questions may be put, if the subcommittee so desire. For each subject and for each method of examination (that is to say, written or oral) the subcommittees take distinct votes, as follows:

First, the examiners vote "yes" or "no" on the question whether the candidate is qualified in any given subject and in any particular kind of examination; then, another vote is taken to determine the candidate's mark, marks from 10 to 20 being given to candidates declared to be qualified and marks from 0 to 9 to those declared to be not qualified.

The true mark for each candidate on each vote is determined by taking the sum of the marks of the three examiners and dividing the sum by 3.

The mean of the marks for each "group" is obtained by taking the arithmetical mean of the marks given on each vote in all the different subjects of this group.

To obtain the general average for any candidate, multiply the mean mark on each group by the proper coefficient; take the sum of the products and divide by 20.

To be declared qualified for admission a candidate must obtain a qualification by a majority of votes in every separate vote.

However, a candidate may be declared qualified for admission who does not qualify on every vote, provided that his mark on any such vote does not fall below 8-20, and his general average does not fall below 14-20.

SYNOPSIS OF THE PROGRAMMES FOR THE EXAMINATION TO ENTER THE FIRST YEAR OF THE MILITARY SCHOOL.

Italian language and literature.—Written examination. A prose composition, an exercise in invention, on a theme given by the minister. In this the candidate must give proof of knowing how to express and develop the appropriate ideas in their logical order in a simple, clear, and correct style.

Oral examination.—The candidate must be able to read and explain an easy piece of prose or poetry, and to reply to a question relating to one of the following subjects: (a) Grammar and rhetoric; (b) Italian literature from the twelfth century to the present time.

History.—(a) Greek and Roman history down to the fall of the Roman Empire; (b) history of the middle ages, with particular reference to the history of the various Italian States, and the House of Savoy especially; (c) modern history, with particular reference to the history of the Italian States and the House of Savoy; the Reformation, the French Revolution, and the Napoleonic wars; history of Europe since 1815; unification of Italy.

Geography.—(a) Elements of cosmography; (b) general principles of geography; Italy, continental, peninsular, and insular; political divisions of Italy, Asia, Africa, Oceanica, America; general ideas only.

Elements of natural sciences.—Mechanics: Matter, force, solids, liquids, gases, elasticity, gravity, heat, light, magnetism, electricity, chemistry, astronomy, physical geography, zoology, and natural history, botany.

Arithmetic and algebra.—Arithmetic: Through the subject. Algebra: Through the solution of equations of the second degree with one unknown quantity; arithmetical and geometrical progressions; exponential functions and logarithms; solution of exponential equations by means of logarithms. Geometry: Through plane and solid geometry. Trigonometry: Plane. Through the solution of oblique angled triangles, and determination of the area of triangles.

French language.—Written examination.

Translation of a short tale or romance of an easy style from Italian into French.

Oral examination.—Grammatical rules and their application; conjugation of the regular verbs; irregular verbs.

Exercises in reading.—Grammatical analysis; construction of the sentence.

The course of instruction at the military school commences in the month of October. The boys admitted in the year 1893 were ordered to report at the school on the 12th and 14th of the month; those admitted in 1894, on the 14th and 15th of the month.

The number of admissions, as has already been stated, is fixed every year by the minister of war. Two hundred and seven were admitted in 1893, of whom 60 came from the *collegi militari*, 95 from the diploma competition, and 52 from the ordinary competition. In 1894 the total number of admissions was 250, of whom the *collegi militari* supplied 104, the diploma competition 134, and the competitive examination only 12.

The orders for 1895 state that the number of admissions to the military school this year will be 120. (*Giornale Militare Ufficiale*, Circular No. 12, 25 January, 1895.) Apparently the number does not include those who will be admitted from the fifth class of the *collegi militari*.

Terms of payment; free and half-free places.—The cost of pension (or board) is 900 lire or francs for the scholars of the military school and military academy, the installments of which are paid quarterly and in advance. In addition each scholar must pay, on admission, for his first equipment, a sum of 350 lire. From this last contribution the scholars promoted from the *collegi militari* are exempted.

There is also an annual contribution from each scholar of 120 lire, payable in advance in installments, which is intended to provide for the renovation and repair of clothing and equipment, and to supply text-books and other necessary articles.

Free places, as such, are granted only to the sons of officers of the army or navy and some of the civil services, where such officers have been killed in battle, or have died of wounds or disease received or contracted in the field.

Half-free places are granted for family services, (a) to the sons of officers of the army and navy who have served at least eight years, (b) to the sons of certain persons who have received military decorations, (c) to boys belonging to families who have rendered distinguished services to the state.

Half-free places are granted on account of personal merit, (*a*) to boys who are admitted to the military academy or the military school on the diploma competition; (*b*) to boys who are admitted to either of these schools on competitive examination, provided they stand in the first tenth of the total number admitted on such competition, and provided also that their general average does not fall below 16-20; (*c*) to such pupils in the *collegi militari*, military school, and military academy as stand in the first tenth of the total number of those promoted a year in each of these establishments, provided that their general average does not fall below 16-20.

A boy may be entitled to a half-free place for two different reasons; in such a case he gets a free place.

The exemption accompanying a free or half-free place refers only to the pension or board money. The contribution for first equipment and the contribution for repairs, etc., must be paid in all cases and by all classes of scholars. Pupils coming from the *collegi militari*, or any of the other national military schools, are exempt however from the contribution for first equipment.

Assignments.—Those pupils of the military school who desire to be assigned to the cavalry must make their applications therefor immediately after entering the school.

Those who desire to be assigned to the commissariat corps must make their applications therefor immediately after their entrance into the second-class year.

Those who make applications for the cavalry must deposit 4,000 francs, or its equivalent, to pay for two horses and the necessary horse equipments, when they are promoted to be second lieutenants of cavalry.

At the end of the first year of the course the aspirants for the cavalry will be subjected to an examination in equitation, and those who are pronounced unfit for the cavalry will be assigned to the infantry section.

Toward the end of the month of January the pupils of the second year who are aspirants for the cavalry are examined again in equitation, and those who are pronounced unfit are assigned to the infantry section.

At the end of the second year those applicants for the cavalry who do not pass in equitation are not allowed to be reexamined, but are turned back a year, unless they choose assignment to the infantry.

Military school—Course of instruction.

Subjects.	First year coefficients.			Second year coefficients.		
	Number of lesson.	Course.	Examination.	Number of lesson.	Course.	Examination.
Italian literature:						
Written	70	5	7	60	5	7
Oral		3	4		3	4
Physical and natural sciences.....	60	3	5			
Small arms and artillery.....	40	3	5			
French and German languages.....	60	3	5	60	3	5
Topography.....	60	4	6			
Topographical drawing.....	50	2	3			
Graphical projections (descriptive geometry).....	40	3				
Military history.....	60	3	5	60	3	5
Military art.....	60	4	6	60	4	6
Law, political and military.....				50	3	4
Military geography.....				70	3	6
Fortification (drawing included).....				100	3	6
Military accounts.....				20	3	
Military regulations:						
Theoretical.....	50	2	3	50	2	3
Practical.....	150	3	5	150	4	7
Gymnastics.....	120	2		90	2	
Fencing.....						
Riding (for military cadets).....				60	2	
Conduct.....		4			4	
Military aptitude.....		2			3	
Total.....	830	46	54	830	47	53
Riding (for the cavalry aspirants).....	120			200	2	4
Mark for the practical period of instruction (instructional camp) to be added to the final average:						
Military instruction.....		.01			.01	
Topographic exercise.....		.01			.01	

Marking and standing.—The final standing of pupils at the military school is determined after the examinations, which are held at the end of each scholastic year, but the pupils receive marks on the progress they have made during the course, determined by their written work, their drawings, and their answers to questions put to them by the professors and instructors during the lectures and class instruction.

Marks are also given by the instructors in riding, fencing, and gymnastics for each pupil at the end of every two months.

Marks are given in conduct and military aptitude by the company commanders at the end of every four months.

The standing is made out in the middle of the year, on the basis of the marks given during the term; the average mark of each scholar is multiplied by the corresponding coefficient and the sum of the products is taken. Dividing this sum by the sum of the coefficients gives the general average for each scholar. The scholars then take rank according to their respective general averages. Those scholars are declared deficient who obtain a mark less than 10-20 in any subject.

At the end of each scholastic year the average for the term's work is determined and combined with the average resulting from the examination. In this way is established the yearly general average on which depends the final standing of the pupils in each class.

In order to be promoted a class, or to graduate, a pupil must obtain in each subject a general average of not less than 10-20, and in all

subjects a final general average of not less than 11-20, including the marks given for conduct and military aptitude.

Those pupils who fail to qualify are turned back a year. If they have already been turned back one year, they are transferred to some corps of the army to finish the time for which they are liable to military service.

The time for which boys who enter the military school or the military academy bind themselves to serve in the army is determined by the law of "*Arruolamento volontario ordinario*," or ordinary volunteer enlistment. This time is four years in the cavalry and three years in all the other arms. Those scholars of the military school who fail in their graduating year in any branch except military regulations may enter the army as sergeants, being assigned to corps in accordance with their applications. Such scholars must contract to serve for five years, in which time their two years at the military school will be counted.

Assignments to regiments on graduation.—The assignments to regiments are made in accordance with the following rules:

Those graduates who are in the first tenth of the whole class, independently of the arm or corps for which they are aspirants, are allowed to designate the three regiments in which they prefer to serve. The other graduates will have no choice, but will be assigned to regiments in their own arms according to the numerical order of the regiments, beginning each year with the one designated by the minister. Such graduates as are pronounced physically qualified for the "*bersaglieri*" (rifles), and the "*Alpini*" (mountain rifles), by an examining committee appointed at the school, are commissioned in those regiments, and the tallest graduates are assigned to the grenadiers.

Lots are drawn for the places in the commissariat corps when there are more applicants than there are vacancies or disposable places.

The same rule is followed when more graduates are recommended for the rifles than there are vacancies available.

As a general rule, applications from newly appointed officers for assignment to particular regiments will not be entertained by the minister of war. Exceptions for the higher graduates have been indicated.

The cavalry graduates of the military school are immediately sent to take a post-graduate course at the school of cavalry in Pinerola. Their ultimate seniority is determined by their standing at the end of the course.

Military organization, etc.—For the purpose of military instruction, drills, etc., the scholars of each class are divided into companies, which in turn are organized into two battalions; the first battalion is formed by the companies of the second year, or seniors, and second battalion by the companies of the first year, or juniors. The number of companies in a battalion depends on the number of scholars in the class.

Each company is organized in a manner conformable to the infantry drill and interior service regulations. The commanding officers of com-

panies are captains, and the subaltern officers lieutenants detailed from the army. The acting noncommissioned officers, or "capiscelti and scelti," are appointed from the cadets of the second year who are specially qualified for such duties, from which class are also appointed the cadet instructors or drillmasters. To each company are also attached two of the noncommissioned officers of the army belonging to the school staff; also two of the school domestics, as policemen.

Each battalion of the school is commanded by a field officer, generally a major, detailed from the army. When the two battalions are united for reviews, inspection, etc., the command of the whole is generally taken by the colonel, who is second in command at the school.

The commander of the school is a general officer, who is directly responsible to the minister of war.

II.—THE ACCADEMIA MILITARE, OR MILITARY ACADEMY OF TURIN.

The object of this school is to educate boys for the position of officers in the artillery and engineer arms.

The course of study is completed in three scholastic years, at the end of which those scholars who pass the prescribed examinations are appointed second lieutenants of artillery or engineers, with seniority from the date of their entering the last year of the course.

Admission to the military academy.—The number of admissions yearly to the lowest class of the military academy is fixed every year by the minister of war, and is published in the *Giornale Militare Ufficiale* at the same time that the number of admissions for the military school is announced. These places are all given in accordance with the results of a competitive complementary examination, to which are admitted only such boys as belong to the three following categories: (a) Boys who have graduated at the *collegi militari*; (b) boys who have obtained the diploma of a classical school or technical school, and who satisfy all the other requirements for this class of applicants as prescribed in the regulations for admission to the military school; (c) boys who have passed in all the subjects of the entrance examination for the military school, and who have obtained in the mathematical examination an average of not less than 14–20.

All these boys must possess the same qualifications with regard to Italian nationality, age, height, etc., that are required for admission to the military school.

Complementary examination.—The subjects of the complementary examination for admission to the lowest class of the military academy are the following: Trigonometry, complementary geometry, and complementary algebra, in accordance with the programmes, which will be given later.

This examination, which is oral only and which lasts fifteen minutes for each candidate, is given by a committee appointed by the minister of war, which holds its sessions successively at the military academy and at the various *collegi militari*.

For each one of the three subjects mentioned above the president of the examining committee draws by lot a question from the list on the programme, and on this question the candidate is examined during the time allotted to him. The committee may however put further questions to the candidate on any of the subjects of examination, and may besides question him on programmes 8 and 9 for admission to the military school. (These numbers refer to geometry and trigonometry.)

With regard to the votes to be taken to determine whether a candidate is qualified, and to determine his mark and general average, the regulations correspond in general to those laid down for the military school. A final vote is taken for all three of the subjects of examination.

All those candidates who obtain a final mark of not less than 10 are declared qualified.

When the number of qualified candidates is greater than the number of vacancies, the vacancies are given to those who have obtained the highest ratings on the complementary examination, irrespective of the class of competitors to which they belong.

SAMPLE QUESTIONS.

1. *Trigonometry.*—No. 8—Area of a triangle; (*a*) in functions of the two sides and the included angle; (*b*) in functions of one side and the angles; (*c*) in functions of the three sides. Area of a quadrilateral in functions of the two diagonals and the angle included between them. Area of a regular polygon in functions of the side and the number of sides. To calculate the diagonals, the angles, the area of a quadrilateral inscribed in a circle, and the radius of the circle, in terms of the sides. Problem of Pothenot.

2. *Algebra.*—No. 6—Product of *m* binomial factors of the form of $a+b$, $a+c$, $a+d$. * * * Number of terms; law of the exponents of *a*, and law of the coefficients; development of $(a+b)^m$, *m* being entire and positive; law of the coefficients and equality of the coefficients of terms equidistant from the two extremes; development of $(a-b)^m$; sum of the binomial coefficients and sum of the same coefficients with alternate signs.

3. *Geometry.*—No. 2—The sum of the squares of the sides of a quadrilateral is equal to the sum of the squares of the diagonals, increased by four times the square of the segment which unites the middle points of the diagonals; in every quadrilateral inscribed in a circle the product of the two diagonals is equal to the sum of the products of the opposite sides; in every quadrilateral inscribed in a circle the two diagonals are to each other as the sum of the products of the sides which meet respectively at the extremities of the same diagonals; calculate the area of a quadrilateral in terms of the sides and the two diagonals; calculate the area and the diagonal of an inscribed quadrilateral, and the radius of the circumscribing circle, in terms of the sides.

The so-called "questions" of these programmes, it will be seen, are really sets of questions.

The course of instruction at the military academy commences in October. In 1893 and 1894 the boys admitted were ordered to report on the 14th of this month.

The number of admissions, as has been stated, is fixed every year by the minister of war. In 1893 the total number of admissions to the lowest class was 42; in 1894 it was 63. The orders for this year announce that 70 places will be open for competition for the class entering in October, 1895.

Terms of payment; free and half-free places.—The regulations under these heads are the same as those that apply to the military school.

Military academy—Course of instruction.

Subjects.	Approximate number of—		Coefficients.	
	Lessons.	Days drawing.	Course.	Examination.
FIRST YEAR.				
Finite analysis (higher algebra, spherical trigonometry, analytical geometry).....	195		8	12
Projective geometry, i. e., higher or non-Euclidian geometry.....	60	30	6	8
Physics (mechanics, electricity, magnetism, optics).....	90		6	8
Topography.....	30	30	4	5
Italian literature.....	90	(¹)	5	7
French literature.....	60		2	3
Military law and regulations.....	15		3	4
Right-line drawing.....		30	1	2
German language (optional).....	30		3	
Total.....	570	90	.02	.03
SECOND YEAR.				
Infinitesimal analysis (differential and integral calculus).....	120		8	12
Descriptive geometry.....	60	30	6	9
Chemistry.....	60		4	6
Italian literature.....	30	(²)	3	4
French literature.....	60		2	3
Field fortification.....	30	30	3	4
Military art (organization and logistics).....	30		3	4
Military history (ancient, mediæval, and commencement of modern period).....	60		3	4
Landscape drawing.....		30	3	
German language (optional).....	60		.02	.03
Total.....	510	90		
THIRD YEAR.				
"Meccanica razionale" (geometrical treatment).....	120		8	12
Applications of descriptive geometry.....	60	30	6	9
Applied chemistry.....	60		4	6
Elements of artillery.....	60		3	4
Military art—tactics.....	45		3	4
Military history—modern times.....	60		3	8
Elements of administration and accounts.....	15		2	2
Topography.....	30	30	3	4
Architectural drawing.....		30	3	
German language (optional).....	60		0.02	0.03
Total.....	510	90		

¹ Composition, questions, and examination.

² Composition, questions, and oral examination.

For military instruction and conduct the coefficients are, respectively, 8 and 6 for each year for the "course" only.

The length of the lessons and of the sessions in drawing is between one hour and an hour and a quarter.

Marking and standing.—The progress made by the different scholars during the year is measured by the marks given to them by the professors and instructors, and which are based on their written work and on the answers to the questions put during the lectures and class instruction.

During the first four months of the year the scholars retain the standing they had at the beginning of the term.

At the end of the first term of four months, and also at the end of the second term of this length, the standing is made out anew. The director of the studies causes to be determined the general average of each scholar. The average for each branch is determined from the marks, the written work, and the drawings, if any drawing is included in the subject.

Marks are also assigned at the end of every four months for conduct and military instruction.

Each subject has its own coefficient, established by the minister of war, for the purpose of determining the classification or standing.

To obtain the general average for any scholar, multiply the average in each subject by the proper coefficient; take the sum of these products and divide by the sum of the coefficients. To the result add the average for any optional study that has been taken, calculated in accordance with the proper coefficient fixed by the minister of war. All those whose general average in the obligatory subjects falls below 10–20 are declared deficient.

The yearly examinations.—At the end of the scholastic year, and before the examinations take place, the averages of the scholars in each branch of study are determined according to the principles already laid down. The marks are also determined for conduct and military instruction.

The votes are taken by the examining subcommittee on each scholar and in each subject. The first vote determines the matter of qualification. After this vote, another is taken to determine the mark to which the scholar is entitled. If he has been declared qualified, each of the three members of the examining subcommittee must assign him a mark not lower than 10 and not higher than 20. If he has been declared not qualified, each member must assign him a mark between 0 and 9. The definite mark is the arithmetical mean of the marks given by the three examiners.

To determine the final general average, on which depends the standing, multiply the annual average in each subject by the proper coefficient, and also the average on examination by the prescribed coefficient; take the sum of the products and divide by the total sum of all the

coefficients. The general average thus obtained is increased by the average gained on optional subjects, if any.

Every scholar is declared qualified on examination when he obtains on every subject of examination a mark not less than 10-20, including the averages for conduct and military instruction.

A written examination in Italian literature will precede all the other examinations; any scholar who does not obtain on this examination a mark of at least 10-20 will not be admitted to the oral examination in the same subject.

Any scholar who is declared deficient in any subject is entitled to a reexamination in this subject, provided that his final general average is not less than 12-20. In other cases, scholars who are not qualified must repeat the year's course, unless they have already been turned back a year, in which case they are either transferred to some corps or regiment in the army to serve out their time (see page 14) or to the military school.

The scholars who fail in the first or second year's examination of the military academy have the option of entering the corresponding class of the military school. Those who fail on the graduating examination, and who can not or do not wish to repeat the course, have the same rights with regard to promotion as if they had graduated at the military school.

Assignment on graduation.—The graduates of the military academy who are appointed second lieutenants are assigned to the artillery or engineers in accordance, as far as possible, with their own applications. However, the minister has the power to make assignments according to what he may deem the interests of the service, taking into account only the particular aptitude of the officer and disregarding his application for assignment to one corps or the other.

Before being assigned to regiments and before doing duty with troops, the graduates of the military academy who are appointed second lieutenants are sent to the school of application of artillery and engineers to finish their professional education. Here the officers of the two arms follow separate courses of instruction, and their seniority in their own arms depends on their standing when they finish this professional course.

Military organization, etc.—The scholars are organized into companies, which are divided into sections. The third company is formed of the scholars of the first year or lowest class, the second company corresponds to the second year, and the first company to the scholars of the third year. The sections into which the companies are divided are approximately equal.

The commanding officers of the companies and the lieutenants are respectively captains and lieutenants detailed from the army.

The three companies united constitute the cadet brigade.

The acting noncommissioned officers "capi-scelti and scelti" are detailed from the cadets, one "capo-sculto" and a number of "scelti"

to each company. They are taken from the cadets of the third year or highest class.

In the way of practical instruction the scholars of the second and third years are exercised in riding three times a week, and the scholars of all three classes receive every week three lessons in fencing and two in gymnastics. They have besides such drills and practical military instruction as are necessary to fit them for their special arms.

Vacations.—There is an ordinary vacation or furlough every year, in the interval between the end of one course and the commencement of the next. For such cadets as have been promoted a class, the maximum length of this vacation is thirty days. For those who are to be reexamined, the vacation is curtailed more or less, according to circumstances, and the commandant of the academy may deprive any cadet of his whole vacation on account of bad conduct, etc.

Modification in the organization of the academy.—Among the reforms projected in the royal decree of the 6th of November, 1894, was the consolidation of the military academy and the school of application of artillery and engineers. At the present time (April 25, 1895) this decree has not yet been approved by Parliament, and may possibly never be carried out.

AUSTRIA.

The military schools in Austria which correspond most closely to the United States Military Academy are the Theresa Military Academy of Wiener-Neustadt, and the Technical Military Academy of Vienna.

Before proceeding to a description of either of these schools, a brief reference will be necessary to the schools which prepare for these academies, which are called military "Realschulen" or technical schools. Though these schools are specially intended to prepare for the military academies, there is nothing to prevent boys from getting their preparation in other "Realschulen" or in private educational establishments. The "Realschulen" generally in Austria and Germany are intended to lay the basis for a scientific education, or what in France is called "Penseignement moderne." The classical schools are called "Gymnasia."

The course at the military real schools is seven years, of which four are passed in the "Unter-Realschule," and three years in the "Ober-Realschule." There are four of these under technical schools, situated respectively at St. Polten, Guns, Eisenstadt, and Kaschau. They have in all a capacity of about 860 scholars. The superior technical school is at Weisskirchen. It has a capacity of 450 scholars.

The military technical schools also prepare for what are called the "Cadetten-Schulen" or cadet schools. The graduates of the cadet

schools do not enter the army as officers, but are assigned to corps and regiments as cadets, with the actual or honorary position of noncommissioned officers. As vacancies occur, they are appointed "Cadet-Officers-Strelvertreter" (cadet officers' substitutes), in which position they exercise the functions of officers and associate with them without actually having officers' rank. After a probationary period in this position, they may be nominated by the Emperor to be lieutenants of the lowest grade, in their respective corps, but they must be acceptable to the officers of the unit where they have been on probation.

Armed with what is called the matura certificate, the graduate of the "Ober-Realschule" is entitled to apply for appointment to one of the military academies. In these appointments preference is given to officers' sons first, and then to sons of officials. The standing of at least "good" is required for admission to the academies. Of the graduates with this standing about 60 per cent are promoted to the Theresa Military Academy and about 40 per cent to the Technical Military Academy. Graduates of the "Ober-Realschule," with only "sufficient" standing, are generally sent to the second class of a cadet school.

The following table, showing the classification list of the "Ober-Realschule" for the year 1888-'89, will illustrate the system of promotion, or recommendation for promotion in the Austrian military schools:

	Class I.			Class II.			Class III.			Total.
	A.	B.	C.	A.	B.	C.	A.	B.	C.	
Excellent.....	1	2	1	2	2	1	4	3	2	18
Very good.....	5	3	3	4	8	5	9	7	10	54
Good.....	24	26	25	28	27	30	23	30	26	239
Sufficient.....	16	13	12	9	9	6	7	4	2	78
Insufficient.....	3	2	4	2	.....	.....	.....	.....	.....	15
Unclassified.....	1	2	4	1	1	1	.....	.....	.....	10
Total.....	50	48	49	46	47	45	43	44	42	414
	147			136			129			
Ordered promoted a class.....	45	44	40	43	44	41	.....	.....	.....	257
Reexamination allowed.....	2	2	5	2	.....	3	.....	.....	2	16
Discharge asked by parents.....	.....	1	1	.....	.....	.....	.....	.....	.....	2
Recommended for—										
Theresa Military Academy.....	.....	.....	.....	.....	.....	.....	22	25	22	67
Technical Military Academy.....	.....	.....	.....	.....	.....	.....	16	17	16	49
Transfers to cadet schools.....	1	.....	1	.....	2	.....	5	3	2	14
Turned back one year.....	.....	1	.....	.....	1	.....	.....	.....	.....	2
Dismissal.....	1	.....	1	1	.....	.....	.....	.....	.....	3
Discharge, physical disability.....	.....	.....	1	.....	.....	.....	.....	1	.....	2
Furlough for six months.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Transfer to naval school.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1
Total.....	50	48	49	46	47	45	43	44	42	414
	147			138			129			

Boys enter the "Unter-Realschule" at the age of about ten. The seven-years' course comprises three groups of subjects of instruction, viz:

Group A: Religious instruction; languages, German, Hungarian or Bohemian (either one), Polish (for boys whose fathers are not citizens of countries of the Hungarian Crown, Polish may be chosen in the Ober-Realschule course instead of Hungarian or Bohemian), French;

geography, history, natural history, physics, chemistry, mathematics (arithmetic and algebra, geometry, geometrical drawing), descriptive geometry, free-hand drawing, calligraphy.

Group B: Drills, target practice, drills and exercises in field service, gymnastics, fencing, games, including skating, swimming.

Group C: Service regulations, deportment and sanitary instructions, singing and music, dancing.

The instruction in the Realschulen is extremely thorough. Those who do not pass the yearly examinations in July are turned back a year in their classes, or may be sent away. By the time the "Ober-Real" course is reached, a sufficient number has been weeded out to prevent any crowding of the course.

THE MILITARY ACADEMIES.

The Theresa Military Academy of Wiener-Neustadt educates officers for the infantry, rifles, and cavalry; the Technical Military Academy of Vienna educates officers for the artillery, engineers, and technical troops (including the railway and telegraph troops).

ADMISSION TO THE MILITARY ACADEMIES.

The different kinds of places at the military academies are: (1) "Ararial" (imperial or treasury) places, wholly or half free; (2) "Stiftungs" (foundation or endowment) places; (3) paying places.

These different kinds of places are at the disposal of the imperial war ministry or the ministries of national defense of Austria and Hungary. The places for which there are endowments of private funds are disposed of in accordance with the stipulations of the letter of donation. The "Ararial" places are given directly by the Emperor. In awarding these places preference is given to the sons of officers, and then to the sons of officials.

The "Stiftungs" places are disposed of by competitive examination, the persons who are allowed to compete being designated by the state, county, or other authorities or the corporations or private individuals interested.

Board (Kostgeld).—The price of board is 800 gulden yearly (about \$320) at both academies, or half that amount for the half-free places. Besides the board money, a payment of 14 gulden at the beginning of each school year is required from each aspirant admitted to a military academy or military technical school. This is called "school money."

Qualifications for admission.—Aspirants must not be under 17 nor over 20 years of age on the 1st of September of the year they enter. These limits are the same for both academies. They must possess Austrian or Hungarian citizenship (foreigners may be admitted by special permission of the Emperor, under certain conditions). They must possess also physical fitness for military training and satisfactory moral character.

Applications for places.—These applications must be before the proper authorities by the 15th of May in each year. The necessary accom-

panying papers are: (1) A certificate of domicile; (2) a baptismal or birth certificate; (3) a military surgical certificate; (4) the proper school certificate.

The surgical certificate filed with the application for a place will not of itself be sufficient to secure entrance to either academy. The applicant must, in addition, pass a medical examination at the academy immediately after his arrival.

Applicants who are passed at this surgical examination are then admitted to the regular entrance examination.

Only the aspirants coming from private educational establishments are required to pass the complete entrance examination. To enter the Technical Military Academy, however, the "Ober-Realschule" graduates must pass an examination in descriptive geometry. Otherwise, the "Ober-Realschule" graduating certificate, with the notation with at least "good," is sufficient for admission.

The full examinations for the civil scholars in both academies are as follows:

I.—MILITARY ACADEMY OF WIENER-NEUSTADT

[The Theresa Military Academy.]

(a) *German language*.—Oral: Free delivery of a given and studied theme; different kinds of periods and expressions; knowledge of the principal periods of German literary history, and of the prominent Austrian writers of the nineteenth century. Written: Paragraphs on historical, religious, and biographical themes; logical arrangement of matter in larger periods in a given theme.

(b) *Geography*.—Thorough acquaintance with the physical and political geography of Europe, especially of the states bordering on Austria-Hungary, including the statistical military conditions of the latter, and an acquaintance with the Austro-Hungarian monarchy in all its details; general knowledge of other parts of the world, with special reference to European colonies; knowledge of mathematical and physical geography. The aspirant must be able to give a good graphical representation of the continent of Europe and especially of central Europe. Best text-book, Sonklar's "Geographie für die k. u. k. Militar Real-und Cadettenschulen."

(c) *History*.—Knowledge of the principal historical events of ancient times, of the Middle Ages, and of modern times down to the present, a correct comprehension of the correlation of these events, with special reference to the development of Austria-Hungary. Text-books recommended: "Lehrbuch der allgemeinen Geschichte für die k. u. k. Cadettenschulen," or A. Gindely's "Lehrbuch der allgemeinen Geschichte für Obergymnasien."

(d) *Physics*.—General and special properties of bodies; mechanics of solid, fluid, and gaseous bodies; wave motion, acoustics, optics, heat, magnetism, and electricity, with the elementary mathematical treatment of these subjects. (See the text-books recommended for the Ober-Realschule course by Handl.)

(e) *Chemistry*.—Same as the course for the third year of the Ober-Realschule course. This course includes the elements of organic and inorganic chemistry, and also a knowledge of the synthesis of the more important carbon compounds. (See the text-books recommended for the higher grades of the middle schools by Roscoe.)

(f) *Mathematics*.—Arithmetic and algebra, including the solution of equations of the second degree with one or two unknown quantities, arithmetical and geometrical progressions, and the theory of combinations, binomial theorem.

Geometry.—Planimetry, stereometry, plane and spherical trigonometry, elements of analytical geometry, including right lines and conic sections. Text-book recommended, Moenik's Lehrbücher für Oberclassen.

(g) *Calligraphy*.—Good, legible, pleasing, and easy-running style of handwriting, in both German and Latin characters.

II.—THE TECHNICAL MILITARY ACADEMY.

The same requirements as for the Theresa Military Academy in Wiener-Neustadt, with the addition of descriptive geometry.

Various relations of points, right lines, and planes; representation of polyhedrons, their plane and other sections; representation of curved lines, curved surfaces, and their plane and other sections; tangent planes to curved surfaces; shades and shadows.

Although scholars may be admitted to any class of the Real-Schulen on passing the required examination for that year, no one is allowed to "pass up" a year at the military academies. Aspirants are only admitted to the academies in the first year, or lowest class.

COURSES OF INSTRUCTION AT THE MILITARY ACADEMIES.

Rating and marking.—There are five different ratings in the Austrian military schools, and to each rating is assigned a numerical value, as follows:

"Vorzüglich," or excellent.....	5
"Sehr gut," or very good.....	4
"Gut," or good.....	3
"Genügend," or sufficient.....	2
"Ungenügend," or insufficient.....	1
"Schlecht," or bad.....	0

In order to be graded as "excellent" the average in any subject must be equal to at least $4\frac{1}{2}$, or, more correctly, must exceed $4\frac{1}{2}$.

To determine, for instance, the minimum credit which will insure the rating excellent, take the sum of the number of subjects of instruction in the Group A, for the particular school and year; multiply this sum by 9, and divide the product by 2. When this dividend is divisible by 2, then the half plus 1 will be the minimum credit; when it is not divisible by 2, then the "grössere Hälfte," or the half plus one-half, will be the minimum credit.

In a similar manner is determined the minimum credit for the ratings "very good" and "good." In the first case the multiplier is 7, in the last case 5. To obtain the minimum credit for the rating of "sufficient," multiply the sum of the number of subjects of instruction by 2.

The following table exhibits the minimum credit for all these ratings at both of the academies:

Minimum credit for number of subjects of instruction of the Group A of the curriculum.

No.	Name of school.	Class.	Excel- lent.	Very good.	Good.	Suffi- cient.	
12)	Theresa Military Academy.....	I	55	43	31	24	
16)		II	73	57	41	32	
22)		III	100	78	56	44	
	Technical Military Academy:						
11)	Artillery division.....	I	50	39	28	22	
18)		II	82	64	46	36	
23)		III	104	81	58	46	
11)	Engineer division.....	I	50	39	28	22	
17)		II	77	60	43	34	
22)		III	100	78	56	44	

The length of the whole course of instruction at both academies is three years.

The school year, which at both academies begins on the 18th of September and ends on the 17th of August, is divided into a theoretical and a practical course; the theoretical course is divided into a winter and a summer semester.

The theoretical course at the Theresa Military Academy lasts till the 30th of June, and at the Technical Military Academy till the 31st of May; the rest of the school year forms the practical course; one month is allowed for the vacation.

The subjects of instruction at the two academies and the division of these subjects among the different years of the course are indicated by the following table:

Subjects	Theresa Military Academy.			Technical Military Academy.					
				Artillery division.			Engineer division.		
	Class I.	Class II.	Class III.	Class I.	Class II.	Class III.	Class I.	Class II.	Class III.
GROUP A.									
Military correspondence	1	1	1	1	1	1	1	1	1
Hungarian or Bohemian language	1	1	1	1	1	1	1	1	1
French language	1	1	1	1	1	1	1	1	1
Geography		1	1		1	1		1	1
General military history			1			1			1
Physics			1			1			1
Physics and technology			1			1			1
Chemistry and technology			1	1	1	1	1	1	1
Higher mathematics	1	1	1	1	1	1	1	1	1
Practical geometry	1	1	1	1	1	1	1	1	1
Descriptive geometry	1	1	1	1	1	1	1	1	1
Architecture						1			1
Law			1			1			1
Army organization		1	1		1	1		1	1
Military administration			1			1			1
Artillery instruction				1	1	1			1
Study of arms	1	1	1		1	1	1	1	1
Technical instruction					1	1			1
Pioneer service	1	1	1						1
Fortification and attack, and defense of fortifications		1	1		1	1		1	1
Drill regulations:								1	1
Infantry	1	1	1						1
Cavalry			1						1
Artillery					1	1			1
Tactics		1	1		1	1		1	1
Service regulations	1	1	1	1	1	1	1	1	1
Horses and veterinary service			1			1			1
Study of ground and representation of ground	1	1	1	1	1	1	1	1	1
Free-hand drawing	1	1	1	1	1	1	1	1	1
Total instructions in each year	12	16	22	11	18	23	11	17	22
GROUP B.									
Drills and field-service exercises	1	1	1	1	1	1	1	1	1
Gymnastics	1	1	1	1	1	1	1	1	1
Fencing	1	1	1	1	1	1	1	1	1
Riding			1		1	1			1
Total instructions	3	3	4	3	4	4	3	3	4
GROUP C.									
Service regulations and department	1	1	1	1	1	1	1	1	1
Sanitary affairs			1			1			1
Swimming	1	1	1	1	1	1	1	1	1
Singing and music	1	1	1	1	1	1	1	1	1
Dancing	1	1	1	1	1	1	1	1	1
Total instructions	4	4	5	4	4	5	4	4	5

The course of instruction has been slightly changed from the above scheme, but the changes, though not exactly known, are of small importance.

The higher mathematics taught at the Theresa Military Academy comprise (1) algebraic analysis, (2) analytical geometry of two and three dimensions, and (3) differential and integral calculus. At the Technical Military Academy the course comprises the same branches, but a greater amount of time is devoted to the subject.

Assignment of the students to courses.—At the Theresa Military Academy the course of the first two years is common for all of the students, but in the third year the pupils are assigned to the cavalry or infantry Abtheilungs according to their fitness for the mounted or dismounted service. At the Technical Military Academy the pupils upon entering are at once assigned to the Engineer or the Artillery Abtheilung, with a view to a special training for one or the other arm of the service. The division is continued up to the end of the course.

Organization for military instruction, etc.—At the Theresa Military Academy the pupils are organized into an infantry half battalion (two companies), officered from the army; a part of the first (upper) classes formed into a platoon for cavalry instruction, to which all the pupils of this class are assigned by turns.

The half battalion of the Technical Military Academy consists of one engineer company and one artillery company. It should be mentioned that there is at the Technical Military Academy a "Supernumerary Abtheilung," the students of which have been judged not fit for active military service. They are under training for the branches of the administrative services.

Graduation and obligation to serve in the army.—Graduates of the military academies whose standing is at least "good" are assigned to the army as lieutenants; those whose standing is at least "satisfactory" enter as cadets, and those below the rating of satisfactory are assigned to the army as noncommissioned officers.

Graduates who have held "ararial" or "stiftungs" places are bound to serve in the army one year for every full year's instruction in the military schools or academies; those who have held half-free "ararial" places must serve half a year for every full year of instruction, plus the three years' regular service, but no pupil who has held a free place is obliged to serve more than ten years, and no one who has held a half-free place is obliged to serve more than seven years in the army.

Such pupils as change from a place of one kind to another during the course of instruction are bound by the service obligation attached to the last kind of place held; but in this case the total time of obligatory service is not to exceed seven years.

Those pupils who for any reason leave any of the military educational establishments without completing the course of instruction are only obliged to serve their regular time with the colors (three years).

The number of students in each of the academies for the year 1895 is fixed in the army list as follows: Theresa Military Academy, 450; Technical Military Academy, 279.

These numbers are hardly ever equaled; for instance, the budget for 1895 appropriates for only 400 at the Theresa Academy and 230 at the Technical Military Academy.

In the two military academies the number of "stiftungs" places amounts to 107; the total number of "pay places" is 75, and of the half-free places, 13. The remaining places, amounting to about 450, are apparently all "ararial" or free places.

ENGLAND.

The schools which correspond most nearly to the United States Military Academy are the Royal Military Academy, at Woolwich, and the Royal Military College, at Sandhurst.

I.—THE ROYAL MILITARY ACADEMY.

1. This institution is maintained for the purpose of affording a special military education to candidates for commissions in the royal artillery and royal engineers. Candidates must, in the opinion of the commander in chief, be in all respects suitable to hold commissions in the army.

2. *Regulations for admission.*—Admission to the Royal Military Academy as cadets will be granted to the successful candidates at an open competitive examination.

The number of cadets admitted to the academy will vary according to the requirements of the service, and notice will be given from time to time of the number of vacancies open to competition. At the examination which commenced June 26, 1894, the number of vacancies to be competed for was 50.

The dates of admission will be on the Thursday of the week in which the 17th of March or 24th of September falls each year.

The examination of candidates for admission to the academy will be conducted by the civil service commissioners. The examinations will be held in London and at such other centers as the commissioners may appoint. (Fees are from £1 to £3.)

The number of trials allowed will not exceed three.

The successful candidates will be inspected by a medical board, and no candidate will be considered eligible for admission to the academy unless certified by the board to be free from bodily defects or ailments, and in all respects fit for Her Majesty's service.¹

¹ The present minimum standard for officers is 5 feet 4 inches in height, and 33 inches chest measurement.

The limits of age for admission to the academy will be from 16 to 18. Candidates must be within those limits of age on the 1st of July for the summer examination and on the 1st of December for the winter examination.

3. *Examinations.*—The examinations will be held half-yearly, and will commence in June and November; due notice will be given of the dates of the examination, and every candidate for those examinations must send to the military secretary, on a date not later than the 15th of May or 15th of October, respectively, an application in his own handwriting to attend the examination. Candidates will be supplied with a “form of particulars,” which should be carefully filled up and signed, and returned without delay to the military secretary, accompanied by the following papers:

(a) An extract from the Register of his birth (or an equivalent legal paper).

(b) A certificate of good moral character, signed by the tutors or heads of the schools or colleges at which he received his education for the four years immediately preceding the date of application, or some other satisfactory proof of good moral character.

(c) If the candidate holds a commission in the militia, a recommendation from the commanding officer of the regiment.

4. The subjects of the examination and the maximum number of marks obtainable for each subject will be as follows:

CLASS I.

(1) *Mathematics:* (a) Arithmetic, including vulgar and decimal fractions, proportion, and simple interest; (b) algebra, up to and including the binomial theorem; the theory and use of logarithms; (c) Euclid, Books I to IV, and VI; (d) plane trigonometry, up to and including solution of triangles and mensuration; (e) statics; the equilibrium of forces acting in one plane and of parallel forces, the center of gravity, the mechanical powers; dynamics—uniform, uniformly accelerated, and uniform circular motion, falling bodies, and projectiles in vacuo. Analytical methods of solution will not be required; 3,500 marks.

(2) Latin (analytical methods of solution will not be required), 2,000 marks.

(3) French or German (200 for colloquial) (analytical methods of solution will not be required), 2,000 marks.

(4) English composition, including spelling and handwriting (analytical methods of solution will not be required), 1,000 marks.

(5) Drawing, geometrical, including spelling and handwriting (analytical methods of solution will not be required), 1,000 marks.

Candidates will be required to show a satisfactory knowledge of each of the above-mentioned branches of mathematics, and must also obtain such an aggregate of marks in the subjects of Class I as may satisfy the civil service commissioners. Candidates who have previously to January 1, 1894, passed the army preliminary,¹ or any other of the examinations which have hitherto been accepted as equivalent thereto, will not be rejected for failing to qualify in arithmetic, or to obtain the aggregate required in Class I.

¹Formerly the entrance examination for Woolwich was divided into the “preliminary” and the “further” examinations. The present regulations, which went into effect January 1, 1894, abolished the “army preliminary examination.” It covered much the same subjects as those mentioned in the present Class I.

CLASS II.

(1) Higher mathematics: In all the following subjects a great importance will be attached to accuracy in numerical results: Further questions and problems on the subjects of the obligatory examination: Statics, problems, and exercises will be extended to friction; the graphical or geometrical method of treating such problems should be studied, as well as the analytical; no application of the differential calculus to statics will be required. Dynamics, problems, and exercises will be extended to collisions and work. (Analytical methods of solution, but not the use of the differential calculus, will be involved.) Analytical geometry, problems on straight line and circle. Conic sections, elementary properties, with easy problems, both on the analytical and geometrical methods, 2,000 marks.

(2) German or French, as alternating with subject 3, in Class I (200 for colloquial), 2,000 marks.

(3) Greek, 2,000 marks.

(4) English history: There will be set one general paper; one paper limited to a fixed period, of which notice will be given, 2,000 marks.

(5) Chemistry: Elements of inorganic chemistry, 2,000 marks.

(6) Physics: Elementary properties of electricity, magnetism, heat, light, and sound, 2,000 marks.

(7) Physiography and geology, 2,000 marks.

In each of the subjects (5), (6), and (7) the examination will be partly practical. Only two of the subjects in Class II can be taken up.

CLASS III.

(1) Geography, 500 marks.

(2) Drawing, free-hand, 500 marks.

Both these subjects may be taken up.

The number of marks allowed to each candidate in the several subjects in which he has been examined will be summed up, and the resulting total will determine the place of the candidate in the competitive list, the successful candidates being those who stand at the head of the list up to the number of cadetships competed for.

5. *Time-table, June, 1894.*—The examinations covered the time from the 28th June to the 7th July, inclusive, the hours of attendance being from 10 a. m. to 5.30 p. m., with an intermission for lunch.

The medical examination of the successful candidates takes place after the result of the examination has been announced, and is held in London.

NOTE.—Some of the rules prescribed for the conduct of the examinations are as follows:

No candidate may quit the examination room until the expiration of half an hour from the time fixed for the commencement of the paper on which he is engaged.

No candidate who has left the examination room during the hours assigned to paper work may return to the paper which he has quitted without special permission, obtained before he leaves the room. In such cases the commissioners will decide whether marks can be allotted.

During the whole of the examination each candidate will be designated by the number assigned to him on the time table, and he must write this number (not his name) on every paper which he sends in.

Extract from table of marks showing the marks obtained by the successful candidates for admission to the Royal Military Academy, Woolwich, June, 1894.
I.—SUCCESSFUL CANDIDATES.

Number in order of merit.	Number in examination.	Name.	Class I (obligatory).						Class II (any two may be taken up.)						Class III.		Total.			
			Mathematics.	Latin.	Alternative.		English composition, etc.	Geometrical drawing.	Total, Class I.	Higher mathematics.	Alternative.		Greek.	English history.	Chemistry.	Physics.		Physiography and geology.	Geography.	Free-hand drawings.
					French.	German.					German.	French.								
		Maximum	3,500	2,000	2,000	2,000	1,000	1,000	1,000	9,500	2,000	2,000	2,000	2,000	2,000	2,000	500	500	14,500	
1	217	Moore, J. O'H.....	3,102	1,156	1,218	.....	731	636	6,843	1,755	.....	.....	.....	1,757	.....	.....	212	262	10,829
2	10	Rudmose-Brown, T. B.....	2,601	1,589	1,515	.....	843	715	7,363	1,415	.....	.....	.....	.....	.....	.....	355	212	10,813
50	299	Haig, A. G.....	2,397	1,478	1,030	.....	700	458	6,063	.....	1,255	940	.....	.....	.....	.....	152	161	8,571

II.—UNSUCCESSFUL CANDIDATES, QUALIFIED.

[May be exempted from further examination if nominated to the Royal Military College as Queen's cadets, Indian cadets, pages of honor, or from the militia for commission in the army.]

51	289	* * * * *	2,644	1,210	1,218	.....	661	375	6,108	1,115	957	.....	.....	.....	.....	.....	165	203	8,558
158	140	* * * * *	1,807	498	565	.....	300	507	3,677	.....	711	180	.....	.....	.....	.....	140	197	4,905

III.—CANDIDATES NOT QUALIFIED.

[Who failed to qualify in one or more branches of obligatory mathematics, but who may be exempted from further examination if nominated as Queen's cadets, Indian cadets, pages of honor, or from the militia.]

The candidate who passed lowest on this list obtained a total of..... 4,277

6. *Course of instruction.*—The length of the course of instruction will be two years, divided into four terms.

All the cadets in the third and fourth classes will be educated together. On leaving the third class the cadets promoted to the second class will bifurcate into two separate divisions for artillery and engineers, respectively, which separation will be maintained for the remainder of the course at the academy.

Cadets passing highest on the list of the third class will have the choice of joining the engineer division, so far as the vacancies may be available, with a view to obtaining commissions in the royal engineers; the remainder will be attached to the artillery division, with a view to obtaining commissions in the royal artillery.

When once a cadet has joined any particular division no transfer will, under any circumstances, be allowed.

The following subjects, in addition to drill, riding, and gymnastics, will form the ordinary course of obligatory studies, with the marks assigned to each:

FOURTH AND THIRD CLASSES.

- Mathematics, 3,000 marks, including 200 for plates, sketches, and notes.
- Field fortification, 2,000 marks, including 400 for plates, sketches, and notes.
- Military topography, 2,000 marks, including 800 for plates, sketches, and notes.
- French or German, 1,000 marks.
- Chemistry and physics, 1,500 marks, including 50 for plates, sketches, and notes.

SECOND AND FIRST CLASSES.

Subjects common to the artillery and engineer divisions.

- Military topography, 1,000 marks, including 400 for plates, sketches, and notes.
- Tactics, 1,000 marks.
- Chemistry and physics, 1,500 marks, including 100 for notes and examples.

Special to artillery division.

- Artillery, 2,000 marks, including 200 for plates and notes.
- Fortification, 1,000 marks, including 200 for plates and notes.

Special to engineer division.

- Fortification, 2,000 marks, including 400 for plates and notes.
- Artillery, 1,000 marks, including 100 for plates and notes.
- Mathematics, 2,000 marks, including 100 for plates and notes.
- Free-hand drawing, 1,000 marks.

In addition to the above obligatory course, every cadet will be allowed, at his option, to take up a voluntary subject in the third and fourth classes—landscape drawing; also to be examined in the third class in an advanced paper in mathematics on the course of the fourth and third classes, and in a paper on the differential and integral calculus.

The maximum marks for these subjects will be 700 for landscape drawing, 0.5 being the counting minimum at each examination, and 400 for each of the mathematical papers above mentioned, 0.4 being the minimum to count marks on each paper.

A cadet will not be allowed to take up or present himself for examination in voluntary mathematics unless the professor reports that he has previously attained a sufficient proficiency in the obligatory mathematics.

The language to be studied by a cadet must be that in which he possesses such proficiency as will enable him to benefit by the advanced instruction given to the class.

7. *Examinations.*—There will be examinations at the end of each term, conducted by independent examiners. A cadet failing to pass satisfactorily at any examination will not get class promotion.

The examination in the third class will cover the fourth and third classes' course, and that of the first class the second and first classes' course.

The examinations are almost always in writing.

At the end of the course those cadets who have passed satisfactory examinations will be entitled to commissions as second lieutenants in the royal artillery from the artillery division, and in the royal engineers from the engineer division.

For class promotion from the fourth class, and also from the third class, a cadet will be required at each examination to obtain 0.5 of the marks in the obligatory course of mathematics and in at least three other obligatory subjects, and 0.5 of the aggregate of marks allotted at that examination for the six obligatory subjects, as shown in Table B.

To count marks in an obligatory subject, at least 0.25 of the total marks for that subject in the examination must be obtained.

The marks allowed to count in the fourth class will be added to those allowed to count in the third class, and the result will determine the order of merit for appointment to the artillery and engineer divisions; but no cadet can be posted to the engineer division who does not obtain 0.5 in fortification in the examination in the fourth and third classes.

For class promotion from the second class, and also for commission at the end of the course, the following qualifications will be required:

Artillery division.—Five-tenths in artillery and in at least three other obligatory subjects and 0.5 of the aggregate of the marks allotted at that examination for the five obligatory subjects, as shown in Table C.

Engineer division.—Five-tenths in fortification and in electricity, and in at least three other subjects, and 0.5 of the aggregate of the marks allotted at that examination for the seven obligatory subjects, as shown in Table C.

To count marks in an obligatory subject at least 0.25 of the total marks for that subject in the examination must be obtained.

The marks allowed to count in the second class will be added to those allowed to count in the first class, and the result will determine the order of merit, and the cadets will be gazetted to their respective corps in the order in which they pass.

8. A cadet will be removed from the academy on the following grounds: (1) If he fall more than one term behind the class with which he originally joined the academy; (2) if he fail to acquire a sufficient proficiency in military exercises.

Exceptions to these rules only allowed on account of illness.

9. *Prizes.*—Prizes will be awarded as follows:

At the end of the first year's course to the cadet who has obtained the highest number of marks in mathematics, French, German, drawing.

At the end of the second year's course to the cadet who has obtained the highest number of marks during the second year's course in artillery division: Artillery, fortification. Engineer division: Mathematics, artillery, fortification. Combined first class: Chemistry and physics, military topography, tactics,¹ free-hand drawing.

A prize for riding and one for gymnastics will be given in the first class to the cadet who shows the greatest proficiency in the same, but no marks will be awarded.

The regular hours at Woolwich are: Reveille, 6.15 a. m.; breakfast, 7.15; studies and drill, 8.15; luncheon, 1.30 p. m.; dinner, 7.30. The detailed time-table is not available.

TABLE B.—Marks, fourth and third classes.

Voluntary subjects.			Obligatory.							Voluntary.		
	Marks.	Counting minimum.										
			Mathematics.	Field fort.	Military topography.	French or German.	Chemistry and physics.	Model drawing.	Total.	Landscape drawing.	Advanced paper.	Differential and integral calculus.
1. Landscape drawing	700	.5										
2. Advanced paper in mathematics.....	400	.4										
3. Differential integral calculus.....	400											
Fourth class:												
Maximum.....	750		750	500	500	250	500	75	2,575	175	.....	.....
Minimum.....	375		375	(*)	(*)	(*)	(*)	(*)	1,287	87	.....	.....
Third class:												
Maximum.....	2,250		2,250	1,500	1,500	750	1,000	225	7,225	525	400	400
Minimum.....	1,125		1,125	(*)	(*)	(*)	(*)	(*)	3,612	262	160	160

* See page 8.

¹ This subject is voluntary for the artillery division.

TABLE C.—Marks, second and first classes.

	Engineer and artillery divisions combined.			Artillery division.		Engineer division.				Total artillery division.	Total engineer division.
	Military topography.	Tactics.	Chemistry and physics.	Artillery.	Fortification.	Fortification.	Artillery.	Mathematics.	Free-hand drawing.		
Second class:											
Maximum	250	250	500	700	250	500	250	1,000	250	\$1,950	3,000
Minimum	(*)	(*)	‡250	350	(*)	250	(*)	(*)	(*)	950	1,500
First class:											
Maximum	750	750	1,000	1,300	750	1,500	750	1,000	750	\$4,500	6,500
Minimum	(*)	(*)	‡500	650	(*)	750	(*)	(*)	(*)	2,275	3,250

* See page 8.
 † This subject voluntary for artillery division.
 ‡ Compulsory qualifying subject for engineer division.
 § These figures do not include marks for free-hand drawing.

12. The marks are apportioned as follows:

Syllabus of the course of instruction.

MATHEMATICS (ENGINEER DIVISION ONLY).

	Fourth class.	Third class.	Second class.	First class.
Notes, plates, etc.		200		100
Examination	750	2,050	1,000	900
Total	750	2,250	1,000	1,000
Voluntary papers		800		
		3,050		
	3,800		2,000	

FOURTH CLASS.

Subjects.	Marks.	Treatises.
Algebra	150	Hall & Knight's Higher Algebra.
Trigonometry and mensuration	150	Goodwin's or Todhunter's Trigonometry (smaller edition), Brabant's Mensuration.
Analytical geometry	150	Smith's Conic Sections.
Mechanics	300	Robinson's Treatise.
Total	750	

THIRD CLASS.

Analytical geometry—repetition of the fourth class course.	400	See fourth class course.
Mechanics (plates count 200 additional), repetition of fourth class course in dynamics and statics.	950	Do.
Applied mechanics. Stability of structures, 200 marks; strength of materials, 200 marks.	400	Crofton's Applied Mechanics, second edition, 1886.
Hydrostatics	300	Besant's Hydrostatics, edition 1892.
Plates (in mechanics)	200	
Total	2,250	
Voluntary mathematics—problems in trigonometry, analytical geometry, applied mechanics, and hydrostatics, 400 marks; differential and integral calculus, 400 marks.	800	Demouivre's Theorem; Smith's Conic Sections; Crofton's Treatise on Applied Mechanics; Besant's Hydrostatics; Greenhill's Treatise on Differential and Integral Calculus, edition 1891.

UNITED STATES MILITARY ACADEMY.

Syllabus of the course of instruction—Continued.

SECOND CLASS, ENGINEER DIVISION.

Subjects.	Marks.	Treatises.
Geometry, including spherical trigonometry	300	} Smith's Conic Sections. Spherical Trigonometry, Goodwin's Treatise, fourth edition, 1893. Greenhill's Treatise, edition 1891. Lectures.
Differential and integral calculus	450	
Statics and dynamics	250	
Total	1,000	

FIRST CLASS, ENGINEER DIVISION.

Statics and dynamics	400	} Goodeve's Treatise, edition 1888.
Hydrostatics	250	
Mechanism	250	
Plates	100	
Total	1,000	

13. The marks are apportioned as follows:

Fortifications, practical solid geometry, and military engineering.

	Fourth class.	Third class.	Engineer division.		Artillery division.	
			Second class.	First class.	Second class.	First class.
Notes, plates, etc.	100	300	100	300	50	150
Examination	400	1,200	400	1,200	200	600
Total	500	1,500	500	1,500	250	750

FOURTH CLASS.

Subjects.	Marks.	Treatises.
Practical solid geometry, elementary, orthographic projection.	200	} Ross's Practical Solid Geometry, edition 1887, pages 1-28. First six problems, pages 29-33. Text-Book of Fortification and Military Engineering. Part I, edition 1892. Paragraphs 1, 4, 5, 8, 10, 16, 18, 27, 66-91. Also lithographs of works on modern type.
Field fortification	200	
Notes, plates, etc.	100	
Total	500	

THIRD CLASS.

Practical solid geometry, elementary	400	} Ross's Practical Solid Geometry, edition 1887. Review of fourth class course. Also Contoured Plans of Parapets, etc. Text-Book of Fortification and Military Engineering. Part I, edition 1892. Review of fourth class course, and as far as paragraph 133. Also lithographs, etc.
Field fortification	800	
Notes, Plates, etc	300	
Total	1,500	

Fortifications, practical solid geometry, and military engineering—Continued.

ARTILLERY DIVISION, SECOND CLASS.

Subjects.	Marks.	Treatises.
Field fortification (applied).....	200	Text-book of Fortification and Military Engineering, Part I, edition 1892. Do. Regulations and Instructions for Encampments. Engineering, Part II, edition 1893.
Pioneer duties (applied).....		
Camp duties (applied).....		
Coast defenses (applied).....		
*Notes, plates, etc. (applied).....	50	
Total.....	250	

ENGINEER DIVISION, SECOND CLASS.

Practical solid geometry (advanced), orthographic projection.....	200	Ross's Practical Solid Geometry, edition 1887.
Pioneer duties.....	200	Text-book of Fortification and Military Engineering, Part I. Do. Regulations and Instructions for Encampments. Text-book of Fortification and Military Engineering, Part II, edition 1893.
Field fortification (applied).....		
Camp duties.....		
Coast defenses.....		
Notes, plates, etc.....	100	
Total.....	500	

ARTILLERY DIVISION, FIRST CLASS.

Permanent fortification.....	600	Text-book of Fortification and Military Engineering, Part II, edition 1893.
Attack and defense of forts and fortresses.....		
Second-class course, review of and reexamination in.		
Notes, plates, etc.....	150	
Total.....	750	

ENGINEER DIVISION, FIRST CLASS.

Permanent fortification.....	1,200	Text-book of Fortification and Military Engineering, Part II, edition 1893.
Attack and defense of forts and fortresses.....		
Second-class course, including extra paper for engineer division, covering the whole year's course.		
Notes, plates, etc.....	300	
Total.....	1,500	

14. The marks are apportioned as follows:

MILITARY TOPOGRAPHY, FOURTH AND THIRD CLASSES.

	Fourth class.	Third class.
Notes, plates, etc.....	200	600
Examination, indoor.....	300	400
Examination, outdoor; uncountoured sketch by aid of prismatic compass and sketching case.....		500
Total.....	500	1,500

Fourth-class course: Text-book of military topography, practical work indoor; practical work outdoor.

Third-class course: Text-book of military topography, practical work indoor, practical work outdoor.

MILITARY TOPOGRAPHY, SECOND AND FIRST CLASSES.

	Second class.	First class.
Notes, plates, etc.....	100	300
Examination, indoor.....	150	150
Examination, outdoor; contoured sketch by clino-compass and sketching case.....		300
Total	250	750

Second-class course: Text-book of military topography; practical work, indoor; practical work outdoor.

First-class course: Text-book of military topography; practical work indoor; practical work outdoor.

15. The marks allotted to each of these languages are apportioned as follows:

DISTRIBUTION OF MARKS.

	Fourth class.	Third class.
Written examination:		
Writing from dictation.....	35	90
Translation from English.....	50	150
Translation into English.....	45	130
Grammatical questions.....	30	95
Composition.....	35	115
Oral examination:		
Conversation.....	30	95
Viva voce translation from English.....	25	75
Total	250	750
	1,000	

16. The marks are apportioned as follows:

CHEMISTRY AND PHYSICS.

	Fourth class.	Third class.	Second class.	First class.
Examination.....	500	950	450	950
Notes, examples, etc.....		50	50	50
Total	1,500		1,500	

FOURTH CLASS.

Subjects.	Marks.	Treatise.
Theoretical chemistry and physics: (a) elementary chemistry and physics; (b) chemistry of metals.....	400	Notes on chemistry, practical exercises, and (for chemistry of metals) notes of lectures.
Practical chemistry.....	100	
Total	500	

THIRD CLASS.

	Marks.	Treatise.
Sound, heat, light, and explosives.....	650	Notes on heat; notes on explosives. Practical exercises on chemistry.
Practical chemistry.....	300	
Notes, examples, etc.....	50	
Total	1,000	

17. The marks are apportioned as follows:

Electricity and magnetism.

SECOND CLASS.

Subjects.	Marks.	Treatises.
Theoretical	250	Notes on electricity. Sylvanus Thomson's Electricity for reference.
Practical	200	
Notes, examples, etc.	50	
Total	500	

FIRST CLASS.

Theoretical	550
Practical	400
Notes, examples, etc.	50
Total	1,000

18. The marks are apportioned as follows:

TACTICS (NOT MINOR TACTICS), SECOND AND FIRST CLASSES.

	Examination.
Second class	250
First class	750
Total	1,000

19. The marks are apportioned as follows:

Artillery, second and first classes.

	Artillery division.		Engineer division.	
	Second class.	First class.	Second class.	First class.
Notes, plates, etc	40	160	25	75
Examination	660	1,140	225	675
Total	700	1,300	250	750

Artillery division.

SECOND CLASS.

Subjects.	Marks.	Treatises.
Ordnance	180	Treatise on Ordnance, 1893. Treatise on Ammunition, 1892. Handbook on Gunpowder and Gun Cotton, 1888. Notes on Cordite.
Ammunition	180	
Explosives	100	
Mechanism	200	
Notes, plates, etc.	40	
Total	700	

Artillery division—Continued.

FIRST CLASS.

Subjects.	Marks.	Treatises.
Ordnance	180	Treatise on Ordnance, 1893.
Ammunition	180	Treatise on Ammunition, 1895.
Military carriages	340	Treatise on Military Carriages, 1888.
Principles of gunnery	340	Text-book of Gunnery, 1887.
Organization, equipment, and employment of artillery.	100	Field, Siege, and Garrison Artillery drill books; notes and lectures.
Notes, plates, etc.	160	
Total	1,300	

Engineer division.

SECOND CLASS.

Ordnance	125	Treatise on Ordnance, 1893.
Ammunition	100	Treatise on Ammunition, 1892.
Notes, plates, etc.	25	
Total	250	

FIRST CLASS.

Ordnance	125	Treatise on Ordnance, 1893.
Ammunition	100	Treatise on Ammunition, 1892.
Military carriages	200	Treatise on Military Carriages, 1888.
Principles of gunnery	200	Text-book of Gunnery, 1887.
Organization, equipment, and employment of artillery.	50	Field, siege, and garrison artillery drill books; notes and lectures.
Notes, plates, etc.	75	
Total	750	

20. *Artillery drills and exercises.*—Artillery division, second class: Field-artillery drill (handbook, 1893.) Field-gun drill. Garrison artillery, Vols. I and II, 1892. First class: Garrison artillery, Vol. I, 1892. 9-inch R. M. L. gun drill. Garrison artillery, Vol. II, 1892. Exercises. Siege-artillery drill, 1891. Exercises. Miscellaneous. Sights and range and position finders.

Engineer division, second class: Field-artillery drill, 1889. Field-gun drill. Garrison-artillery drill, Vol. I. Laying ordnance. 9-inch R. M. L. gun drill. Garrison-artillery drill, Vol. II. Exercises. First class: Garrison-artillery drill, Vol. II. Exercises. Siege-artillery drill, 1891. Exercises. Laying. 6.6-inch R. M. L. gun drill. Miscellaneous. Scott's sight and depression range-finder.

21. *Pay and terms of payment.*—The terms of payment for cadets are regulated by the articles of the royal warrant for pay, etc.

The amount to be contributed on behalf of a cadet at the Royal Military Academy shall depend on the position held by his father. These amounts are payable half-yearly in advance.

The half-yearly contributions range from £150 for the son of a private gentleman, and £80 for the son of a general or admiral, down to £40 for the son of an officer below the rank of lieutenant-colonel in the

army or commander in the navy, the minimum contribution being £20 for the son of a deceased officer whose family has been left in pecuniary distress.

Pay at the rate of 3 shillings a day shall be credited to a cadet to cover the expenses of regimental clothing, messing, washing, and other contingencies. All other necessary expenses, which can not be covered by his pay, shall be chargeable to his parent or guardian in addition to the regulated contribution.

If a cadet be rusticated or removed during a term his daily pay shall cease from the date of such rustication or removal, and the contribution made for the half-year shall be forfeited.

Each cadet, other than a Queen's cadet¹, on first joining, will be required to pay, in addition to the regulated contribution, a sum of £25 toward covering the expense of uniform, books, etc., and to bring with him the articles of clothing of which he will receive notice, and which must afterwards be kept up at his own expense. In addition to the half-yearly contribution in advance, he must also deposit £5 for contingent expenses, which sum he will be required to make up on returning to the academy after each vacation, toward covering any expense that may be incurred on his account during the ensuing half year.

II.—THE ROYAL MILITARY COLLEGE.

1. The Royal Military College is maintained for the purpose of affording a special military education to candidates for commissions in the cavalry and infantry. Candidates must, in the opinion of the commander in chief, be in all respects suitable to hold commissions in the army.

2. *Regulations for admission.*—Admission to the Royal Military College will be granted (a) to successful candidates at a competitive examination; (b) to Queen's cadets, honorary Queen's cadets, Indian cadets, and pages of honor, subject to a qualifying examination.

The other requirements under the head of "regulations for admission" are the same as those set forth for Woolwich under the same head, with the following exceptions and additions:

The dates of admission will be the 10th of February and the 1st of September in each year.

The limits of age for admission to the college will be from 17 to 19. Competitors who desire to obtain commissions in the West India Regi-

¹A Queen's cadet has no contribution to pay and no admission fee. A Queen's cadet at Woolwich must enter by competitive examination, having no advantage in this respect over the other candidates. At Sandhurst, however, the Queen's cadets have to pass only a qualifying examination. There was only one Queen's cadet at Woolwich last year on the 27th of June, the date of the inspection of the Board of Visitors.

ment may be admitted up to the age of 22 until July, 1894, and up to that of 21 after July, 1894.

3. *Examinations.*—The regulations under this head are the same as those comprised under the same subject, paragraph 3, of the Woolwich examinations.

4. *Subjects of examination.*—The subjects of the examination and the maximum number of marks obtainable for each subject will be as follows:

CLASS I.

(1) Mathematics: (a) Arithmetic, including vulgar and decimal fractions, proportion, and simple interest, 3,000 marks; (b) algebra, up to and including the binomial theorem; the theory and use of logarithms, 3,000 marks; (c) Euclid, Books I to IV and VI, 3,000 marks; (d) plane trigonometry, up to and including solution of triangles and mensuration, 3,000 marks.

(2) Latin, 2,000 marks.

(3) French or German (200 for colloquial), 2,000.

(4) English composition, including spelling and handwriting, 1,000 marks.

(5) Drawing, geometrical, 1,000 marks.

Candidates who have not previously to the 1st of January, 1894, passed the army preliminary or other examinations which have been accepted as equivalent thereto, will be required to qualify in arithmetic, and must also obtain such an aggregate of marks in the subjects in Class I as may satisfy the Civil Service Commission.

CLASS II.

(1) Higher mathematics: In all the following subjects great importance will be attached to accuracy in numerical results. Further questions and problems on the subjects of the obligatory examination, 2,000 marks. Statics: The equilibrium of forces acting in one plane and of parallel forces, the center of gravity, the mechanical powers and friction; the graphical or geometrical method of treating such problems should be studied as well as the analytical; no application of the differential calculus to statics will be required, 2,000 marks. Dynamics: Uniform, uniformly accelerated, and uniform circular motion, falling bodies and projectiles in vacuo, collisions and work; analytical methods of solution, but not the use of the differential calculus will be involved, 2,000 marks. Analytical geometry: Problems on straight line and circle, 2,000 marks. Conic sections: Elementary properties, with easy problems both on the analytical and geometrical methods.

(2) German or French, as alternating with subject 3, of Class I, 200 for colloquial, 2,000 marks.

(3) Greek, 2,000 marks.

(4) English history: There will be set, one general paper, one paper limited to a fixed period, of which notice will be given, 2,000 marks.

(5) Chemistry: Elements of inorganic chemistry, 2,000 marks.

(6) Physics: Elementary properties of electricity, magnetism, heat, light, and sound, 2,000 marks.

(7) Physiography and geology, 2,000 marks.

In each of the subjects (5), (6), and (7), the examination will be partly practical.

Only two of the subjects in Class II can be taken up.

CLASS III.

- (1) Geography, 500 marks.
- (2) Drawing, freehand, 500 marks.

Both these subjects may be taken up.

5. The number of marks allowed to each candidate in the several subjects in which he has been examined will be summed up, and the resulting total will determine the place of the candidate in the competitive list, the successful candidates being those who stand at the head of the list up to the number of cadetships competed for.

(a) At the examination held November 21, 1894, the number of cadetships to be awarded was 101, of which 83 were for the infantry, 14 for the cavalry, and 4 for the West India regiment. These numbers, however, were subject to reduction according to the number of cadetships awarded under paragraph (c). Intending competitors are always to inform the military secretary before the date fixed for the examination whether they elect to be considered candidates for cavalry, or infantry, or staff corps.¹ If within the prescribed limits of age, they may return their names (1) for both infantry and cavalry, expressing a preference for one or the other, or staff corps; (2) for infantry or staff corps; or (3) for cavalry only, or staff corps. Cadetships will be given to successful candidates, subject to the above limitation of numbers, in order of merit, in accordance with the election they have made. In the case of (1) those who have returned their names for both infantry and cavalry, they will be taken for infantry or cavalry in accordance with the preference expressed by them. Candidates must distinctly understand that the election made by them before the examination will be absolutely final, and that it can not be altered after the result of the examination has been declared.

(b) The West India cadetships were awarded in the same manner as heretofore. The number of competitors is usually small, and as the candidates are generally above the regular age of admission to Sandhurst, they can go in for the West India regiment only.

(c) Thirty-five cadetships, with a view to commissions in the Indian staff corps, were awarded to candidates who were obliged to pass a qualifying examination only. Competitors must, when notifying their preference for the cavalry or infantry, as above, state whether they wish, in addition, to be considered candidates for the Indian staff corps. All Queen's cadets (British and Indian) and honorary Queen's cadets, nominated by the secretary of state for India in council, will have the option of electing whether they will join the military college for appointment to the staff corps, or for commissions in British cavalry or infantry. The cadetships remaining, after the claims of the Queen's cadets and honorary Queen's cadets (Indian) have been satisfied, will be allotted in order of merit to successful candidates, other than candidates for the West India regiment, who have elected for the Indian staff corps.

¹ Indian staff corps.

(d) The total number of vacancies each half-year at Sandhurst is 120, and as there are three classes or "educational divisions," the total establishment is 360. Supernumerary cadets are, however, admitted. The number of supernumeraries at the date of the last inspection of the Board of Visitors, June, 1894, was 20.

6. *Queen's cadets, honorary Queen's cadets, Indian cadets, and pages of honor.*—A limited number of the sons of officers, who have earned the privilege by service of a specified nature, are appointed Queen's or honorary Queen's cadets, or Queen's India or honorary Queen's India cadets, and are admitted to Sandhurst on passing a qualifying examination only. The number of admissions of this class is about 18 every half-year.

Pages of honor, youths who have served in the household of the Queen, may also be admitted to Sandhurst, being admitted in the same manner as Queen's cadets.

Queen's cadets will be granted an educational allowance of £40 a year, tenable between the ages of 13 and 17, and they are exempt from the payment of any contribution while at Sandhurst.

With regard to Queen's cadets, the director-general of military education remarks as follows:

The object of giving a money allowance from the age of 13 is to enable the cadet to obtain an education which his mother's means would not otherwise enable her to secure for him. Instead of this it becomes a guaranty for his entering Sandhurst without that education. To give money for education and then to admit on a low qualification seems to me to be illogical.

Queen's India cadets are also exempt from payment at Sandhurst.

The total number of cadets at each rate of contribution at Sandhurst at the time of the inspection by the board of visitors in June, 1894, was as follows:

Who do not pay contribution:		At £70 per annum.....	14
Queen's cadets	12	At £80 per annum.....	1
India cadets.....	22	At £150 per annum.....	195
At £20 per annum.....	5		
At £40 per annum.....	51		
At £60 per annum.....	80		
		Total	380

7. *Pay and terms of payment.*—The pay of cadets, and the terms of payment at Sandhurst, are the same as are prescribed for Woolwich, with the exception noted for the privileged cadets.

8. *Time-table, June, 1894.*—The examinations covered the time from the 27th of June to the 7th of July, inclusive, the hours of attendance and the intermission in the middle of the day being practically the same as for the Woolwich examination.

The rules for the conduct of the examination quoted under paragraph 5, Woolwich, note, apply also to the Sandhurst examination.

Extract from table of marks—Competition for admission to the Royal Military College, Sandhurst, June, 1894.

I.—CANDIDATES SUCCESSFUL FOR CAVALRY CADETSHIPS (14).

Number in order of merit.	Number in examination.	Name.	Class I (obligatory).										Class II (any two may be taken up).					Class III.		Total.	
			Mathematics.	Latin.	Alternative.		English composition including spelling and writing.	Geometrical drawing.	Total, Class I.	Higher mathematics.	German.	French.	Greek.	English history.	Chemistry.	Physic.	Physiography and geology.	Geography.	Free-hand drawing.		
90	453	Maximum	3,000	2,000	2,000	2,000	1,000	1,000	1,000	1,000	9,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	500	500	14,000
126	528	A. W. H.	1,696	814	1,495	770	395	5,140	1,449	1,138	1,088	1,296	1,088	1,088	1,088	1,088	379	293	7,966		7,966
		W. A. N.	1,263	1,059	1,387	330	555	4,655	1,091	1,091	1,091	1,296	1,091	1,091	1,091	159	285	7,486		7,486	

II.—CANDIDATES SUCCESSFUL FOR INFANTRY CADETSHIPS (83).

1	754	G. R. P.	2,480	1,149	1,315	625	680	6,249	1,801	1,449												378	349	10,226
86	376	J. H. D.	1,700	1,184	1,068	605	677	5,234	1,105	979												303	391	8,011

III.—QUEEN'S CADETS, AND 2 QUEEN'S INDIA CADETS QUALIFIED.

[The highest with a total of 6,949, the lowest with a total of 4,617.]

Of the unsuccessful candidates, 284 qualified, and consequently were eligible for admission to the college if subsequently appointed Queen's cadets; Nos. 88 and 89 on this list passed higher than any of the successful cavalry candidates, but as they put down their names for infantry only, they were unsuccessful in securing cadetships; the total mark for No. 88 was 8,004; the lowest of the unsuccessful candidates who qualified had a total of 4,002.

9. *Synopsis of course of instruction, etc.*—The length of the course of instruction is one and one-half years, divided into three terms or classes of six months each. The classes are known as seniors, intermediates and juniors.

10. The new syllabus of the course of instruction, 1895, gives the subjects now taught and the list of text-books, but does not give the marks allotted to each nor the subjects studied by the different classes. The old regulations, abolished January 1, 1894, gave the following list of subjects and the following marks:

Military administration, 300 marks.

Military law, 300 marks.

Tactics, including musketry, 600 marks, including 150 for tactical schemes.

Fortification, 900 marks, including 300 for plates, sketches, etc.

Military topography, 800 marks, including 200 for plates, sketches, etc.

Drill, 200 marks.

Riding, 200 marks.

Gymnastics, 200 marks.

The present course of instruction comprises:

Fortification, including artillery and field fortification. (Phillips's Fortification.)

Military topography: Tactics, including musketry. (Cavalry Drill; Field Artillery Drill; Infantry Drill; Cley's Minor Tactics; Musketry Instruction.)

Military administration. (Queen's Regulations; Manual of Military Law; Pay Warrant.)

Military law. (Queen's Regulations; Manual of Military Law.)

Military exercises: (a) Drill. (Infantry Drill, 1893; Musketry Instruction (Lee-Metford), 1894; Rifle Exercises (Lee-Metford), 1892.) (b) Gymnastics. (As laid down in the regulations.) (c) Riding. (In accordance with the system laid down in the cavalry drill.)

Voluntary subjects: Ambulance and stretcher drill, first aid, etc.; range finding; signaling.

11. The following time-table gives an idea of the employment of time in summer and winter:

Summer time-table.

Studies, exercises, etc.	Sunday.	Monday.	Tuesday, Thursday, and Friday.	Wednesday.	Saturday.
Rouse	8 a. m.	5.45 a. m.	5.45 a. m.	5.45 a. m.	5.45 a. m.
Drill, riding, and physical training.	.....	6.10 to 7.10 a. m.	6.15 to 7.15 a. m.	6.15 to 7.15 a. m. . . . .	.....
Commandant's parade .....	.....	.....	.....	.....	6.15 to 7.15 a. m.
First study, physical training .....	.....	7.20 to 8.20 a. m.	7.20 to 8.20 a. m.	7.20 to 8.20 a. m.	7.20 to 8.20 a. m.
Breakfast	9 a. m.	8.20 a. m.	8.20 a. m.	8.20 a. m.	8.20 a. m.
Hospital attendance	9.30 a. m.	8.30 a. m.	8.30 a. m.	8.30 a. m.	8.30 a. m.
Drill and riding .....	.....	9 to 10 a. m.	9 to 10 a. m. . . . .	.....	9 to 10.3 a. m.
Divine-service parade	10.30 a. m. . . . .	.....	.....	.....	.....
Extradrill, riding, or gymnastics.	.....	.....	.....	2 to 3 p. m.	11.30 a. m. to 12.30 p. m.
Second study .....	.....	10.15 a. m. to 2.15 p. m.	10.15 a. m. to 2.15 p. m.	9 a. m. to 1 p. m. . . . .	.....
Luncheon	1 p. m.	2.15 p. m.	2.15 p. m.	1 p. m.	1 p. m.
Riding and gymnastics .....	.....	3.15 to 4.15 p. m.	3.15 to 4.15 p. m. . . . .	.....	.....
Riding .....	.....	4.15 to 5.15 p. m.	4.15 to 5.15 p. m. . . . .	.....	.....
Restriction and stoppage of leave, roll call.	5 p. m. . . . .	.....	.....	.....	5 p. m.
Sword drill .....	.....	6.15 to 7.15 p. m.	6.15 to 7.15 p. m. . . . .	.....	.....
Mess	8 p. m.	7.45 p. m.	7.45 p. m.	7.45 p. m.	8 p. m.
First post	9.15 p. m.	9.15 p. m.	9.15 p. m.	9.15 p. m.	9.15 p. m.
Last post	9.45 p. m.	9.45 p. m.	9.45 p. m.	9.45 p. m.	9.45 p. m.
Lights out	11 p. m.	10 p. m.	10 p. m.	10 p. m.	10 p. m.

Winter time-table.

Studies, exercises, etc.	Sunday.	Monday, Tuesday, Thursday, Friday.	Wednesday.	Saturday.
Rouse	8 a. m.	6.30 a. m.	6.30 a. m.	6.30 a. m.
First study, riding or physical training.	.....	7 to 8 a. m.	7 to 8 a. m.	7 to 8 a. m.
Breakfast	9 a. m.	8 a. m.	8 a. m.	8 a. m.
Hospital attendance	9.30 a. m.	8.30 a. m.	8.30 a. m.	8.30 a. m.
Parade, riding, and gymnastics .....	.....	9 to 10 a. m.	9 to 10 a. m. . . . .	.....
Commandant's parade .....	.....	.....	.....	9 to 10.30 a. m.
Second study .....	.....	10.15 a. m. to 1.45 p. m.	10.15 a. m. to 1.45 p. m. . . . .	.....
Divine service parade	10.30 a. m. . . . .	.....	.....	.....
Extra drill, riding, and gymnastics .....	.....	.....	2.30 to 3.30 p. m.	12 m. to 1 p. m.
Extra study .....	.....	.....	.....	12 m. to 1 p. m.
Luncheon	1 p. m.	1.45 p. m.	1.45 p. m.	1 p. m.
Parade, riding, and sword drill .....	.....	4.15 to 5.15 p. m. . . . .	.....	.....
Gymnastics .....	.....	5.15 to 6.15 p. m. . . . .	.....	.....
Restriction drill or roll call	5 and 9.30 p. m. . . . .	.....	Drill, 3 to 4 p. m.	Drill, 12 m. and 3 to 4 p. m.; roll call, 5 p. m.
Stoppage of leave roll call	5 p. m. . . . .	.....	.....	5 p. m.
Private study:	.....	.....	.....	.....
First and second divisions .....	.....	6 to 7.15 p. m. . . . .	.....	.....
Third division .....	.....	6.30 to 7.15 p. m. . . . .	.....	.....
Gymnastics .....	.....	6.15 to 7.15 p. m. . . . .	.....	.....
Mess	8 p. m.	7.45 p. m.	7.45 p. m.	9.30 p. m.
First post	10.15 p. m.	9.45 p. m.	9.45 p. m.	10.15 p. m.
Last post	10.45 p. m.	10.15 p. m.	10.15 p. m.	10.45 p. m.
Lights out	11 p. m.	10.30 p. m.	10.30 p. m.	11 p. m.

Programme of the studies and exercises for the week ending February 23, 1895.

Day and number of educational division.	First study: riding and physical training, 7 to 8 a. m.		Parade riding and gymnastics, 9 to 10 a. m.
	Branch.	Work.	
Monday:			
1.....	Tactics, etc.....	Lecture: Military law.....	A and B, riding; C, D, E, and F, drill.
2.....	Military topography.....	A and B, riding; C, D, E, and F, physical training.	A and B, gymnastics; C, D, E, and F, drill.
3.....	Fortification.....	Lecture: Fortification.....	Drill.
Tuesday:			
1.....	Fortification.....	Lecture: Fortification.....	C and D, riding; A, B, E, and F, drill.
2.....	Tactics, etc.....	C and D, riding; A, B, E, and F, physical training.	C and D, gymnastics; A, B, E, and F, drill.
3.....	Military topography.....	Lecture: Military topography.	Drill.
Wednesday:			
1.....	Military topography.....	Lecture: Military topography.	E and F, riding; A, B, C, and D, drill.
2.....	Fortification.....	E and F, riding; A, B, C, and D, physical training.	E and F, gymnastics; A, B, C, and D, drill.
3.....	Tactics, etc.....	Lecture: Administration.....	Drill.
Thursday:			
1.....	Tactics, etc.....	Lecture: Tactics.....	A and B, riding; C, D, E, and F, drill.
2.....	Military topography.....	A and B, riding; C, D, E, and F, physical training.	A and B, gymnastics; C, D, E, and F, drill.
3.....	Fortification.....	Lecture: Fortification.....	Drill.
Friday:			
1.....	Fortification.....	Lecture: Fortification.....	C and D, riding; A, B, E, and F, drill.
2.....	Tactics, etc.....	C and D, riding; A, B, E, and F, physical training.	C and D, gymnastics; A, B, E, and F, drill.
3.....	Military topography.....	Lecture: Military topography.	Drill.
Saturday:			
1.....	Fortification.....	Lecture: Fortification.....	} Commandant's parade, 9 a. m. to 10.30 a. m.
2.....		E and F, riding; A, B, C, and D, physical training.	
3.....	Military topography.....	Lecture: Military topography.	
Day and number of educational division.	Second study, 10.15 a. m. to 1.45 p. m.		Parade, riding, and sword drill, 2.45 to 3.45 p. m.
Monday:			
1.....	Tactics, etc.; class instruction.....		C and D, riding; A and B, sword drill.
2.....	Military topography; class instruction.....		Drill.
3.....	Fortification; geometrical drawing, Plate II, 10.15 to 12; notes artillery or class instruction, 12 to 1.45.		Do.
Tuesday:			
1.....	Fortification; class instruction, 10.15 to 12; field fortification, Plate III, 12 to 1.45.		E and F, riding; C and D, sword drill.
2.....	Tactics, etc.; lecture on military law, 12.45, and class instruction.		Drill.
3.....	Field military topography; class instruction.....		Do.
Wednesday:			
1.....	Military topography; class instruction.....		
2.....	Fortification; lecture 10.15 to 11 a. m.; field fortification, Plate I, 11 a. m. to 1.45 p. m.		
3.....	Tactics, etc.; class instruction.....		
Thursday:			
1.....	Tactics, etc.; class instruction.....		E and F, riding; A and B, sword drill.
2.....	Military topography; class instruction.....		Drill.
3.....	Fortification; geometrical drawing, Plate II, 10.15 to 1.45; class instruction as required.		Do.
Friday:			
1.....	Fortification; field fortification, Plate III, Class I H. of D., Class II H. of D.		A and B, riding; C and D, sword drill.
2.....	Tactics, etc.; lecture on tactics, 12.45, and class instruction.		Drill.
3.....	Military topography; class instruction.....		Do.
Saturday:			
1.....			
2.....			
3.....			

Programme of the studies and exercises for the week ending February 23, 1895—Continued.

Day and number of educational division.	Riding and sword drill, 4.15 to 5.15 p. m.	Study, 5.15 to 6; gymnastics, 5.15 to 6.15 p. m.	Private study. Divisions I and II, 6 to 7.15 p. m.; Division III (part), 6.30 to 7.15 p. m.	Gymnastics, Division III (part), 6.15 to 7.15 p. m.
Monday:				
1.....	E and F, riding; C and D, sword drill.	.....	Tactics, etc.....	
2.....	.....	.....	.....
3.....	.....	A, B, and C, gymnastics; D, E, and F, fortification; notes, artillery.	Military topography. A, B, and C, fortification; notes, artillery.	D, E, and F.
Tuesday:				
1.....	A and B, riding; C and D, sword drill.	.....	Fortification; notes, X	
2.....	.....	.....	.....
3.....	.....	A, B, and C, military topography; D, E, and F, gymnastics.	Tactics, etc. D, E, and F, military topography.	A, B, and C.
Wednesday:				
1.....	.....	.....	.....
2.....	.....	.....	.....
3.....	.....	.....	.....
Thursday:				
1.....	C and D, riding; E and F, sword drill.	.....	Tactics, etc.....	
2.....	.....	.....	.....
3.....	.....	A, B, and C, gymnastics; D, E, and F, fortification; notes, artillery.	Military topography. A, B, and C, fortification; notes, artillery.	D, E, and F.
Friday:				
1.....	E and F, riding; A and B, sword drill.	.....	Fortification; notes, VII.	o
2.....	.....	.....	Tactics, etc.	
3.....	.....	A, B, and C, military topography; D, E, F, gymnastics.	D, E, and F, military topography.	A, B, and C.
Saturday:				
1.....	.....	.....	.....
2.....	.....	.....	.....
3.....	.....	.....	.....

NOTE.—The letters A, B, C, D, E, and F are the designations of the six companies into which the cadets are divided, each company being about 60 strong; each of these companies contains a subdivision of about 20 from each of the three educational divisions or classes of the college.

12. The headwork or intellectual work at Sandhurst takes up only about four hours each day, but the time of the cadets is taken up in some way or another, from 7 in the morning until about 5 in the afternoon, for four days of the week, and from 7 a. m. to 1 p. m. on two days of the week. The afternoons on which there are no military exercises or studies are Saturday and Wednesday, and cadets who are not under restriction are generally given leave from Saturday noon to Monday morning.

Although the course is nominally eighteen months, the breaks due to the Saturday and Sunday holidays, the summer and other vacations, reduce the actual academic work in the year from twelve months to less than eight. The summer vacation lasts from the 15th July to the 1st of September. There is a winter vacation of eight weeks and an Easter vacation of two weeks.

Compared with the Royal Military Academy, the Sandhurst vacations are considerably longer. The board of visitors of 1894 called attention to the fact that the vacations at Woolwich and Sandhurst are

of different lengths and at different periods of the year. They recommended that the vacations at the two institutions should be at the same periods, and that they should coincide, if possible, with those of other educational institutions.

The working of the classes at Sandhurst is seriously affected by having two kinds of cadets at the institution, i. e., the competitive cadets and the Queen's cadets. The Queen's cadets find themselves side by side with youths who are more advanced than themselves, so that there is a tendency to delay the instruction of the abler cadets, or to hurry over it with the privileged cadets. As might be expected, the proportion of the Queen's cadets who fail to pass their examinations is greater than that of the competitive cadets. The professor of fortification at Sandhurst reported on the 28th of November, 1893, "That out of the 12 cadets who failed to qualify at the first term examination for removal from the third division to the second division, 7 were Queen's or honorary Queen's cadets, i. e., 58 per cent. Yet the Queen's cadets only form about 15 per cent of the total strength of the division."

The director-general of military education in his report for 1893, gives the following figures:

From June, 1889, to December, 1891, the whole number of cadets who passed the final examinations was 1,012, of whom 891 entered by competitive examination and 121 by qualifying examination. The number who failed at the final examinations during the same period was 22, of whom 13 entered by competitive examination and 9 by qualifying examination.

GENERAL REMARKS ON THE TWO INSTITUTIONS.

13. The characteristic features of the Woolwich and Sandhurst schools are the brief period of instruction and the somewhat exacting competitive standards for admission; the two occupying to a considerable extent the relation of cause and effect, and some diversity of judgment is expressed as to their expediency. On the one hand it is asserted that too prolonged a course would tend to discourage young men of the class from which the supply of officers in England is naturally drawn from undertaking an arduous training following the years spent under tuition at the public schools, particularly in view of the fact that the army as a profession is not paid enough to be self-supporting, and not all who enter it can be sure even of continued employment on full pay. An alternative proposed is to raise the standard of admission and thereby take advantage of the competition, to counteract the brevity of instruction later, and at the same time to supply a means of pretty thoroughly sifting the material at the outset.

On the other hand, it is contended that mere academic proficiency is not by any means the surest test of those qualities which go to make a soldier, however desirable as an auxiliary, and that a period of training sufficiently long to develop and modify individual characteristics

and to saturate the pupil with the traditions and essential requirements of the military service is needed both to impart the requisite technical knowledge and military instinct, and in particular to inculcate habits of discipline that are essential and that can not be acquired if the period of tutelage is too short.

In the case of Sandhurst, the course of instruction has within the last few years been lengthened from one year to eighteen months, so that a demand for a still further lengthening of the course would probably meet strong opposition. With regard to Woolwich, it is very generally conceded that the course of instruction is too short, or, as the boards of visitors of 1893 and 1894 express it, "that no amount of instruction that can be given during the two years which cadets now pass at the academy can by any possibility be considered adequate for the completion of the instruction of officers of artillery any more than it can be for that of officers of engineers."

An additional argument for longer courses of instruction is found in the fact that, especially in the case of Woolwich, the army vacancies are fewer than the graduates, and thus the young men are kept waiting without occupation or pay for prolonged periods after completing the course. Of the graduates from Woolwich, for example, of March, 1894, the greater number were still unprovided for in March, 1895.

It is evident that such an intervening stage of idleness and freedom from restraint is highly disadvantageous to the individual at the age of graduation.

The matter has been brought before Parliament, and the secretary of state for war has agreed that provision should be made for continuing instruction and supervision until commissions are given and the young officers ordered to duty.

FRANCE.

The schools which correspond most nearly to the United States Military Academy are the École Polytechnique at Paris and the École Spéciale Militaire at St. Cyr, or St. Cyr, as it is popularly designated.

I.—L'ÉCOLE POLYTECHNIQUE, OR THE POLYTECHNIC SCHOOL.

This school is at Paris and was founded in 1794. It has been reorganized by various decrees, the latest of which was dated March 13, 1894.

The object of the school is to train students for the following branches of the public service, viz: The artillery of the army and the marine artillery; the engineer corps of the army (Génie Militaire); the engineer corps of the navy or naval constructors (Génie maritime); the corps of naval officers; the hydrographic corps; the marine commissariat corps; the corps of highways and bridges (ponts et chaussées); the manufac-

ories of the State; the engineers of the powder and saltpeter service; the mining engineers, and the telegraphic lines; also for such other public services as require a profound knowledge of the mathematical, physical, and chemical sciences.

Admittance to the school is exclusively by competitive examination. After a two years' course, the student may go to one of the special schools of application for any of the above-mentioned services, provided he can pass successfully the final examinations and be declared to be acceptable for this service by the decision of a committee which draws up the classification list for the public services.

Fulfillment of these conditions does not give an absolute right to enter any of the public services; admission to any service depends upon the number of vacancies existing at the time of leaving the school, upon the physical aptitude of the student, and his place on the order of merit.

The polytechnic school is subject to military discipline and is directly subject to the minister of war.

The number of students to be admitted is fixed every year by the minister of war. In 1894 the number was fixed at 210. The admission depends partly upon the capacity of the school buildings and partly upon the prospective number of vacancies, although the minister is authorized to admit one-tenth more than the number necessary to fill vacancies that will presumably occur.

The cost of board (pension) is 1,000 francs per year. The cost of the outfit is fixed every year by the minister. A deposit of 100 francs in addition is required on entering to constitute the student's individual fund (*masse*).

Full or half bursars are appointed from those whose family financial circumstances require such concessions. These are required to bind themselves to serve the State for ten years, unless they reimburse the treasury the cost of their respective bursarships. On graduating into the artillery or engineers each bursar cadet receives the cost of a first outfit.

The competition for admission to the Polytechnic is public, and takes place every year in Paris and in certain cities designated by the minister of war.

All candidates must be French born or naturalized, must have been vaccinated or have had the smallpox, and must be between the limits of 17 and 21 years of age on the 1st of January of the year of the competition. Temporarily, soldiers who have served six months with the colors are eligible up to the age of 25.

Candidates must enter their names, by the 1st of April, at the latest, either at the prefecture of the department where they are studying, if they are civilians, or, if they are soldiers, at the prefecture of the department where they are garrisoned. Only the students of the *Prytanée Militaire* are exempt from the requirement of entering their names.

Before they are allowed to enter their names candidates must produce the following papers:

(1) The legally attested birth certificates of the candidate and his father.

(2) Proof that the candidate possesses one of the following diplomas: *Bachelier ès sciences*, or *bachelier de l'enseignement secondaire spécial ou moderne*. Certificates that the candidate has passed the first examination for the baccalaureate are also admitted in lieu of the diplomas above mentioned.

(3) A certificate of physical aptitude.

(4) A declaration of the place where he wishes to be examined.

(5) A declaration from the father of the candidate with regard to the payment of the board (pension) for his son, or an application for a bur-sarship or demibursarship.

Every candidate who succeeds in obtaining an appointment to the school, and who does not report to the commandant of the school within the time fixed by the letter of appointment, will be considered as having resigned.

On arriving at the school, every appointee will be subjected to a medical examination, and all those who are found fit for military service are required to sign an engagement to serve three years from October 1 in the army. The two years' service at the school is credited to the scholar, but in case a scholar fails in his studies or is dismissed for misconduct, he is required to serve out his full term of three years as a soldier in some line regiment.

For certain reasons, such as failure in health or on account of injury, scholars may be turned back for one year, but not more than once, and this year does not count as a credit against the three years' engagement.

By article 15 of the new decree, a certain number of foreigners may be permitted by the minister of war to follow the course as externals, provided their aptitude has been established by means of a special examination, but no such foreigner may be admitted as a resident scholar.

The scholars live in barracks and are divided into four companies for purposes of discipline and military instruction; for academic purposes they are classed into two divisions, corresponding to the years of the course. Twice a year the standing of each scholar is published by bulletin. At the end of the school year an examination fixes the relative order of merit in each division, and the average of the results of the final examinations of both years fixes the order of merit of the graduating class. The scholars of the graduating class select the public service which they wish to enter before they go up for the final examination, and they also declare their secondary selections. If they decide not to enter any of the public services, they so declare, and are then sent, equally with those who have selected a civil position in the public service, to serve one year in the reserve of the army as second

lieutenants. They must all fulfill the three years of service for which they contracted on entering the school.

If, for any reason, any scholar should not accept the place in the public service assigned to him, or if his graduating standing should not have obtained for him a vacancy in some of the services supplied by the polytechnic school, he may be appointed a second lieutenant in some part of the army or navy not specified in the list of services supplied by the school, or may be sent to the school of forestry, or to one of the schools of application for the civil service.

Those who graduate in the artillery and engineers of the army and the marine artillery are sent, as *élèves sous lieutenants* (student second lieutenants), to take a post-graduate course at the school of application for the artillery and engineers at Fontainebleau (formerly Metz).

Of the graduates of 1894, who went into the army or marine, 76 entered the artillery of the army, 24 the marine artillery, 10 the marine engineers (naval constructors), 1 became a hydrographer of the navy, and 21 went into the engineer corps of the army.

The polytechnic school, though under the minister of war, is much more of a scientific school than a military one. A diploma from this school is considered invaluable for any scientific career.

ENTRANCE EXAMINATIONS.

The competition is divided into three successive examinations: First, the "compositions" or written papers; second, the preliminary examinations or examinations of the first degree (oral), and, third, the examinations of the second degree (oral).

Papers ("compositions").—These include a paper on the course of special mathematics, a problem in descriptive geometry, a paper on the French language, a paper on physics and chemistry, a trigonometrical problem, a pen-and-ink (or india-ink) drawing, and a drawing of a bust from a plaster cast.

All the papers are corrected and marked. When the marks allotted to any paper, multiplied by the proper coefficient, amount to less than the sum fixed by the examining board, the candidate is not allowed to enter the examinations of the first degree.

EXAMINATION OF THE FIRST DEGREE.

The oral examinations of the first degree are held on the subjects specified in the programme of admission, and serve, in connection with the mathematical papers and the papers in chemistry and physics, to exclude from the oral examinations of the second degree such candidates as are insufficiently prepared.

To accomplish this result, the mean of the marks of the two examinations will be multiplied by 10; to this will be added the mark of the physical and chemical paper multiplied by 2, and the mark on the mathematical paper. When the sum of the points thus obtained is less than the minimum fixed by the examining board, the candidate will be eliminated.

EXAMINATION OF THE SECOND DEGREE.

The oral examinations of the first degree serve, in connection with the papers and the oral examinations of the second degree, to determine the classification in order of merit.

Coefficients.

Oral examinations of the first degree.....	10
Mathematical paper.....	1
Physical and chemical paper.....	2
For final admission:	
Mean of the two oral examinations of first degree.....	18
Examinations of the second degree:	
Mathematics—	
First examiner.....	20
Second examiner.....	20
Physics.....	10
Chemistry.....	5
German.....	5
Papers:	
Mathematics.....	4
Descriptive geometry.....	3
Trigonometrical problem.....	1
Drawing.....	4
Pen-and-ink sketching.....	1
French.....	6

The marks on the different papers and examinations range from 0 to 20.

Any candidate who obtains in any subject a mark less than 5 shall be reported to the board and may be excluded for insufficient preparation, and any candidate who turns in, in any subject, a blank sheet will not be allowed to enter the oral examinations.

PROGRAMME OF SUBJECTS OF EXAMINATIONS (1895).

The examiners are always allowed to satisfy themselves that the candidates are properly grounded in the elementary mathematics (arithmetic, geometry, and algebra).

- (1) Algebra: Through the higher algebra.
- (2) Trigonometry: Through plane and spherical trigonometry.
- (3) Analytical geometry: Analytical geometry of two and three dimensions.
- (4) Mechanics: Cinematics, dynamics, and statics.
- (5) Descriptive geometry: As far as the intersection of conical or cylindrical surfaces or the intersections of surfaces of revolution whose axes intersect.
- (6) Physics: Optics, measuring instruments, such as verniers, micrometers, and spherometers; weight, laws of falling bodies, etc.; hydrostatics, statics of gases; heat, calorimetry; changes of state, such as fusion, solidification, and suffusion; hygrometry.
- (7) Chemistry: Organic and inorganic.

(8) French language: A composition of the same style as those prescribed by the programmes of the class of philosophy.

(9) German language: The principal rules of grammar; translating at sight; answering in German questions addressed to them in that language, etc.

(10) Geometrical drawing, drawings in india ink, and copies: Candidates must execute a problem in descriptive geometry, an india-ink drawing, and a copy from a plaster cast, in pencil.

(11) Problems and drawings to be handed to the examiners: Candidates must turn in to the examiners a number of descriptive geometry problems, and drawings in pencil and india ink, executed by themselves during the current scholastic year. This work must be properly attested, so as to make sure that the drawings presented are really the work of the candidates in question. Attempts at deception with regard to these matters will rule out a candidate from further competition.

FURTHER REGULATIONS.

An advantage of 15 points will be granted to those candidates who produce the diploma of *bachelier ès lettres*, or a certificate that the candidate has passed the first examinations for this baccalaureate degree.

An advantage of from 1 to 5 points is granted to those candidates who show themselves proficient in some living language other than German.

A number of points, varying from 1 to 15, will be allowed the candidates for their aptitude in physical exercises (fencing, gymnastics, and riding). Candidates are not admitted to the examination of the second degree unless they can present a certificate from the physical examining board to the effect that they have passed the tests required by this board.

All the subjects included in the programme are equally obligatory. Candidates whose information on any of the subjects of examination is deemed to be insufficient are to be struck from the list, whatever may be the rank they occupy in the order of merit.

COURSE OF INSTRUCTION.

The course comprises the following branches, Analysis (the higher branches of analysis), mechanics and machines, descriptive geometry and stereotomy, physics, chemistry, astronomy, architecture, history and literature, drawing, including drawing of machinery, and German.

There is also a department of military instruction, presided over by a *chef d'escadron* of artillery.

No list of text-books is available at present.

II.—L'ÉCOLE SPÉCIALE MILITAIRE A ST. CYR.

The special military school of St. Cyr, or St. Cyr as it is popularly designated, dates from the time of Louis XIV. It was last reorganized

in 1882. It is intended to supply officers for the infantry, the cavalry, and the marine infantry.

The course of instruction lasts two years, and no scholar is allowed to remain more than three years at the school. The privilege of taking a third year to complete the course is only allowed where circumstances of exceptional gravity have compelled a student to suspend work at the school.

The school is subject to military discipline.

The cost of board (pension) is 1,000 francs and that of the outfit from 600 to 700 francs.

Busarships or half busarships may be granted to young men whose parents are unable to support them at the school. Outfits or partial outfits may also be allowed in such cases.

Admittance to the school is exclusively by competitive examination. The competition is divided into three parts:

- (1) The papers ("compositions").
- (2) The examination of the first degree (oral).
- (3) The examination of the second degree (oral).

Competitors are limited to those who have obtained degrees as *bachelier ès lettres*, *bachelier ès sciences*, *bachelier de l'enseignement spécial*, or a certificate of qualification for the baccalaureate degree in secondary or classical modern schools.

Possession of one or more of these degrees or certificates gives a right to a number of points, varying from 40 to 15, according to the number and kinds of degrees possessed by the competitor. These count for admission only.

The programmes and dates of the entering examinations or competitions are published every year sufficiently long in advance to give candidates from the remotest parts of France plenty of time to compete. Candidates must be French born or naturalized, robust and well-formed, free from any ailment that would unfit them for the military service, and not less than 17 or more than 21 years of age on the 1st of January of the year of the competition. They must be registered as candidates before the night of the 15th of April, those not belonging to the army at the prefecture of the region where they are completing their studies, those already soldiers at the prefecture of the region where they are garrisoned. Scholars of the *Prytanée Militaire* need not register. The competitions for admission are held during the months of June and July at all the principal centers of any army corps region.

Accompanying his application to register, the candidate must furnish the proper birth certificates, a surgeon's certificate of vaccination, and a certificate from the local recruiting officer that he has military aptitude; also a statement of the place where he desires to be examined, and a statement from his parents or guardians that they are able to pay the expenses of board, etc., or if not so able, a request for a full or half busarship.

COMPETITIONS.

Papers ("compositions").—(a) A paper on the French language of the grade of the class of elementary mathematics; (b) an exercise in German, German script to be employed; also a translation from the German; both exercise and translation to be made without the help of a dictionary; (c) a mathematical paper; (d) a logarithmic calculation, solution of a triangle; no tables allowed, except a five-place table of logarithms; (e) a simple problem in descriptive geometry, or in one-plane descriptive geometry; (f) a drawing in pencil, from a plaster cast; (g) a shaded copy of a landscape; (h) a topographical drawing, copy of a map on a scale of 1-20000.

A failure to turn in any one of these papers will exclude the candidate from the rest of the competition. However, an unfinished paper will not necessarily be a ground for exclusion.

In all the papers stress will be laid upon legible writing and correct spelling. Failure on these points will exclude a candidate from further competition.

The papers are judged by examiners and "correctors" appointed by the minister of war.

The marks given by the "correctors" range from 0 to 20.

The mark given to a paper is multiplied by the corresponding coefficient, and the result is the number of points gained by the candidate on such paper.

The mean of the marks on the pencil drawing and the landscape drawing gives the number of points allowed for drawing.

In any case where the sum of the products formed by multiplying the marks on the different papers by the corresponding coefficients is less than a certain limit the candidate is excluded.

This limit is fixed every year by the minister on the recommendation of the examining committee under the presidency of the director-general of infantry.

EXAMINATIONS OF THE FIRST DEGREE.

Taken in connection with the papers the examination of the first degree decides the question of "admissibility" in the case of any candidate. The subjects of this examination include all those mentioned in the programme, with the exception of the German language.

The board is composed of three examiners, one for the literary part and two for the scientific part.

The questions put to any candidate are drawn by lot from a number prepared by the examiners. Each examiner marks the candidate on the answers to the questions he has put to him, on a scale ranging from 0 to 20; he multiplies this number by the corresponding coefficient and puts down the partial products on a sheet bearing the name of the candidate.

To obtain the total number of points to which a candidate is entitled on this oral examination, the examiners add together all these partial products.

To determine the total number of the points which will fix the position of the candidate in the order of merit, add together the total number of points obtained as just mentioned, the total number obtained on papers, those allowed for physical aptitude, and the credit or "majoration," if any, allowed for the literary diplomas or certificates.

Each examiner devotes, in general, twenty-five minutes to the examination of a candidate. All the answers of the candidate are considered in giving him his mark, which ranges between 0 and 20.

The examiners of the first degree put down, on a sheet bearing the name of the candidate, the three marks obtained, multiply each by the corresponding coefficient, and take the sum of the products. This result is added to the total number of points obtained on the papers.

In any case where the sum of all the points thus obtained is less than a certain limit, the candidate is excluded from the examinations of the second degree.

The candidates who satisfy all the above conditions receive a certificate of "admissibility," on the presentation of which they are admitted to the examinations of the second degree.

EXAMINATIONS OF THE SECOND DEGREE.

For the examinations of the second degree the board is composed of five examiners—three for the scientific part, one for history and geography, and one for German and English.

PHYSICAL APTITUDE.

Independently of the written or oral examinations, the candidates undergo another to determine their physical aptitude, their skill in riding, fencing, and gymnastics. The last three are obligatory.

A mark, ranging from 0 to 20, is given each candidate for each of the three separate examinations in riding, fencing, and gymnastics.

The effectives of the school are fixed every year by the minister of war, upon which depends the number of vacancies to be competed for. Heretofore the effectives were usually fixed at 900, which would give a yearly number of 450 admissions, or rather more. In 1894 the number of places to be competed for was 475, for which there were about 2,200 entries. For 1895 the number of admissions has been raised to 600, and the 150 additional may be taken from those at the top of the list of successful candidates for entrance to the naval school.

Every candidate who receives an appointment, and who does not report to the commandant of the school within the time fixed by his letter of appointment, is considered as having resigned.

No one can be admitted to St. Cyr who is under the height of 1 meter 540 millimeters (about 61 inches), or who is laboring under any of the

disabilities that would involve discharge from the army. Consequently the appointees on their arrival at the school are subjected to a medical examination. If they pass this examination they are required to sign an engagement to serve for three years.

Bursar cadets are required to serve for ten years, unless they make good the sums that have been advanced by the state for their board, etc.

PROGRAMME OF THE SUBJECTS OF EXAMINATION.

(1) History: The history of France and of Europe from the reign of Louis XIII to the present time. (Coincides as far as possible with the course of history taught at the "lycées," which correspond to our high schools.)

(2) Geography: (a) Europe: Physical geography; orography; hydrography; political geography; railways. (b) France: Physical geography; orography; hydrography; political geography; railways; internal navigation; colonies, particularly Algeria and Tunis. (c) Asia: Seas, coasts, islands, capes, etc.; orography; hydrography; foreign colonies; China and Japan. (d) Africa: Seas, coasts, islands, capes, etc.; rivers and lakes; European colonies; Egypt. (e) America: Seas, coasts, islands, capes, etc.; mountains and rivers; European colonies; United States; summary information on the other American States. (f) Oceania: Archipelagoes and islands; European colonies.

(3) German language: A theme on the blackboard; reading German script; translating at sight; conversing in German.

(4) English language: Optional. Questions only.

(5) Algebra: Through the solution of equations of the first degree and equations of the second degree with one unknown quantity; also through arithmetical and geometrical progressions, including logarithms.

(6) Geometry: Through spherical geometry.

(7) Descriptive geometry and one-plane descriptive geometry; as far as the projection of the plane sections of spheres, cones, and cylinders of the second order.

(8) Plane trigonometry: Through the solution of triangles.

(9) Analytical geometry: Rectilinear coordinates only.

(10) Mechanics: Statics, cinematics, dynamics.

(11) Physics: Hydrostatics, heat, electricity, optics.

(12) Cosmography: Constellations and principal stars, celestial sphere, the earth, construction of maps.

(13) Topography: Planimetry, representation of the ground, accidents of ground, measure of distances on the ground, measure of angles, theory of the execution of a regular survey, estimation of the difference of level of two points.

Table of coefficients.

(1) Papers:		
French paper	14	
Mathematical paper	14	
Logarithmic calculation	2	
Problem in descriptive geometry	6	
Drawing from model	3	
Topographical drawing	2	
German theme	8	
German translation	4	
Total	53	53
(2) Examinations of the first degree:		
Physics, mechanics, cosmography, topography	10	
Algebra, geometry, descriptive geometry, trigonometry, analytical geometry	10	
History and geography	10	
Total	30	
Sum of the coefficients for "admissibility"	83	
(3) Examinations of the second degree:		
Literary subjects—		
French paper (supplementary coefficient)	2	
History	14	
Geography	14	
German	10	
English (optional)	2	
Scientific subjects—		
Algebra and plane trigonometry	16	
Geometry	12	
Descriptive geometry	10	
Analytical geometry	10	
Cosmography and topography	6	
Physics and mechanics	18	
Total	114	
(4) Physical aptitude:		
Riding	2	
Fencing	3	
Gymnastics	3	
Total	8	
Sum of the coefficients for admission	205	

COURSE OF INSTRUCTION, ETC.

The course of instruction includes the following branches: Artillery, topography, military art and history, military legislation and administration, fortification, musketry, geography and statistics, military literature, German, and drawing.

The cadets also receive instruction, practical and theoretical, in infantry and cavalry, and in gymnastics and fencing.

The purpose of the instruction given to the cadets is purely military.

During their stay at the school all the cadets receive instruction in riding.

The cadets are divided into two divisions or classes, corresponding to their respective years of instruction at the school. They are promoted from the second to the first division after passing the prescribed examination.

The cadets of the first division undergo a final or graduating examination.

A cadet who is dismissed for misconduct is sent to do duty in some regiment, as a noncommissioned officer or private, according to the circumstances.

Those who fail at the final examinations, and who are not turned back at the school, are sent to regiments as noncommissioned officers to complete their three years' service. The successful graduates go to the infantry or cavalry or the marine infantry as second lieutenants. They rank in the army according to their graduating standing.

The school is organized on a military basis. The scholars live in the barracks and are formed into a battalion of eight companies, constituting one infantry battalion. This battalion ranks as the first of the army of France. The officers of the battalion are detailed from the army. The sergeant major, quartermaster sergeant, sergeants, and corporals are detailed from the scholars of the senior class or division.

Those scholars who, at the Easter examination of their first year, have, at their own request, and after an examination by a board of cavalry officers, been designated for the cavalry, form a special section for cavalry instruction, inspections, and discipline. Once classed in the cavalry section a cadet can not be taken out of it, except for some infirmity which would unfit him for mounted service.

The cavalry section has an organization corresponding very nearly to that of a squadron. Its officers and acting noncommissioned officers are appointed in a manner similar to that prescribed for the school infantry battalion.

Cadets receive pay at the rate of 28 centimes (5½ cents) per day.

The number of graduates from St. Cyr in 1894 was 417, of whom 75 went into the cavalry and the remainder to the infantry.

No list of text-books used at St. Cyr is available at present.

GERMANY (PRUSSIA).

The school which corresponds most nearly to the United States Military Academy is the "Haupt-Kadetten-Anstalt" or Upper Cadet School at Gross-Lichterfelde.

This school is fed or supplied by the "Kadettenhausen" or preparatory cadet schools, of which there are now seven, viz, Goslin (formerly at Culmer), Potsdam, Wahlstadt, Bensberg, Plon, Cranienstein, and Karlsruhe. An eighth school is now building at Naumburg.

Beginning with the lowest class of the preparatory schools, the classes are designated as Sexta or VI, Quinta or V, Quarta or IV, Unter-tertia or U. III, Ober-tertia or O. III, Unter-secunda or U. II, Ober-secunda or O. II, Unter-prima or U. I, Ober-prima or O. I. In addition there is an extra class called "Selecta."

There are thus nine classes, counting from VI up to and including upper prima. The course of each of these classes lasts one year. The lower or preparatory schools contain the classes from VI up to and including upper tertia; the other classes belong to the upper cadet school. Occasionally also, depending on the space available and the necessities of the case, some of the upper-tertia class are admitted to the upper cadet school. In the upper cadet school begins the immediate preparation for service. The classes from sexta up to and including upper prima are assimilated in the matter of instruction to the corresponding classes of the "Real Schulen" of the first degree.

CONDITIONS OF ADMISSION.

The places at the cadet schools are divided into several different categories.

1. Royal or "budgetary" places, to which pupils are admitted either gratuitously or on payment of a yearly contribution of 90, 180, 300 or 450 marks.

2. "Pensionäre," those who pay for their "pension" or board, whose yearly contribution is fixed at 800 marks.

3. "Hospitanten" or externals, who pay a contribution of 60 marks.

4. Foreigners. Such foreigners as may be admitted form a special class of "pensionäre." Their yearly contribution is fixed at 1,500 marks.

1. *Royal cadets.*—These places are granted: (a) to the sons of officers preference being given to the sons of officers who have been killed in battle or who have died in consequence of wounds or disease contracted in the field; (b) to the sons of noncommissioned officers; (c) to the sons of persons in the civil service who have greatly distinguished themselves.

Applications for these places are made when the boys are 8 or 9 years old, and are addressed to the officer who is at the head of the staff (command) of the "kadettenkorps." The staff is stationed in Berlin. A committee is appointed to decide on these applications. It consists of: (a) the inspector-general of military educational establishment, chairman; (b) a delegate appointed by the war minister; (c) a delegate appointed by the minister of public worship; (d) the officer commanding the several corps of cadets; (e) the officer commanding the upper cadet school at Lichterfelde.

The committee throws out the applications which show no ground for admission, classes the candidates according to the sums which they will have to pay, taking into account the financial position of the parents

and of the boys themselves. The Emperor makes the final decisions after the recommendations of the committee have been submitted to him.

2. *Pensionäre*.—Applications for pay places may be made in behalf of the sons of natives of any of the German States. Foreigners may also apply for these places, but they are only admitted when the rights of natives are not prejudiced thereby.

The number of pay places each year is dependent upon the number of royal cadets admitted.

Applications for pay places are addressed to the officer commanding the several corps of cadets, at his headquarters in Berlin. This officer decided upon these applications.

The youths who are successful in obtaining these "pensionäre" appointments are distributed to the different establishments, regard being paid to the residence of the parents and to the vacancies existing in the various schools.

For admission to any class, either as a royal cadet or as a pensioner, a boy must be between the ages of 10 and 15 years.

3. "*Hospitanten*" or *externals*.—These may be admitted to the preparatory cadet schools on the authority of the officer commanding the several corps of cadets, and in such numbers as the accommodations of the different schools will admit. They must be between the ages of 10 and 14 years, and must pay an annual contribution of 60 marks.

Sons of officers, instructors, professors, and officials of the cadet schools, when admitted as "hospitanten," are exempt from the payment of this contribution.

Sons of officers, instructors, etc., of the upper cadet school, may also be admitted to this establishment as "hospitanten," provided they have not passed the age of 16 years.

EXAMINATIONS.

Boys who receive provisional appointments to any of the cadet schools must report for physical and mental examination at the institution to which they are appointed, as a rule at the beginning of April. If the surgical examinations show deficient physical development, or any defects that would exclude a person from entering the army, the boys are sent back to their parents and not allowed to take the mental examination.

The mental examinations are both oral and written. In the mental examination less stress is laid upon the scope of the candidate's information than upon its thoroughness. To enter the lowest class of a preparatory cadet school the candidate is examined in arithmetic and the German language only. More details of this examination will be given later. To enter a higher class than the *sexta* the candidate must pass an examination upon the course of a year preceding the class which they wish to enter.

In case a boy passes successfully both physical and mental examinations, he is admitted to the institution and uniformed.

ENTRANCE EXAMINATION FOR THE SEXTA.

German language.—Readiness in reading and writing, using both German and Latin characters. Ability to take down from dictation, without grave faults, an easy German theme.

Arithmetic.—Operations under the four fundamental rules of arithmetic. Writing and reading figures up the number of seven places. Knowledge of the principal coins, measures, and weights.

No preparation in Latin or French is required.

The following table shows the subjects of instruction at the different cadet schools and the number of hours of instruction per week in each class and subject:

Subject.	Classes.								
	VI.	V.	IV.	U. III.	O. III.	U. II.	O. II.	U. I.	O. I.
Religion.....	2	2	2	2	2	2	1	2	2
German.....	4	3	3	3	3	3	3	3	3
Latin.....	7	7	6	4	4	3	3	3	3
French.....			6	8	4	4	3	5	4
English.....					4	4	4	4	4
Arithmetic and mathematics.....	4	5	4	5	5	5	5	4	5
History.....	1	1	2	2	2	2	4	} 3	3
Geography.....	2	2	2	2	2	2	3		
Natural history.....	2	2	2	2					
Physics.....					2		3	2	3
Chemistry.....								3	3
Topographical drawing.....				} 2	} 2	} 2	} 2	} 2	} 2
Free-hand drawing.....	2	2	1						
Writing.....	2	2							
Total.....	26	26	28	30	30	30	30	30	30

* Optional.

The higher mathematical course embraces algebra, geometry, trigonometry, the elements of descriptive geometry, and analytical geometry (conic sections).

The course of the Upper-Tertia class, in which an examination must be passed to enter the Upper Cadet School, comprises religion; German—prose and poetry, versification, arrangement of sentences; Latin—through books I and V of De Bello Gallico; French—grammar, reading, and conversation; English—grammar, reading, and conversation; mathematics—geometry, higher arithmetic, and algebra through solution of equations of the first degree; history—history of middle ages up to 1648; geography—geography of Europe, especially of central Europe, the atmosphere, land, seas, inland waters; physics—general properties of bodies, solid, liquid, and gaseous, elements of heat and chemistry, chemical union and combustion; topographical and mathematical drawing—elements of projections and perspective, scales and conventional signs, etc., with an optional course in free-hand drawing and writing.

In all the schools the instruction begins on the 1st of April, at which date cadets who have successfully passed the examinations of their respective classes are promoted a class. For the last five years the

number of promotions in each class has averaged 90 per cent of the number examined. As shown by the preceding table, the number of hours spent in the class room each week is about 30. The morning hours, from 7 to 12, or in the winter from 8 to 1, are employed in this manner, though the time-table is not exactly the same in all the schools. After the morning school hours there is a roll call, at which the orders for the day are read, letters distributed, punishments announced, etc. A drill of half an hour comes next.

Then after dinner comes an hour's recreation, which should be taken, as far as possible, in the open air. Then two hours are devoted to police duty and work around the quarters under the supervision of the instructors. The two hours following are devoted to gymnastics and singing, bathing and swimming, fencing and target practice.

Sundays and holidays the cadets receive a greater amount of liberty than on ordinary days. There are vacations of fourteen days at Eastertide and Christmastide, and of five days at Whitsuntide. In summer there is a vacation of five weeks. About the 1st of October instruction is suspended for a few days, during which time cadets take part in military excursions, which in the upper cadet school have the character of field-service exercises.

Cadets are divided according to their conduct into what are called "Censur-Klassen" or conduct classes. All cadets who have just entered are assigned to the third of these classes. They are promoted to the second class for good conduct and to the first class for exceptionally good conduct. The higher conduct classes enjoy special privileges and favors in the matter of liberty especially. The fourth or lowest conduct class is a disciplinary section. Cadets who pass into this section are under close supervision and enjoy no privileges or liberty.

MILITARY ORGANIZATION.

The preparatory cadet schools, with one exception, are intended to accommodate 220 cadets each. The school of Plon has only room for 150. In each of these schools the boys are organized into two companies, the officers of which are detailed from the army. Corporals and sergeants are detailed from the cadets.

The theoretical course in the lower cadet schools is, as has been noticed before, the same or nearly the same as that of the Real-Schulen of the first degree, and military subjects are not embraced in the curriculum at all. The cadets, of course, are under military discipline, and the amount of drill and other exercises in which they have to take part has already been indicated. A constant effort is made by the military instructors to train the characters as well as the minds of the boys, and to cultivate correct deportment and manners and a high sense of honor.

THE UPPER CADET SCHOOL.

The entrance examination for this school and the studies pursued have already been outlined. Besides the branches already mentioned, the cadets receive instruction in the regulations of the service, so that they may be well grounded in these matters on entering the army. The upper-class cadets also receive instruction in riding. Guard mounting and guard duty are practiced twice a week.

The complement of the school is 1,000 cadets, organized into two battalions of five companies each. The officers of the companies and battalions are detailed from the army; the noncommissioned officers and even sword-knot ensigns are appointed from the cadets.

After passing successfully through two years of the course (the classes of the lower and upper *secunda*) a cadet is admitted to the *Port-épée-Fahrnich's* examination (sword-knot ensign's examination). This is held every year, in the spring, before the superior military examination committee of Berlin.

1. Those cadets who will attain their seventeenth year on the 1st of April and who have the requisite physical development are, if they pass this examination successfully, (*a*) either recommended for appointment in the army as brevet sword-knot ensigns (*charakterisirte Port-épée-Fahrniche*), or (*b*) are transferred to the "selecta" class in order to prepare directly for the officer's examination, or (*c*) transferred to the under *prima*.

Those cadets who, having passed through the upper *secunda*, fail at the ensign examination, or who, on account of unsatisfactory standing, are not admitted to it, are as a rule, either returned to their parents or else entered in the army as privates, exceptionally as noncommissioned officers, for the discharge of their liability to military service.

(*b*) *Selecta*.—The course of the "Selecta" class corresponds closely to that taken in the so-called "war schools," and consists entirely of military studies and the French and Russian languages. *Selecta* cadets are the only persons who receive, directly, officers' commissions. All other aspirants for commissions, whether cadets or "avantageurs," must first pass through the grade of sword-knot ensign.

The members of the *selecta* are at the close of their course, if deemed proficient, admitted to the officers' examination. Those who pass, and who seem qualified by reason of their conduct and bearing on and off duty, receive their appointments as second lieutenants at once. Such cadets as pass, but are not perfectly satisfactory, enter the army as ensigns, and may gain their commissions in from two to six months. Those who fail are also appointed ensigns and sent to regiments, to be reexamined at the end of three months.

Those cadets of the upper *secunda* who are admitted to the *selecta* and gain high rank in this class have a considerable advantage over those of the same class who enter the army as brevet sword knot ensigns.

The first-named get their second lieutenantancies about one year after the expiration of the upper-secunda course, while the greater number who are transferred to the army as brevet sword-knot ensigns, only gain their commissions in about one year and seven months.

This time is made up about as follows:

First, the cadets appointed sword-knot ensigns are sent to regiments to serve for five months from about the 1st of May, and at the end of that time they ought to have won the "dienstzeugniss," or military qualification certificate, from their respective squadron, battery, or company commanders. This entitles them to the grade of actual or effective sword-knot ensign and to admission to the October course of a "war school." If the conduct and application to duty of a brevet sword-knot ensign are satisfactory he is ordered to attend a war school even if he has not on the 1st of October quite completed full five months' service with troops. The war-school course lasts nine or ten months, at the end of which time, if the pupil's marks are satisfactory, he is admitted to the officers' examination, after passing which the aspirant is nominated to the Emperor for a commission as second lieutenant, provided he is acceptable to the majority of the officers of the regiment to which he has been assigned.

(c) *The under-prima.*—To this class of the upper cadet school are transferred those cadets who pass the "Port-épée-Fahnrich's" examination, but who have not yet attained to the prescribed age or the requisite physical development.

To the under-prima class are also transferred those upper-secunda cadets who pass the examination with credit and who have attained the prescribed age and the requisite development, provided the parents of the cadets request this transfer.

Those cadets who pass through the under-prima successfully, and who have attained the prescribed age and physical development, are disposed of as follows, according to the desire of their parents:

They are recommended for appointment in the army, according to their standing, as actual or brevet sword-knot ensigns; or they may be transferred to the upper-prima in order to prepare for the Arbiturienten or Maturitäts examination (the diploma granted to a person who has passed this examination is a qualification for admission to a university course); or they may be, in special exceptional cases, transferred to the selecta.

2. *The upper prima.*—Cadets who have gone through the upper-prima course come up for their arbiturienten examination before the examining committee of the cadet corps, and those who pass this examination are appointed actual sword-knot ensigns, and at the same time sent to take the course at a war school. At the completion of the war-school course, those who have passed with the rating of at least "good" receive with their promotion to the grade of second lieutenant a commission bearing the date of their entrance into the army.

Upper-prima cadets are also appointed to be sword-knot noncommissioned officers if warranted by their general standing and conduct. Upper-prima cadets are to receive, also, as far as possible, instruction in military branches along with their regular theoretical instruction.

The final examination for the upper-prima cadets, or the *Arbiturienten* examination, is to be so arranged that it will be over by the 1st of February.

The war school course for the successful upper-prima cadets begins on the 1st of March, but before joining the war school they are to report to the respective squadrons, batteries, or companies to which they are assigned, not later than the 25th of February, for the purpose of taking the oath and receiving their uniforms.

As has been shown, the higher *selecta* cadets have the advantage in the race for the officer's commission, since it takes them only about three years from the date of entering the upper cadet school to attain this grade (two years in the under and upper *secunda* and one year in the *selecta*). Those who go through both under and upper prima are the last to get commissions, since in the most favorable cases they get rank as second lieutenants only from the date of their entrance into the army, or about four years from the time of their entrance into the upper-cadet school. On the other hand, if a youth is forced to give up the military career for any cause, the one who has passed his *arbiturienten* examination has the best chance in civil life, since the same careers are open to him that are open to the "*arbiturienten*" of the "*Real-gymnasia*."

The following table shows for three years the number of cadets graduating into the army from the cadet corps, and the different classes into which they were divided:

	Second lieutenants.	Actual sword knot.	Brevet ensigns.
1891-92	90	36	153
1892-93	90	21	162
1893-94	87	27	199

War schools.—The programme of these schools, which is essentially the same as that of the *selecta* class at the upper cadet school, and upon which the officers' examination is based, comprises the following subjects:

1. *Tactics.*—Theoretical instruction, and also practical exercises, as follows: (a) Formal tactics, taught by drills of the pupils in the company, battalion (skeleton), squadron (with horses), and the battery (harnessed), attendance at the exercises of troops on the drill ground; (b) applied tactics, taught by solution of problems on the map, solution of problems on the terrain, to which about two weeks of the practical course are devoted; attendance at suitable maneuvers of troops on the terrain, exercises in *kriegsspiel*.

2. *Science of arms.*—This is to teach the construction of the guns and arms used in the German army, practical ballistics, and the effect of

the projectiles of both artillery and infantry; and also with regard to the effect of projectiles, the employment in action of the two arms just mentioned. This instruction is furthered in various ways: (a) By the diligent use of the various aids provided for object instruction. (b) By visits of inspection to various technical establishments and depots. (c) By drills at the guns. (d) By the execution of the minor firing exercises for instruction, according to the infantry firing regulations, by the best shots among the pupils. (e) By attendance at the target ranges of infantry and artillery.

3. *Science of fortification.*—The course comprises field fortification, permanent fortification, and the attack and defense of fortifications. The instruction in this course is furthered by the following exercises: (a) By visits of inspection to various permanent works. (b) By attendance at the various pioneer exercises. (c) By the execution by the pupils themselves of shelter trenches of various profiles. (d) Examples on the map, relating to the fortification of a position of small extent on the basis of a certain tactical disposition. (e) The same kind of exercises on the terrain. The lines of projected works are simply to be outlined with flags or stakes.

In these last exercises several days of the practical course are to be employed.

3. *Study of ground.*—The study of this branch deals with the knowledge and description of the surface of the earth, with reference only to the military significance of the terrain and its influence upon the employment of troops; all deviations into the province of geodesy or of military and physical geography are to be avoided. The study of ground forms not only the basis for topographical drawing and surveying, but also the basis for applied tactics.

4. *Topographical drawing.*—The instruction in this branch comprises a primary triangulation of a tract, topographical land surveying, and hasty surveying for special purposes. Use of surveying instruments is also taught.

5. *Army organization.*—This instruction comprises a detailed study of the peace organization of the German army and its historical development, and also of its recruitment, mobilization for war, and the different war formations. It includes also a course in military justice, etc. A short course is also given on the organization of the German navy.

6. *Instruction in foreign languages.*—(a) French: This is intended to perfect the pupil in the language of conversation, both oral and written. (b) Russian: The instruction in this language is only elementary, the idea being to lay the foundation, which the pupil can improve upon later; it will therefore be limited to reading, writing, as well as translating simple sentences.

7. *Military correspondence, etc.*—This includes practice in the making out of such dispatches, letters, reports, records, rolls, and accounts as are used in the interior service of a company, squadron, etc., and such as are required from an officer exercising an independent command.

8. *Regulations and duties, etc.*—The instruction in this branch embraces the service of subaltern officers, including the instruction to be imparted by them to the men. For mounted officers this includes the contents of the riding instruction and stable service; also a short course in veterinary surgery and farriery. Pupils who belong to the dismounted arms receive instruction in saddling, bridling, care of horses, and the diseases of horses; also in shoeing, as far as such information is necessary for mounted officers of infantry. The subjects mentioned under this head (8) form no part of the officer's examination, however.

8. *Special instruction.*—Special instruction, aside from that mentioned under the head of (8), is given only to: (a) Pupils who are aspirants for commissions in the field or foot artillery, who, separate from each other, are trained in the first term or quarter of the course in the duties of gunners in their respective arms, so that they may be employed in this capacity in the gun drills of the other pupils; (b) pupils who are aspirants for commissions in the pioneers, who are exercised in simple branches of field-pioneer work.

9. *Drills and exercises.*—The purpose of the practical exercises is as follows: (a) The improvement of the bearing and discipline, completion and strengthening of the instruction begun for this purpose in the companies, etc. (b) Exercises in commanding, instructing, and correcting. (d) Completion of the instruction in elementary tactics, in which the pupils must be trained for the duties of section or platoon commanders.

10. *Firing instruction.*—The preliminary exercises mentioned in the firing regulations, and also a careful instruction in the science of musketry, must precede actual target practice. The target practice includes: (a) Firing with target ammunition. (b) The school exercises of the second class, according to the firing regulations for infantry or cavalry, with either the rifle or carbine. (c) Exercises in revolver firing, according to the firing regulations for infantry or cavalry. (d) Instructional firing for ballistic purposes.

11. *Gymnastics, fencing, and swimming.*—Gymnastics: The instruction in gymnastics is for all pupils, but the training differs according to the arms in which they will serve. Fencing: For all pupils, to include fencing with the broadsword; for infantry, in addition, the bayonet exercise. Exercises in swimming are to be held whenever the opportunities occur and the means at hand will permit.

12. *Riding.*—The aim of the instruction in riding is to enable the pupils who belong to the dismounted arms to ride the average troop horse with a firm and easy seat, and over all sorts of ground.

The instruction of the pupils of the mounted arms corresponds to the requirements of the services to which they will be assigned.

13. *Visits of inspection outside of the garrison.*—Five or six days, depending on the location of the different war schools, are spent by the pupils in these visits. They are made to various fortifications, pioneer exercise grounds, polygons, etc. At the war school of Potsdam five

days are allowed for this purpose, and are divided in the following manner: Two days in Spandau (fortress and military establishments). One day in Berlin (pioneer exercise ground). One day in Juterbogk (artillery polygon). One day in Spandau (firing school).

The whole period of instruction at the war schools is divided into four terms, or quarters. Three of these terms are devoted to the theoretical course, while the fourth, which lasts about six weeks, is occupied by the practical course.

It is to be remarked that with few exceptions all the officers of the army pass through the war schools. The exceptions are: (a) Youths who have studied for one year at a university or certain high-class technical schools. "Avantageurs" of this class may at once be given the educational certificate required for a Port-épée-Fahnrich, and are eligible for the officers' examination without having six months' service. They must, however, be "chosen" before being appointed second lieutenants. (b) Cadets of the selecta class, as has been already explained. The selecta cadets are the only aspirants for commissions who are exempt from being "thrown out" by a vote of the corps of officers of the unit to which they are assigned. (c) Officers of the reserve who are transferred to the active army do not pass through the war schools.

Ensigns of foot artillery and engineers who have passed the officer's examination are first appointed supernumerary or extrabudgetary second lieutenants of their respective arms, and are only appointed full or "etatsmässige" second lieutenants after going successfully through the combined artillery and engineer school at Berlin, and passing the professional or "berufs" examination before the "examining committee of the foot artillery and engineer and pionnier corps."

Before attending the courses of this school, all foot artillery and engineer officers are sent to their respective battalions or corps to serve about one year and nine months.

Formerly the officers of field artillery were on the same footing as the officers of the foot artillery in that they were commissioned at the start as supernumerary second lieutenants, and were obliged to pass through the combined artillery and engineer school before receiving their final commissions as officers. For the last three years, however, they have been on the same footing with regard to the first appointments as officers of infantry and cavalry, and are exempt from attending the artillery and engineer school and from passing the "berufs-prufung." For the purpose of receiving their final instruction, however, they have to attend a course of four months at the field artillery firing school.

Saxony and Bavaria.—Saxony and Bavaria have their own cadet corps corresponding to the preparatory and upper cadet schools of Prussia, from which appointments are made to the Saxon or Twelfth army corps and to the corps of the Bavarian army. Saxony, however, has no artillery and engineer school, and officers of those arms have to pass through the Prussian school at Berlin. Bavaria has its own artillery and engineer school at Munich.

A P P E N D I X C

EXTRACT FROM A PAPER READ BEFORE THE WEST POINT BRANCH
OF THE MILITARY SERVICE INSTITUTION, NOVEMBER 15, 1894,
ENTITLED, THE PRELIMINARY EXAMINATION: WEST POINT.

BY FIRST LIEUT. C. D'W. WILLCOX, SECOND UNITED STATES ARTILLERY.

I.

In any investigation bearing on the Military Academy considered as a school, its peculiar character as such must ever be kept in mind. So peculiar is this character that there is no risk in saying that the Military Academy is in a certain sense not a factor in the general system of education of our country. It exists for certain definite purposes; it accomplishes these purposes in its own way, and neither these purposes, nor their accomplishment, constitute for the vast majority of young men to be academically trained a subject of the least interest to them or to their parents and guardians.

* * * * *

The history of the preliminary examination is soon told. First established by Congress in 1812, it required that the candidate should be "well versed" in reading, writing, and arithmetic. No change was made in these subjects until 1866, when English grammar, United States history, and general geography were added. In 1870, the examination was made written. That is to say, if we leave out the first eleven years of the Academy's existence, during which its story is one of chaotic disorganization, the requirements of admission, originally of the simplest character, have been changed but once, and then only by the addition of elements equally simple.

* * * * *

II.

If we compare the minimum and the average age of candidates on reporting with the age of graduation from the high schools of the country, both public and private, certain conclusions follow. These ages are for us here, 17 as a minimum and 18½ as an average; for graduation from public high schools the minimum is 18, and for private from 18 to 20. No account is taken of the common and lower schools, for at the average age of passing from them to the high schools a pupil would be three or more years below our minimum. Now, if candidates have had any school training whatever up to the time when they report,

or up to within a year or two of this time for ages greater than 17-18, it is clear that they must have obtained it in the high schools of the country. It results, therefore, that these are of especial interest in the present discussion, for it is upon them that we must build if we are to build at all.

Let us first inquire into their distribution. This inquiry is pertinent, because of the argument so frequently made that the different parts of the country enjoy very unequal advantages in the matter of education, and that consequently any elevation of our standard of admission would hurtfully affect all but a small minority of the older and richer States. Of course this argument is based on a false conception of the purpose for which this academy exists, but, unsound and mischievous as it is, it is continually put forward, both in Congress and out of it, and it rarely fails to carry weight whenever and wherever it may be expressed.

High schools.

PUBLIC.

Name of division.	Number of schools.	Number of pupils (male white).
North Atlantic.....	845	32,548
South Atlantic.....	166	3,820
North Central.....	1,448	39,721
South Central.....	197	4,060
Western.....	117	3,429

PRIVATE.

North Atlantic.....	531	19,261
South Atlantic.....	363	8,751
North Central.....	305	10,564
South Central.....	380	8,362
Western.....	135	2,438

The latest data available in the investigation of this distribution are contained in the report of the Bureau of Education for 1890-91, published in 1894. In this report the United States are grouped, as in the census, into certain great geographical divisions that lend themselves readily to purposes of comparison. For example, the North Atlantic division includes New England and the neighboring States of New York, New Jersey, and Pennsylvania. The South Atlantic and the South Central divisions include all the Southern States, while the North Central and the Western include all the Western States. Of these divisions the North Atlantic and possibly the North Central are the only ones that, by popular hypothesis, would not suffer from raising the standard of admission. And at first blush, the hypothesis would appear to be justified. For if we compare the numbers tabulated below, the advantage seems to be overwhelmingly in favor of the two divisions mentioned.

Certainly the 52,000 of the North Atlantic, the 50,000 of the North Central, when compared with the 25,000 and the 6,000 high-school pupils of the South and the West, respectively, would show that the

former divisions far outstrip the remainder of the country in matters educational. But such a comparison would be unfair. Indeed, the data given do not represent the distribution of high schools except geographically. To make a fair comparison we must obviously take population into account, and in the Southern States only the white population; for it is evidently illogical, in determining the distribution of high-school facilities, to include a class of inhabitants not reached by this distribution. While in some Southern States the blacks outnumber the whites, and form, in all the remainder of them, a very large percentage of the population, in none of them, save the District of Columbia and South Carolina, do the black pupils amount to more than a small fraction of all the high school pupils. To include the negroes, then, would be to give a totally incorrect indication of the spread of school facilities in those States in which negroes exist in large numbers. For this reason they have been omitted in the Southern States, and, for the sake of exact comparison, they have been omitted throughout, in company with the Chinese and the Indians. But this omission is of no consequence, so far as North and West are concerned. For example, in the North Central division it makes a difference of less than 0.004 pupils per 1,000 of population. In the North Atlantic division the effect of the omission is somewhat greater—0.02 per 1,000 of population.

These conditions premised, and taking as unit 1,000 of population, we have the following results:

PUBLIC HIGH SCHOOLS.

Number of white pupils per 1,000 of population:

North Atlantic division	1.90
South Atlantic division .....	.68
North Central division	1.82
South Central division .....	.55
Western division	1.20

PRIVATE HIGH SCHOOLS.

North Atlantic division	1.12
South Atlantic division	1.57
North Central division .....	.48
South Central division	1.13
Western division .....	.85

These tables show at a glance that where the public school-system is weak the private is strong, and reversely; more specifically, that while the Southern States are inferior to the remainder of the Union in public schools, they are much superior in private so far as distribution is concerned.

Adding these results together we have:

PUBLIC AND PRIVATE HIGH SCHOOLS.

Number of white pupils per 1,000 of population:

North Atlantic division	3.02
South Atlantic division	2.25
North Central division	2.30
South Central division	1.68
Western division	2.05

It is submitted that, from the point of view of this paper, these results are not unfavorable. New England and adjacent States surpass the rest of the country, but in a ratio that is by no means excessive. In three of the five divisions containing over one-half the population of the country, the distribution is, for the purposes of this argument, uniform. For over 47,000,000 of inhabitants the ratio is over 2 to 1,000, and substantially not exceeding 3 to 1,000. The belief is ventured that these results are encouraging. In other words, it is believed that an increase in admission-requirements would not, as usually assumed, injuriously affect all but a small number of States. The difference in educational advantages, as measured by high schools, between the various parts of the country, is not so great as generally imagined.

Averages, however, tell only average truth. They may not tell a useful truth at all. Thus, in the case before us, it is pertinent to inquire into the distribution of the average itself. For, evidently, in any one of the great divisions given, some States may so excel in educational advantages as to credit other States of the same division with a standard to which these are not in the least entitled. Let us, then, investigate this question with respect to the least favored State. Defining such a State to be one in which the ratio of high school pupils to 1,000 of population is smallest, and applying the test, we have the following table:

Division and State.	Pupils per 1,000 of population.	Population.*	Division and State.	Pupils per 1,000 of population.	Population.*
North Atlantic:			North Central—Continued.		
New Hampshire.....	5.85	376,000	Illinois.....	2.00	3,769,000
Maine.....	5.38	660,000	Kansas.....	1.96	1,377,000
Vermont.....	5.22	332,000	Missouri.....	1.66	2,529,000
Massachusetts.....	4.66	2,216,000	Indiana.....	1.64	2,147,000
Connecticut.....	3.74	734,000	South Dakota.....	.69	328,000
New York.....	3.00	5,924,000	North Dakota.....	.49	183,000
Rhode Island.....	2.73	338,000	South Central:		
New Jersey.....	2.50	1,397,000	Mississippi.....	2.34	545,000
Pennsylvania.....	1.64	5,149,000	Tennessee.....	1.99	1,337,000
South Atlantic:			Alabama.....	1.90	834,000
District of Columbia.....	5.65	155,000	Texas.....	1.71	1,746,000
Delaware.....	3.07	141,000	Kentucky.....	1.40	1,591,000
Georgia.....	2.83	979,000	Louisiana.....	1.40	559,000
North Carolina.....	2.78	1,056,000	Arkansas.....	.92	819,000
Virginia.....	2.38	1,921,000	Western:		
South Carolina.....	2.07	462,000	Nevada.....	3.85	40,000
Florida.....	2.03	225,000	Colorado.....	2.42	405,000
Maryland.....	1.84	827,000	California.....	2.31	1,112,000
West Virginia†.....	.23	731,000	Utah.....	2.04	206,000
North Central:			Oregon.....	2.02	302,000
Ohio.....	3.20	3,585,000	Washington.....	1.81	341,000
Iowa.....	3.14	1,902,000	Idaho.....	1.59	82,000
Michigan.....	2.60	2,073,000	New Mexico.....	1.30	143,000
Wisconsin.....	2.33	1,681,000	Montana.....	1.12	128,000
Minnesota.....	2.27	1,297,000	Wyoming.....	.58	60,000
Nebraska.....	2.09	1,047,000			

* The next higher 1,000 is taken in all cases but South Carolina and Idaho.

† No private schools whatever are reported from West Virginia; the ratio 0.23 is, therefore, on the face of it, incorrect. Nevada's ratio (3.85) seems to be unreliably great.

From this table we see that 4 States (counting the District of Columbia) have over 5 pupils per 1,000 of population, 1 State has between 5 and 4, 6 States (counting Nevada) have between 4 and 3, 17 States have

between 3 and 2, 14 States have between 2 and 1, and 5 States (counting West Virginia) have 1; or, 28 out of 47 States have over 2 pupils per 1,000 of population, and these States furnish by far the greater number of candidates. Of the 14 States having between 1 and 2 per 1,000, 10 are nearer 2 to 1,000 than 1 to 1,000. It is concluded that the average is, on the whole, fairly well distributed.

This is, however, not the only conclusion. Two additional results at least attract attention. Of these, the more important is that, with the exception of a few States of small population (like Delaware and Nevada), the more populous States have the greater number of pupils, both relatively and absolutely, under high-school instruction; or, the States that furnish the greater number of candidates also furnish, so far as high schools go, the greater facilities for educating them. The next conclusion in degree of importance is that in what are supposed to be the more backward parts of the country opportunities of instruction are not only fairly well distributed, but they will compare not unfavorably, all things equal, with those of the more fortunate parts of the land. Both of these conclusions bear directly upon the initial proposition, that in general, candidates, if they have any instruction at all, must get it in the high schools, both public and private.

Such being the distribution of high schools, both by great divisions and by States, it remains to be shown that candidates have come under its influence. At the same time, it is particularly desired to point out that no proof of this proposition is necessary in the general argument of this paper. If opportunities of instruction exist widespread, we have a right to force candidates to use them, whether they have done so in the past or not. This contention is held to be entirely sound. If, however, it can be shown that candidates have availed themselves of these opportunities, to just this extent will the general argument be unexpectedly strengthened.

For the last ten years exactly a record has been kept in the adjutant's office of the school history of the respective candidates as they presented themselves year by year. When begun, in the spring of 1884, it was taken of the classes actually under instruction, and in all cases it shows what sorts of schools have been attended and for how long. In short, this record furnishes a complete statistical account of the training of the persons to whom it applies. In collating the data the number of cadets and of successful candidates that had been to public high schools was first taken, then the number of those that had been to private but not to public high schools and lastly, of those that had been to normal schools, but no sort of high school. The object in all cases was to find the reach of school advantages. In many instances candidates had attended two, and in some few cases even all three, of the kinds of schools enumerated. Such cases were, however, for the reason just given, counted only once. And for the same reason the same analysis was made of the unsuccessful candidates. In respect of time spent at school, it should be added

that no period less than a month was taken into account. The results are tabulated on next page, and on account of their interest, are also represented graphically.

From this table we see that of 1,862 candidates, 1,299 or 77.2 per cent had attended high schools. Of those successful the percentage is 77.5, and of unsuccessful 76.6. It should be recollected that among the latter are to be found those rejected by the medical board, as well as alternates whose principals were successful.

Over three-fourths, then, of all candidates for the past ten years have of their own free will availed themselves of high school instruction. That is, not only is this instruction fairly well spread, but it reaches the classes from whom the greater number of candidates are drawn.

These results acquire special significance if brought face to face with the subjects usually studied in high schools. Obviously, the arguments so far brought forward are pointless, useless, unless these subjects are directly available for examination purposes. Now, it is precisely because they are available that the question of distribution has been gone into with so much detail. All the high schools in the country teach algebra and geometry, Latin, history, and others of the so-called English branches. Many of them offer French, German, Greek, physics, chemistry, and some of them even go into physiology and civil government. Of these subjects, those of special interest to us, as being those on which an elevation of standard would bear, are just those that are most generally taught. While French and chemistry, for example, are offered only in certain schools, algebra is offered in all of them. Some of these studies may be regarded as luxuries, others as necessities. The necessities are found everywhere.

Cadets under instruction March 5, 1884.

Class.	High school.		Normal school.	Total school.	Per cent of total school.	College.	Number in class.
	Public.	Private.					
1884	14	8	7	29	78.3	16	37
1885	24	10	2	36	87.7	12	41
1886	44	18	7	69	77.1	36	88
1887	45	43	15	73	72.2	39	101

Class.	Candidates admitted.							Candidates not admitted.						
	High school.		Normal school.	Total school.	Per cent. of total school.	College.	Number admitted.	High school.		Normal school.	Total school.	Per cent. of total school.	College.	Number.
	Public.	Private.						Public.	Private.					
1888	52	16	14	82	83.6	39	98	18	10	7	35	74.4	12	47
1889	50	11	11	72	75.7	30	95	21	7	9	37	77	17	48
1890	67	15	16	98	76.5	39	128	18	5	14	37	71.1	16	52
1891	71	8	22	101	78.9	43	127	30	8	4	42	60.8	27	69
1892	50	10	14	74	73.2	31	101	81	8	18	57	82.6	10	69
1893	45	14	12	71	73.9	32	96	50	5	17	72	76.5	30	94
1894	52	6	8	66	80.3	26	82	42	8	16	66	82.5	17	80
1895	59	5	16	80	80.8	34	99	40	3	7	50	78.1	10	64
1896	55	12	16	83	72.8	40	114	28	3	9	40	86.9	7	80
1897	60	6	20	86	79.6	36	108	38	6	6	50	76.7	17	46

While the facts just stated are held to be sufficiently well-known to require no further explanation, it is, at this point, neither uninteresting nor uninteresting to make a comparison between the favored and unfavored parts of our land, in respect of the number of students of algebra and of geometry. For it is the possible introduction of just these very subjects, that will excite the bitterest opposition from those who stick to it through thick and thin, that any increase would not exclude New England, but would exclude the South and the West.

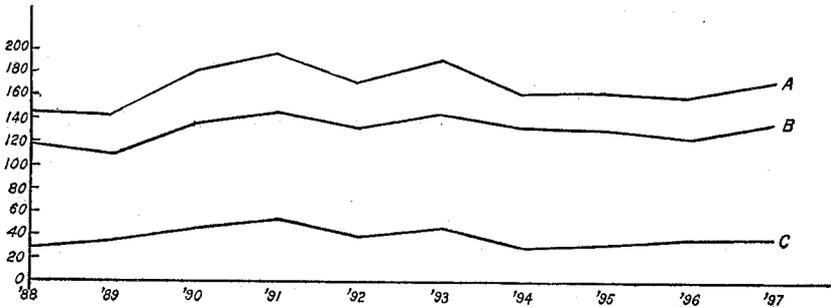
With the same units and limitations as before, we have:

Number of students of algebra per 1,000:

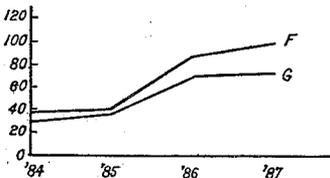
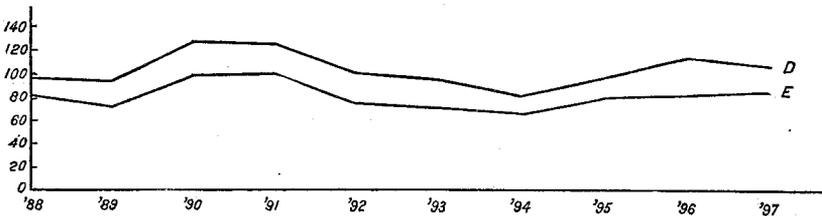
North Atlantic division	1.46
South Atlantic division	1.32
North Central division	1.15
South-Central division	1.04
Western division	1.17

Number of students of geometry per 1,000:

North Atlantic division .....	.90
South Atlantic division .....	.55
North Central division .....	.48
South Central division .....	.43
Western division .....	.66



- A. Total of candidates reporting.
- B. Total of candidates having attended high or normal schools.
- C. Total of candidates that had not attended high or normal schools.



- D. Total of candidates admitted.
- E. Total of candidates admitted who had attended high or normal schools.
- F. Total of cadets under instruction March 5, 1884.
- G. Total of cadets, etc., who had attended high or normal schools.

These results may fairly be called striking, not because the numbers are themselves extraordinarily large, but because these numbers are practically uniform, expressed in terms of the unit of 1,000 of population.

They become still more striking when we compare them with the total number of high-school pupils, in terms of the unit just mentioned. For then we have:

Percentage of high-school pupils studying algebra:	
North Atlantic division	48.34
South Atlantic division	58.66
North Central division	50.00
South Central division	61.90
Western division	57.17
Percentage of high-school pupils studying geometry:	
North Atlantic division	29.80
South Atlantic division	24.44
North Central division	20.86
South Central division	25.05
Western division	32.19

It must be borne in mind that all the results brought forward in respect of high schools are three years old. There is no reason for believing that they would be traversed by later data. While, however, it would be very difficult as yet to cover the past three years, it is legitimate in an inquiry like the present one to forecast the future, and that in spite of the fact that of all things to prophesy is one of the most dangerous. Whether the requirements of admission be increased or not, the steps taken, or to be taken, in the matter of secondary education bear directly on the questions under discussion. No apology, therefore, is needed for touching upon them to-night.

The National Council of Education in July, 1892, appointed a committee of ten, with President Eliot, of Harvard, as chairman, to report on the subject of secondary school studies in the United States. After due deliberation, the committee on November 10, 1892, appointed conferences of ten members each to report on the following subjects, respectively: Latin, Greek, English, other modern languages, mathematics, physics, astronomy and chemistry, natural history, history, and geography. These conferences were composed of professors and of school-teachers drawn from all parts of the country and representing all sorts of institutions, from high schools to universities. For example, the conference on mathematics included Professor Newcomb as chairman, but it also included teachers in boys' schools.

To these respective conferences was sent a list of questions covering the points on which it was desired that report be made, and in some sort fixing the limit thereof. In due time the conferences met and made their recommendations to the committee of ten. These formed the basis of a general report by this committee, which report, together with the special recommendations just mentioned, was published by the Bureau of Education in 1893.

Of these recommendations some possess no present interest for us. Greek, for example, will never be a requirement for admission, and the

same may probably be said of physics, astronomy, chemistry, and natural history.

I shall, therefore, in respect of these, merely point out their bearing on the general mental development of candidates, and pass on to the more detailed, though necessarily very brief, consideration of those that are of practical interest to us.

And first, of English, the character of the recommendations may best be grasped by considering the requirements of admission to college, resulting from the course recommended. These are, the study of masterpieces of English literature; parallel reading of related works; some acquaintance with literary history and criticism, and, largely, the ability of the candidate to express himself clearly and correctly in all of his examination papers. It is supposed that the pupil has already received training in grammar and rhetoric. It is well to note here that the standard implied is neither ideal nor theoretical, for many colleges have already reached it.

Closely connected with English is the subject of foreign (modern) languages. The conference on this subject recommended the introduction of the elective study of either French or German at the age of 10; in any case, that such study should form part of the high-school course. Here again is it worthy of note that many schools, both public and private, teach French or German, or both, and that many colleges require to-day some knowledge of either or of both as alternatives of Latin or Greek.

Perhaps the most valuable and to us the most interesting recommendations are those made on the subject of mathematics. Like the house that defied the storm, West Point is built on a rock, and that rock is mathematics. Here, if anywhere, we might feel ourselves under compulsion to move slowly and surely in the matter of changing the admission requirements. It is therefore significant that the conference—of which, be it recollected, Professor Newcomb was chairman—recommended a course in arithmetic to begin at 6 and to end at 13, and one in concrete geometry for grammar schools, to be given in connection with drawing. The conference further recommended that systematic algebra should be begun at 14 and demonstrative geometry at the end of the first year's algebra, to be carried on two years. It expresses the belief "that if the introductory course in concrete geometry has been well taught, both plane and solid geometry can be mastered at this time," and that "boys going to a scientific school might profitably spend a year on trigonometry and some of the higher parts of algebra, after completing the regular course in algebra and geometry." These higher subjects accordingly find a place in the schedule carefully drawn up by the committee of ten to express their idea of the amount and nature of the work to be done in schools.

The recommendations on geography were of a revolutionary character. The suggestions made, if carried out, will involve a more or less radical change not only in the methods of teaching this subject, but

also in the conception of its nature. For example, "their definition of the word makes it embrace not only a description of the surface of the earth, but also the elements of zoology, astronomy, and meteorology, as well as many considerations pertaining to commerce, government, and ethnology." Whether we should ever be willing to follow the conference through its changes is more than doubtful. But even if it is certain that we shall not, it is not amiss to note the resulting extension of general knowledge, the formation of habits of observation, and of accurate statement. These are positive results, available in any branch of knowledge, that is, we could turn them to account in other subjects, both before and after admission. If, however, we may for the present be justified in taking a more or less negative view of the recommendations on geography, we shall not be justified in taking such a view of those on history. The conference on this subject was of the belief "that the time devoted to history and the allied subjects should be materially increased," and arguments are presented in favor of this increase. "They state strongly their conviction that they have recommended 'nothing that was not already being done in some good schools, and that might not reasonably be attained wherever there is an efficient system of graded schools,' and "that the teaching of history should be intimately connected with the teaching of English."

It is, perhaps, within the knowledge of all our readers that one of the remarks most frequently made in criticism of officers of the Army bears on their lack of historical knowledge. It is only comparatively lately that a mere acquaintance with the bare outlines of our country's history has been thought necessary as a condition of entrance. The establishment of a course in history is of still more recent occurrence. And yet there is a whole branch of military science to which a knowledge of general history is a necessary introduction. It is not maintained that an examination covering more than our own country will furnish this essential, but it is maintained that if the general standard of historical studies is raised in accordance with the recommendations given above, the range of these studies at the Academy can be greatly increased. And of course that means higher requirements of admission in history.

Such is a very brief and imperfect outline of so much of this celebrated report as directly concerns us. Its significance and value lie in the fact that it unquestionably constitutes a new point of departure in the development of secondary schools. A high but not unattainable standard has been set before them. We shall here at the Academy feel the effect of this, whether directly or indirectly. But if we have it in our power to achieve greatness, shall we wait to have it thrust upon us? Bearing as they do directly upon admission to the Academy, are not the recommendations of the committee of ten worthy of serious consideration? If, being only recommendations, they have apparently received disproportionate attention to-night, it is because they really form an important, a necessary part of the subject in hand. It is as

though a general advance had been sounded along the whole line, an advance that will sweep us along with it, whether we are aware of it or not. If the question of secondary instruction is important to us, the probable development of this instruction can not be ignored.

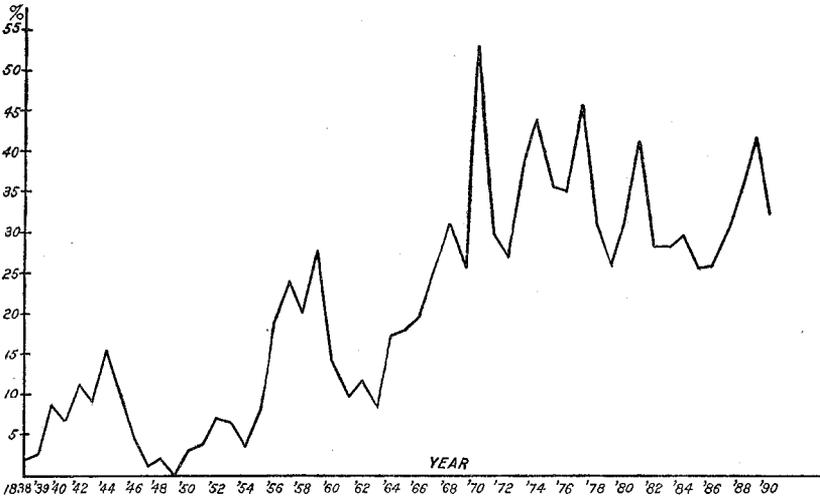
If now we group together the circumstances under which our entrance standard was originally fixed; the distribution of high schools, their reach over possible candidates, their courses of study, and the high standard to which these are tending, will anyone maintain that our entrance requirements are to-day in accord with these conditions? Is it not reasonably demonstrated that an affirmative answer must be given to the question that has served as a foundation for this whole argument? Does not the educational condition of the country justify an increase of the requirements of admission?

III.

To say that the Academy holds a unique position as an educational institution does not mean that we shall not profit by the experience of other schools. Particularly is this statement true when we reflect that until the beginning of the fourth year cadets receive no academic instruction whatever in purely military subjects. During the first three years of his career the cadet is undergoing mental training—training that of course he can turn to immediate account in his subsequent profession, but still, mental training not in itself professional. We are therefore at liberty to compare this institution with others in those respects in which they all agree. This comparison may obviously be made with any college or university, but will be limited in this discussion to technical schools, which, like the Academy, are giving training as a foundation for professions of responsibility. And of course the comparison involves only conditions of admission.

Mere examination of the accompanying table is all that is needed. But certain questions suggest themselves. If these schools, training men for responsible professions, find it safe to exact more than mere rudiments, why should we not find it safe here? Is it not worth while to make the experiment? Are we in a position to say that it would be hurtful? The better colleges and universities from time to time add to their admission requirements, thereby marking their faith in the soundness of the educational growth of the country. Might we not with safety follow their example, especially when we reflect that, unlike them, we do not depend on popular favor for existence, that we do not depend on students to meet expenses? It is clear from this table that all these requirements bear a distinct relation to subsequent courses. Now, if we look at our standard after admission, if we reflect upon the effort necessary to graduate, upon the character of the profession of arms, even in our own unmilitary country, we are forced to the conclusion that our entrance requirements bear no relation to subsequent efforts. The object of an entrance examination is, or should be, to measure acquired knowledge, and to test fitness for further training.

Ours does neither. For example, our backbone being mathematics, our examination calls for no knowledge of this branch, and most certainly is no test of the candidate's ability to pursue it. Let us take English, and let us take it because the cadet will have to use his native speech with accuracy and flexibility in many varied subjects. Roughly speaking, all that we ask is that a candidate shall not make more than a certain percentage of errors in spelling, reading, and elementary parsing. Surely it will not be claimed that our standard is what it ought reasonably to be. The examination is not even competitive. The Government is ready to give, and does give, a life position in the most honorable and responsible of professions, not to the boy who can read and write and cipher better than his neighbor, but to any boy who can read and write and cipher sufficiently well to escape being called a dunce. But suppose the examination were competitive; would that be



Fluctuation (per cent) in numbers of candidates found deficient, 1838-1890.

enough? If present conditions are maintained any boy of ordinary intelligence can at short notice come up to our requirements; that is to say, we declare to the world that we have no special requirements for a highly specialized profession. In making such a declaration, are we doing our full duty to the service? Have we no rights of our own, no responsibility in the premises? Of course some one will object that even now many boys fail to get in, and conclude therefrom that we require enough. The premise is admitted, but the conclusion flatly denied. What if many boys should fail to enter under a higher standard? Is it our business to let in a great number of boys, or is it our business to get the best material possible? If there are every year so many failures both before and after admission, it is not because the entrance standard is too high, but because it is too low.

Entrance requirements of certain scientific schools, with those of the naval and the military academies, 1894.

School.	Age	Languages.				His- tory.	Mathematics.			Phys- ics.	Chem- istry.	Draw- ing.	Remarks.
		English.	French.	Ger- man.	Latin.		Arith- metic.	Algebra.	Geom- etry.					Trigonom- etry.
Sheffield Scientific (Yale).	15	Whitney's Grammar, or equivalent.	.....	.....	Four books Caesar, Virgil (compulsory).	United States.	To include metric system.	To include series, combinatorial, analysis, etc.	Plane, solid, spherical.	Construction and use of tables; solution of plane triangles.	.....	.....	Candidates "are urgently advised" to make themselves acquainted with history of England.
Lawrence Scientific (Harvard).	.....	To include reading of standard works designated in advance and a composition on a subject drawn from same.	Translation of ordinary prose; some sight reading.	Same as French.	.....	United States; England.	.....	Through quadratic equations.	Plane.	.....	Optional.	.....	Advanced mathematics may be offered. French and German alternative.
Massachusetts Institute of Technology.	17	Composition in one hour of an essay, correct in all respects, on some subject drawn from standard authors.	Ability to translate simple prose at sight.	do	.....	United States (or Applicant).	To include metric system.	Through progressions.	Plane, five books.	.....	.....	.....	After 1894, solid geometry or advanced algebra. "It is the intention of the faculty to require both of these at no distant day." French and German alternative.
Columbia School of Mines.	18	Good English in all examination papers; composition as in Massachusetts Institute of Technology.	Ability to read easy French; elements of grammar.	do	.....	United States.	do	Equations, second degree, series.	Plane, solid, spherical.	Plane, use of tables; solution of triangles.	.....	Free-hand.	.....
Rose Poly-technic, Aut, Ind.	16	Grammar	.....	.....	.....	do	Required.	Through quadratic equations.	Plane	.....	.....	.....	Geography is also required.
Worcester Poly-technic, Worcester, Mass.	16	Grammar. Composition on some subject drawn from works required to be read.	Ability to read, based on study of 250 pages of ordinary prose; sight reading.	.....	.....	do	To include metric system.	Through quadratic equations, proportion.	Plane, solid.	.....	.....	.....	.....
Reusslaer Polytechnic, Troy, N. Y.	.....	Grammar, essay of 150 words on subject given during examination.	.....	.....	.....	.....	do	Through quadratic equations.	Plane, five books of Chauvenet.	.....	.....	.....	Do.

Entrance requirements of certain scientific schools, with those of the naval and the military academies, 1894—Continued.

School.	Age	Languages.				His- tory.	Mathematics.				Phys- ics.	Chem- istry.	Draw- ing.	Remarks.
		English.	French.	Ger- man.	Latin.		Arith- metic.	Algebra.	Geom- etry.	Trigonom- etry.				
Naval Acad- emy.	15- 20	Reading, writing, spell- ing.				United States.	Arith- metic.	Simple equations of one or more variables.						Geography is also required. Spelling throughout con- sidered in marking papers.
Military Academy.	17- 32	Reading, writing, spell- ing (grammar).				.do	.do							Geography required.

In justification of this statement, let it be remembered that the number of failures depends on two things, the method of selection, and the standard itself. The former is not under the Academy's control, but that it greatly affects the number of failures is self-evident. These two independent influences are combined in the preliminary test, and it is therefore distinctly incorrect to charge, as so many have charged, all the failures to one of them alone. For, if we examine the percentages of failures to total examined year by year, from 1838 to 1890, inclusive, it will be found that these percentages follow no law whatever. Now, were the standard alone responsible, just the opposite would be true; some relation would manifest itself, by at least the absence of such great fluctuations as do exist.

The hypothesis of poor selection fully accounts for the results observed. But this indifference to selection is itself largely accounted for by the low standard of admission. For, evidently, if the requirements do not exclude poor material, the field of selection is thereby extended so as to include poor material. Bad selection bears, moreover, not only on numbers of candidates rejected, but also on numbers of cadets found deficient. In no other way can we rationally account for the great fluctuations in these, as observed from year to year. Nothing, therefore, can be more illogical than the cry that the standard of the Academy, both before and after admission, is too high, and nothing can be more reasonably certain than that this cry is traceable not to our severity so much as to our laxity, in so far as laxity and low standard of admission are identical terms.

Let us be honest in this matter. Instead of using the power that is clearly ours, that it is our duty to exert in forcing the worst candidates to come up to a right standard, it has come to pass that we have sunk to the standard of the worst candidates. If this be the case, it follows that, in range at least, our own standard after admission is adjusted to the abilities of the poorest candidates that succeed in entering. If, therefore, present conditions shall prevail, we either betray indifference to the possibility of improvement, or else stand alone in virtually declaring that this possibility is nonexistent. And we shall be practically allowing the poorest material that political or other influence can send us, to limit our development by accepting the qualifications of that material as our point of departure.

It is a law in matters of education that the higher we rise in the scale of institutions the greater the influence exerted by any member of the scale on those below it. The higher schools react on the lower, but not conversely. This law is based on experience, and is indeed but a special case of supply and demand. Hence, if we raise the standard of admission, we shall find beyond peradventure that our raw material will be improved. We shall get better candidates, because, more effort being required to get in, only those who are able to get in will make the effort. These reflections are generally true;

they are independent of all other considerations. But when not only the moral aspect of the case but also independent and unrelated facts support the contentions of this paper, then there is no longer room for doubt; we ought to increase our requirements, but we can increase them, whether we ought to or not.

It may be objected to all that has been said so far, that it consists of destructive criticism merely. But destructive criticism is not necessarily unsound, and it is no part of its duty to point out corrections for the defects that come under its notice. Waiving all this, however, the following schedule of subjects for entrance examination is submitted as the practical result of the discussion:

Candidates are required to be well versed in reading, writing, and spelling; in English grammar and composition; in arithmetic, to include the metric system; in the history of the United States; in the descriptive and the physical geography of the United States; and to have a fair knowledge of algebra, to include quadratic equations; of plain geometry; of the more distinguished English authors, and of such of their works as may from time to time be announced; of the descriptive geography of the earth, and of general history.

Candidates may offer to be examined in drawing; in French, so far as to read ordinary prose; and in Latin, to include such works as Caesar's Gallic War, and the simpler orations of Cicero. The subjects of the optional examination shall be weighted, and considered as counterbalancing some deficiency in the required subjects.

In the execution of this programme no change would be suddenly made. This would manifestly be unfair to all concerned—to candidates, who have a right to the serving of due notice, and to the Academy itself, which would need time in order to make a thorough study of the necessarily consequent changes in its various courses. Unquestionably fewer candidates would at first succeed in entering. But this is in itself no evil, and let it be remembered that fewer cadets would be found deficient. This statement is supported by the experience of the Academy itself, as may be seen from the following table, for since the preliminary examination was in 1870 made written, i. e., more searching, not more difficult, the percentage of graduates to total admitted has risen.¹

Percentage of graduates to total admitted:

1840-1849	48.90
1850-1859	48.26
1860-1869	62.85
1870-1879	54.00
1880-1889	50.41

The number of officers, therefore, supplied to the service would in all probability be just as great as it is now, while the work of getting

¹ Very large classes were graduated in the decade 1860-1869. The war probably sufficiently accounts for this.

rid of the unfit material would be put where it properly belongs, and would cease to be a drag on the Academy itself. But this particular effect—the admission of fewer cadets—would more than probably be only temporary. The invariable law of such cases would at once begin to operate; prospective candidates would work up to the higher standard, and in a few years this difficulty, if difficulty it be, would cease to exist. To all objections that might be raised on this score, it is a sufficient reply that the changes giving rise to them are in the interest, I shall not say of the Academy nor of the service, but of the candidates themselves.

* * * * *

Table showing the number of candidates from each State and Territory, examined and rejected by academic board, from 1838 to 1894, inclusive.

[This table was kindly furnished by Professor Bass.]

State or Territory.	Num-ber ex-amin-ed.	Num-ber re-jected by A.B.	Per-cent re-jected by A.B.	State or Territory.	Num-ber ex-amin-ed.	Num-ber re-jected by A.B.	Per-cent re-jected by A.B.
Alabama.....	172	53	30.8	Nebraska.....	40	16	40
Arizona.....	12	5	41.7	Nevada.....	19	12	63.2
Arkansas.....	82	35	42.7	New Hampshire.....	61	10	16.4
California.....	79	20	25.3	New Jersey.....	134	24	17.9
Colorado.....	18	6	33.3	New Mexico.....	16	4	25
Connecticut.....	93	17	18.3	New York.....	762	160	21
Dakota.....	7	.....	.....	North Carolina.....	196	58	29.6
Delaware.....	29	7	24.1	North Dakota.....	5	3	60
District of Columbia.....	28	2	7.1	Ohio.....	459	111	24.2
Florida.....	30	7	23.3	Oklahoma.....	1	.....	.....
Georgia.....	196	55	28.1	Oregon.....	15	3	20
Idaho.....	15	10	66.6	Pennsylvania.....	618	139	22.5
Illinois.....	322	88	27.3	Rhode Island.....	44	9	20.5
Indiana.....	281	85	30.2	South Carolina.....	143	43	30.1
Iowa.....	130	34	26.2	South Dakota.....	5	1	20
Kansas.....	73	26	35.6	Tennessee.....	259	86	33.2
Kentucky.....	252	72	28.6	Texas.....	118	46	39
Louisiana.....	107	31	29	Utah.....	16	2	12.5
Maine.....	98	14	14.3	Vermont.....	60	12	20
Maryland.....	158	46	29.1	Virginia.....	272	77	28.3
Massachusetts.....	225	45	20	Washington.....	14	3	21.4
Michigan.....	159	46	28.9	West Virginia.....	59	24	40.7
Minnesota.....	59	16	27.1	Wisconsin.....	126	32	25.4
Mississippi.....	130	40	30.8	Wyoming.....	18	7	38.9
Missouri.....	227	73	32.2	At large.....	612	77	12.6
Montana.....	13	5	38.5				

Consolidated table of statistics respecting candidates, 1838-1890.

[This table was kindly furnished by Professor Bass.]

Year.	Number appointed.	Rejected by academic board.	Rejected by medical board.	Appointments canceled.	Declined appointment.	Failed to report.	Admitted.	Per cent rejected by academic board.	Graduated.	Per cent graduated.
1838.....	132	2	1	1	1	16	111	1.77	56	50.4
1839.....	91	2	1	.....	6	6	76	2.55	39	51.3
1840.....	106	3	2	.....	4	8	84	8.68	25	29.8
1841.....	131	8	.....	1	1	7	114	6.56	41	36
1842.....	144	17	9	.....	.....	9	109	13.4	59	54.1
1843.....	77	6	8	.....	.....	3	60	9.09	38	63.3
1844.....	96	14	1	.....	.....	6	75	15.7	38	50.7
1845.....	98	9	1	.....	2	5	81	10	43	53.1
1846.....	121	6	1	.....	3	9	103	4.63	44	42.7
1847.....	84	1	3	.....	3	3	74	1.33	42	56.7
1848.....	84	2	.....	.....	1	.....	81	2.41	43	53.1
1849.....	95	.....	2	.....	1	4	88	0	52	59.1
1850.....	98	3	2	1	.....	2	90	3.22	46	51.1
1851.....	81	3	.....	.....	.....	7	71	4.05	34	47.9
1852.....	102	7	3	.....	.....	2	90	7.22	49	54.4
1853.....	97	6	1	2	.....	5	83	6.74	38	45.8
1854.....	120	4	4	.....	2	7	103	3.74	27	26.2
1855.....	99	7	7	.....	1	4	80	8.05	22	27.5
1856.....	101	17	4	.....	2	6	72	18.97	41	56.9
1857.....	132	26	9	.....	8	7	82	24.07	79	96.3
1858.....	108	19	4	2	.....	7	75	20.21	28	37.3
1859.....	91	26	.....	.....	1	5	60	27.9	25	41.7
1860.....	84	12	.....	.....	.....	72	14.29	27	37.5	
1861.....	148	13	2	2	.....	23	108	10.74	68	63
1862.....	96	11	.....	.....	.....	4	81	11.84	41	50.6
1863.....	126	9	3	.....	5	10	99	8.33	63	63.6
1864.....	101	15	.....	.....	1	12	73	17.04	54	74
1865.....	101	16	4	.....	2	5	74	17.75	39	52.7
1866.....	95	17	1	.....	5	2	70	19.54	58	82.8
1867.....	84	19	1	.....	2	7	55	25.67	41	74.5
1868.....	127	34	3	1	2	11	76	30.9	57	75
1869.....	112	24	7	.....	4	70	25.53	41	58.6	
1870.....	163	73	4	.....	16	5	65	52.89	41	63.1
1871.....	131	32	11	2	1	9	76	29.63	43	56.6
1872.....	165	35	20	.....	1	14	95	26.92	48	50.5
1873.....	230	74	13	.....	7	18	118	38.43	76	64.4
1874.....	175	66	4	2	2	12	89	42.58	43	48.3
1875.....	206	68	6	.....	3	8	121	35.44	67	55.4
1876.....	167	53	3	.....	3	10	98	35.09	52	53.1
1877.....	200	87	3	1	.....	13	96	45.9	53	55.2
1878.....	174	46	1	2	.....	20	102	31.08	37	36.3
1879.....	146	30	.....	4	.....	20	88	25.42	52	59.1
1880.....	139	34	2	1	1	22	73	31.77	37	50.7
1881.....	200	60	4	1	1	46	85	41.37	39	45.9
1882.....	216	51	3	2	4	18	129	28.33	77	59.7
1883.....	235	56	3	.....	3	23	141	28.42	64	45.4
1884.....	178	42	9	.....	1	22	100	29.57	44	44
1885.....	171	33	9	.....	1	27	95	25.78	49	51.6
1886.....	215	45	7	1	.....	24	128	26.01	54	42.2
1887.....	256	56	18	1	4	41	127	30.6	65	51.2
1887.....	210	56	18	.....	.....	29	101	35.67	62	61.4
1888.....	231	68	25	.....	2	33	96	41.46	51	53.1
1889.....	198	53	30	.....	1	22	81	32.38	54	66.7
1890.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	7,368	1,480	277	27	111	642	4,744	.....	.....	.....

REPORTS OF COMMITTEES.

APPOINTMENTS AND EXAMINATIONS.

MESSRS. WASHINGTON, BLAIR, and VENABLE.

Your committee on appointments and examinations beg leave to report to the Board of Visitors that they have devoted considerable time to the investigation of the two subjects embodied in the title of this committee.

First: Your committee is of the unanimous opinion that the number of appointments of candidates to the Military Academy should be substantially increased. The cost of graduating a candidate under the present system is large, but, in the opinion of your committee, it is money well spent. There are accommodations in cadet barracks for a much larger number than the present average membership of the corps of cadets. An increased number could receive instruction without any corresponding increase in the corps of professors and instructors. The probable cost of such increase will be found in the table annexed to this report.

There can be no doubt in the minds of thinking men that in a country such as ours, with a small standing army and dependent upon its volunteers for defense in time of danger, the presence among our people of young men, trained in such a school as this, will amply repay a thousandfold the expense of their education. As the case now stands the Academy does not graduate enough men to fill the vacancies in our skeleton Army. Even should there be a surplus of graduates a portion of them might well be relegated to civil life. Their education and training would be a guaranty of speedy and permanent employment, and their services would ever be available to their country.

Your committee therefore recommends that the number of appointments to the Military Academy be increased, and that the Board ask of Congress to enact such legislation as will give to the President of the United States twenty appointments and one appointment to each Senator, Representative, and Delegate in Congress.

Second. In the opinion of your committee the standard of admission to the Military Academy is too low.

Historically considered, the law of Congress, enacted in 1812, required the candidate to be "well versed" in reading, writing, and arithmetic.

Thus the law stood until 1866, when English grammar, United States history, and general geography were added to the above topics. In 1870 the examination was made written.

Every educated man of to-day is aware that the general standard of education throughout the United States, in the period from 1812 to the present day, has risen to an enormous degree. Every educational institution throughout the length and breadth of this land has participated in that rise save only the United States Military Academy.

At least one year of time out of the four years' course is consumed in the teaching of subjects with which every 17-year-old boy ought to be, and can be under the free-school system of every State in this Union, thoroughly familiar. To start a boy, then, at the point where the preliminary examination leaves him is a pure waste of time and money. In the effort to keep pace with other institutions the curriculum of the academy, starting at this low point, has become overcrowded, and the mental tax upon the students unnecessarily and unwisely severe. In no other military school in civilized countries is the entrance examination so absurdly low.

In Belgium the acquirements are a thorough acquaintance with French or Flemish; a fair knowledge of Latin, Flemish, French, German, or English; history; geography; drawing; and in mathematics, arithmetic, algebra, the elements of geometry, and plane trigonometry. For candidates who intend to enter the artillery or engineers' course, in addition to the above, the entrance examination embraces higher algebra, spherical trigonometry, analytical geometry, and descriptive geometry.

In Italy, to enter the military school of Modena, the candidate must pass an examination in the Italian language and literature; in history, geography, and elements of natural science; in arithmetic, algebra, geometry, and trigonometry; and the French language. To enter the military academy at Turin, which qualifies its graduates for the artillery and engineers, the entrance examination embraces, in addition to the foregoing, trigonometry, complementary geometry, and complementary algebra.

There are two academies in Austria, one the Theresa Military Academy, the other the Technical Military Academy of Vienna. The former prepares for the infantry, rifles, and cavalry; the latter for artillery, engineers, and technical troops.

The entrance examinations for the Theresa Academy embraces the German language; geography—mathematical, physical, and political; history—ancient, medieval, and modern; physics, including mechanics of solid, fluid, and gaseous bodies; wave motion, acoustics, optics, heat, magnetism, and electricity; chemistry, the elements of organic and inorganic chemistry, and the synthesis of the more important carbon

compounds; mathematics—arithmetic and algebra up to equations of second degree with two unknown quantities; arithmetical and geometrical progressions, theory of combinations, binomial theorem, geometry, planimetry, stereometry, plane and spherical trigonometry, elements of analytical geometry, calligraphy. For the Technical Military Academy the topics are the same as the foregoing, with the addition of descriptive geometry.

In England, to enter the Royal Academy at Woolwich, the preliminary examination topics are:

First. Mathematics, including arithmetic, algebra to the binomial theorem, inclusive; first to fourth and sixth books of Euclid; plane trigonometry; and statics, including equilibrium of forces in one plane and of parallel forces, the center of gravity, the mechanical powers; dynamics, uniform and uniformly accelerated, and uniform circular motion; falling bodies and projectiles in vacuo.

Second. Latin.

Third. French or German.

Fourth. English composition.

Fifth. Geometrical drawing.

In the higher mathematics, problems of friction, by the graphical method; analytical geometry; dynamics, to collisions and work, and conic sections. Greek, English history, elements of inorganic chemistry, elements of electricity, magnetism, light, heat, and sound; physiography and geology; geography and free-hand drawing.

In France there are two military schools, the Polytechnic, and the school at St. Cyr. The former trains its students for the artillery, engineers, the navy, and the hydrographic corps, the marine commissariat, the corps of highways and bridges, the manufactories of the State, the engineers of powder and saltpeter service, the mining engineers and the telegraph lines.

The entrance examinations to this school include first a written examination, embracing a paper on the course of special mathematics and a problem in descriptive geometry; a paper on the French language, a paper on physics and chemistry, a trigonometrical problem, a pen-and-ink (or India ink) drawing, a drawing of a bust from a plaster cast.

The oral examinations embrace:

First. Algebra, through higher algebra.

Second. Trigonometry, plane and spherical.

Third. Analytical geometry of two and three dimensions.

Fourth. Mechanics, kinematics, dynamics, and statics.

Fifth. Descriptive geometry to intersection of conical or cylindrical surfaces, or the intersections of surfaces of revolution whose axes intersect.

Sixth. Physics, optics, measuring instruments, such as verniers, etc.; weight, laws of falling bodies, etc.; hydrostatics, statics of gases, heat, calorimetry, change of state, such as fusion, etc.; hygrometry.

Seventh. Chemistry, organic and inorganic.

Eighth. French language.

Ninth. German language.

Tenth. Geometrical drawing.

The school at St. Cyr is intended to supply officers for infantry, cavalry, and marine infantry. To enter this school the candidate must prepare the following papers:

A paper on the French language, an exercise in German, a mathematical paper, a logarithmic calculation, a simple problem in descriptive geometry, a drawing in pencil from plaster cast, a shaded copy of a landscape; a topographical drawing.

Besides this, a satisfactory examination must be passed in—

I. History.

II. Geography.

III. German language.

IV. English (optional).

V. Algebra, through equations of second degree with one unknown quantity; arithmetical and geometrical progressions, and logarithms.

VI. Geometry, through spherical.

VII. Descriptive geometry, to projection of plane sections of spheres and cylinders of second order.

VIII. Plane trigonometry, through solutions of triangles.

IX. Analytical geometry, rectilinear coordinates only.

X. Mechanics, cinematics, statics, dynamics.

XI. Physics, hydrostatics, heat, electricity, optics.

XII. Cosmography, constellations, celestial sphere, the earth, construction of maps.

XIII. Topography.

In Germany the Upper Cadet School more nearly corresponds to our Military Academy than any other institution in that country. To enter this school every cadet must have been through one of seven preparatory schools, the usual course in each of which occupies nine years of instruction, the student being taken at about the age of 10. Upon the completion of the course at any one of these schools, the applicant for entrance to the Upper Cadet School must pass a satisfactory examination upon the following topics:

Religion, German, Latin, through books 1 and 5 of the Gallic war; French and English, grammar, reading, and conversation; mathematics, geometry, higher arithmetic, and algebra, through equations of first degree; history of middle ages to 1648; geography; physics; general properties of bodies, solid, liquid, and gaseous; elements of heat and chemistry, chemical union and combustion; topographical and mathematical drawing (free-hand drawing and writing optional).

A more extended description of these schools is printed as an appendix to the general report of the Board.

The table on p.— *infra*, taken from the paper of Lieutenant Willcox, shows in a compendious form the entrance requirements of the various scientific schools of this country.

It appears from the foregoing that the United States Military Academy in its requirements for admission lags far behind other respectable scientific academies in this country and in Europe.

As before remarked, this entails additional work upon the teachers and students in going over preliminary ground which would better have been cultivated before the applicant presents himself for admission. With a higher standard of admission, the curriculum of the Academy could be pruned of these studies, and others substituted in their place, in such wise that the Military Academy would be abreast of other institutions in the modern progress of learning.

Nor would this entail any hardship upon the masses of our people. A careful examination of the paper of Lieutenant Willcox, above mentioned, will show that in every State in the Union the poorest boy can find free tuition sufficient to fit him to pass an examination in much higher branches than the present law requires.

It is believed that the raising of the standard of admission will result in fewer rejections; first, because applicants of the average age of 18½ have, for the most part, advanced beyond the present standard and pass these examinations after a process of cramming long-forgotten details; and, second, prospective candidates would inevitably work up to the higher standard.

Your committee would therefore recommend that the Board embody in its report a suggestion to Congress to commit, by the proper legislation, the question of entrance examinations to the discretion of the Secretary of War, thus assimilating the Military Academy, in that regard, to the Naval Academy, or else to commit the question to the Academic Board.

Respectfully submitted.

JOSEPH E. WASHINGTON.
FRANK P. BLAIR.
RICHARD M. VENABLE.

DISCIPLINE AND INSTRUCTION.

Messrs. WRIGHT, VENABLE, AND BUTLER.

Your committee begs leave to report as follows:

DISCIPLINE.

Once that the candidate has been admitted to the Academy he begins his military life. He becomes a soldier, and must learn forthwith what the powers, duties, rights, and obligations of a soldier are. He must learn what military discipline is—to obey his superiors and to command properly those lower in rank. He must also pursue certain prescribed studies. He may not acquire very great proficiency as a student, but he must learn to be a disciplinarian.

Your committee has sought all available information with regard to the regulations governing the life of the cadet, and has come to the conclusion that the discipline of the cadets is to be entirely approved.

The discipline is severe, the regulations are all-pervading; but in no essential particular are they overbearing. At every point the cadet is taught to be an officer and a gentleman—the two interdependent factors of his whole military career. Therefore the underlying principle of the discipline of the Academy must be honor. The cadet is put upon his honor in his relations not only with his officers but with his fellow-cadets. Many of the most important regulations governing the conduct of the cadets would be of no effect whatever were not his superiors able to rely upon the truthful statements of the cadet.

The spirit of honor as between the cadets themselves is most commendable. They show a scrupulous regard for each other's rights. The result is a decided atmosphere of mutual toleration, which in turn breeds self-respect, whilst keeping down bullying. Were it not for this well-regulated code of honor there would be frequent outbreaks of the naturally high animal spirits of 300 young men separated from the outside world, their bodies in the pink of physical condition, their nervous systems overtaxed by the strain of their studies. In point of fact the average cadet shows admirable self-control—a most necessary qualification for a soldier.

Your committee does not wish to be understood as reporting a perfect system of honor, with all the results thereof perfect. But we are of the opinion that the practical working out of the code of honor system at West Point is as successful and satisfactory as the frailties of the human conscience will permit.

The routine of the cadet's life, except during the summer tour of duty in camp, is as follows: Reveille at 5.45 a. m.; roll call; police of quarters; cleaning arms, accouterments, etc.; an inspection of his room and an opportunity for a few minutes' study; breakfast at 6.15; guard mounting, at which but a small detail parades, at 7.15; then three-quarters of an hour of recreation; from 8 to 1 p. m. recitations and study; dinner at 1; then recreation until 2; from 2 to 4 p. m. recitations and study; at 4 p. m. military exercises, generally for about an hour; then about half an hour for recreation, followed by the retreat parade, at an hour varying according to the season of the year, but generally about 6 p. m. Immediately after retreat parade, supper; then about half an hour's recreation, followed by a call to quarters at about 7.30; then study in quarters until 9.30 p. m. At 10 p. m. lights are extinguished, and there is an immediate inspection of quarters to see that each cadet is in bed.

From the middle of June to the end of August the entire corps (excepting the second class, which is absent on furlough) is in camp. Then all the routine of the soldier's life is followed—drills, parades, guard duty, practical military engineering—but no instruction in studies during the ten weeks.

INSTRUCTION.

What the cadets study is here given:

Course of study and books used at the Military Academy.

[Books marked thus * are for reference.]

FIRST YEAR.—*Fourth class.*

Department.	Course of study, text-books, and books of reference.
Mathematics	Davies' Elements of Algebra. Davies' Legendre's Geometry. Ludlow's Elements of Trigonometry. Davies' Surveying. Church's Analytical Geometry. * Ludlow's Logarithmic Tables. Williams's Composition and Rhetoric. Abbott's How to Write Clearly. Meiklejohn's English Language. * Smith's Synonyms Discriminated.
Modern languages	* Roget's Thesaurus of English Words. Webster's Dictionary. De Peiffer's French Pronunciation. Keetel's Analytical and Practical French Grammar. Castarede's Treatise on the Conjugation of French Verbs. Roemer's Cours de Lecture et de Traduction, Vol. I. Bocher's College Series of French Plays, Vol. II. * Spier's and Strenne's French Pronouncing Dictionary.
Drill regulations, United States Army.	Practical Instruction in the Schools of the Soldier, Company and Battalion— Infantry. Practical Instruction in the School of the Cannoneer—Siege and Light Artillery.
Use of the sword, etc.	* Blunt's Firing Regulations for Small Arms. Instruction in Fencing and Bayonet Exercise, and Military Gymnastics.

Course of study and books used at the Military Academy—Continued.

[Books marked thus * are for reference.]

SECOND YEAR.—*Third class.*

Department.	Course of study, text-books, and books of reference.
Mathematics.....	Church's Analytical Geometry. Church's Descriptive Geometry, with its application to spherical projections, shades, shadows, and perspective. Bass's Introduction to the Differential Calculus. Church's Calculus. Johnson's Treatise on the Method of Least Squares.
Modern languages....	Borel's Grammaire Francaise. Hennequin's Lessons in Idiomatic French. Revue Militaire de l'Etranger. The Weekly Figaro. Edgen's Compendious French Grammar. *De Peiffer's French Pronunciation. *Spier and Surenne's French Pronouncing Dictionary. Monsanto and Langnellier's Spanish Grammar. Knapp's Spanish Grammar. Mantilla's Spanish Reader, No. 3. Knapp's Spanish Reader. Eco de Madrid.
Drawing.....	*Seoane, Neumann, and Baret's Spanish Dictionary. Constructive problems in plane geometry. Point paths. Topography and plotting of surveys with lead pencil, pen and ink, and colors; construction of the various problems in descriptive geometry, shades and shadows, and linear perspective and isometric projections; practical surveying in the field. *Reed's Topographical Drawing and Sketching, including photography applied to surveying.
Drill regulations, United States Army.	Practical Instruction in the Schools of the Soldier, Company, and Battalion—Infantry. Practical Instruction in the School of the Cannoneer—Light Artillery; and School of the Trooper—Cavalry. Practical Instruction in Small Arms, Target Practice.
Practical military engineering.	*Blunt's Firing Regulations for Small Arms. Practical Instruction in the Construction of Pontoon, Spar, and Trestle Bridges.

THIRD YEAR.—*Second class.*

Natural and experimental philosophy.	Michie's Analytical Mechanics. Michie and Harlow's Practical Astronomy. Young's General Astronomy. Michie's Elements of Wave Motion Relating to Sound and Light. Bloxam's Chemistry (seventh edition). Tillman's Elementary Lessons in Heat (second edition). Tillman's Essential Principles of Chemistry. Tracy's Anatomy, Physiology and Hygiene. Thompson's Elementary Lessons in Electricity and Magnetism (new and revised edition).
Chemistry, mineralogy, and geology.	Tillman's Elementary Text-Book of Mineralogy. LeConte's Elements of Geology (third edition). Free-hand Drawing, and Landscape in black and white. Mechanical and Architectural Drawing in ink and colors. Constructive details: Ordnance Constructions.
Drawing.....	*Reed's Topographical Drawing and Sketching, including Photography Applied to Surveying. United States Army Artillery Drill Regulations. Tidball's Manual of Heavy Artillery Service, U. S. A. United States Army Cavalry Drill Regulations. United States Army Infantry Drill Regulations.
Drill regulations United States Army.	Practical Instruction in the Schools of the Soldier, Company and Battalion Infantry. Practical Instruction in the School of the Cannoneer—Seacoast Artillery; and in the Schools of the Trooper, Troop and Squadron—Cavalry.
Practical military engineering.	Practical Instruction in the Construction of Pontoon Bridges; in laying Gun Platforms, and in the Construction of Revetments and Obstacles. Practical and Theoretical Instruction in Military Signaling.

Course of study and books used at the Military Academy—Continued.

[Books marked thus * are for reference.]

FOURTH YEAR.—*First Class.*

Department.	Course of study, text-books, and books of reference.
Civil and military engineering and science of war.	Wheeler's Civil Engineering. Wheeler's Field Fortifications. Mercur and Mahan's Permanent Fortification (edition of 1887). Mercur's Attack of Fortified Places. Mercur's Elements of the Art of War. Mahan's Stereotomy.
Modern languages	*Royal Engineer's Aide-Mémoire, Parts I and II. *Knapp's Spanish Grammar, Knapp's Spanish Readings. *Seoane, Neuman, and Baret's Dictionary.
Law	Davis's International Law. Cooley's General Principles of Constitutional Law in the United States. Winthrop's Abridgment of Military Law. General Orders No. 100, A. G. O., 1863.
History, geography, and ethics.	Swinton's Outlines of the World's History. *Labberton's New Historical Atlas and General History.
Practical military engineering.	Practical Instruction in the Construction of Ponton, Trestle, and Spar Bridges; in the preparation and application of Siege Materials, and in laying out Field and Siege Works. Practical Instruction in Military Reconnoissance on foot and mounted; in Field Telegraphy, Night Signaling, and the use of the Heliograph.
Natural and experimental philosophy.	*Ernst's Manual of Practical Military Engineering. Practical Instruction in Astronomy.
Drill regulations United States Army.	Practical Instruction in the Schools of the Soldier, Company, and Battalion—Infantry; of the Trooper, Troop, and Squadron—Cavalry; and of the Battery—Artillery.
Ordnance and gunnery.	Bruff's Gunpowder and Interior Ballistics. Bruff's Ordnance and Gunnery. Ingall's System of Exterior Ballistics.

Your committee believes that when the qualifications for admission, the stint of work to be done, and the time—four years—are all considered, the results attained by the corps of instructors are most satisfactory.

Detailed criticism of the subjects of study or of the time to be devoted to each study is out of place at this time, in view of the fact that this committee believes that the standard of admission should be raised, and that the present curriculum should be continued substantially as at present until the changed conditions that may follow the raising of the admission qualifications call for a revising of the lines of study.

To our minds the paramount object to be gained now is raising the standard of admission. Hence, we do not wish to withdraw attention from that issue by discussing proposed changes in curriculum. First raise the admission qualifications, then see if they and the courses of study dovetail properly.

It is for this reason that we refrain from renewing the suggestions of previous boards that English and belles-lettres should receive more attention; that Spanish should be dropped, or that German should take the place of Spanish; that mathematics should be cut down, or that certain scientific courses should be enlarged. We recognize the force of the arguments used; we have considered the questions carefully; but we advise no decisive change in the studies taught until the standard of admission is raised. We hand down to some succeeding board the recommending of a correction of any inequalities that may

appear in the curriculum when the standard of admission shall have been raised.

We were firmly impressed with one great underlying cause of the success of this institution—the thoroughness of the instruction. This shows itself in many ways. The cadet must have a good physique; more than that, each cadet must be a good all-round gymnast. He must not only learn to ride; he must be an accomplished and daring horseman. He must not only learn to swim; he must be a strong and enduring swimmer. He is not simply encouraged to dance as a graceful and agreeable accomplishment; he must learn to dance well. Whatever there is of strength or grace in a man is developed to its utmost capacity.

So too, in the class room. The classes are divided into sections for each study, a section having but rarely over twelve cadets, and generally less than that number. Each section has an instructor. As a result, each cadet is sure to get in such a small section constant and direct supervision by his instructor. At the end of each month a new grading of the class is made according to rank in each study; therefore each cadet finds himself in each study in a section of men of pretty nearly equal standing in that particular study. By this perfect grading a great uniformity of progress is assured; bright men are not held back, nor are dull men forced ahead too fast. Every cadet has, therefore, in every study, in common with eight or nine other cadets of about his own caliber in that course, what amounts practically to a private tutor in that particular study. With so small a number reciting to him, this instructor—this private tutor, as it were—can watch each man's peculiarities, find out his failings, and develop his mental power to the utmost.

Only by this system of small sections and many instructors (made possible by the Government being able to detail as many officers to the Academy as the system requires) can the highly commendable results that are seen on every hand at the Military Academy be attained.

The military exercises were all carried out admirably. The Board had the unusual opportunity of seeing a most interesting and at the same time, in this country, a most rare sight—the drill of a battery of horse artillery, performed with great precision and intelligence, and with fine dash.

By vote of the Board of Visitors this committee was instructed to inspect the camp of the cadets. Accordingly, Mr. Wright and Mr. Butler made separate inspections at different periods of the encampment. Their reports are appended.

J. M. WRIGHT.

RICHARD M. VENABLE.

SIGOURNEY BUTLER.

REPORT OF MR. J. M. WRIGHT.

WASHINGTON, D. C., *October 1, 1895.*

GENTLEMEN: For the greater part of a century the Military Academy at West Point has been distinguished among military schools for maintenance of thorough discipline, dependent in part on watchful enforcement, but more dependent on a firmly established and well-defined code of personal honor. After several weeks of close observation and diligent inquiry, I am of the opinion that there has been no lessening of this obligation of honor, and I am disposed to believe that there is now less inclination to violate rules than when I was a cadet, at a time just preceding the war of the rebellion. This last condition is, perhaps, due to the circumstances that some of the most exacting requirements have been reasonably modified without detriment to discipline, and the average age of cadets has somewhat increased during late years.

There is a wide, popular belief that the West Point authorities have undertaken to repress hazing entirely. It seems to me they have, wisely, only endeavored to moderate it. So long as untrained men are admitted to the ranks of pursuits requiring special training, the informed will practice on the ignorance of their new associates. The natural tendency of young, vigorous, and hardy men is to make their joking rather rough. It may be said of the efforts made to soften this practice that the present form of hazing is mild compared to what it used to be. But to my mind the recent graduates do not appear to be more spirited men than those who went through all the old-time rough hazing, against which there has been such outcry as a practice that broke the spirit of sensitive young men. I saw the new class of this year penned up in barracks for the first three weeks, and I thought that, rather than be in the forlorn and protected condition their appearance indicated, I would prefer the rough-and-tumble early military lessons in camp that new cadets used to receive from the day the encampment began.

The best way to instill into cadets some consideration for the feelings and condition of new associates who have yet to learn the ways of military life, is to extend consideration to the old cadets themselves and surround them with some of the ordinary influences of refined life. No one can compare West Point as it is to-day with what it was a third of a century ago without noting the great improvement in this respect. The present condition of the mess hall is a guaranty of this improvement. I can see how men who left West Point in time to participate in the last war pulled through old-time rough hazing without broken spirits, but only a providential design to preserve them for the great occasion of the war pulled them through the daily experience of the old mess hall without ruined stomachs. At no greater expense than formerly cadets now enjoy the comforts of decent living—in the quality of food, the manner of serving it, and the equipment and surroundings of the dining hall.

I was detailed by the Board of Visitors to remain at West Point to witness the encampment and to observe the training of the new class for admission. I remained there until after the Fourth of July..

The battalion marched into a prepared camp. Formerly cadets pitched their own tents and learned the mystery of tent ropes and tent pegs. At the outset of the late war one of the most useful accomplishments of graduates was that they knew how to lay out camps and pitch tents and could teach the art to new-made soldiers. Now a cadet knows no more about this than a raw volunteer. He has not even the benefit of observation of a complete tent, for the cadet tents are not pegged, but roped to post and rails which find no place in regulations and would be difficult to obtain where there were no trees. A fresh graduate placing a company of troops in camp or an open city lot, or on an open prairie or "the plains," would not know from experience how to pitch a tent. The post and rail supports seem to be a relic of campaigning in the wooded regions of the South.

The laying out of camps is a very exact art in military requirement. A special feature of regulation is that all the ridgepoles shall be straight and parallel.

The camp allowance of clothing is now so large that additional clothing receptacles are swung to the ridgepoles. Every ridgepole was thus made "sway-back" and the effect on the outside appearance was most ungainly and not in conformity to regulations.

Formerly a camp outfit of dress was one overcoat, dress coat and hat, white trousers, fatigue cap, fatigue brown-linen jacket, underclothing; and for upper classmen, a cloth riding jacket.

In addition to the above (except the brown-linen jacket) each cadet now has in camp a rain coat, a top woolen shirt (worn without coat), winter trousers, white jacket and helmet, a cloth undress coat. Formerly a cadet habitually wore his dress coat; now he habitually wears the cloth undress coat or blouse.

Where formerly he had only walking shoes and dancing shoes, he now has one or more kinds of overshoes and all the various shoes that go with the various games and exercises he affects. With an inspecting officer one day I saw in one tent an area of a square yard of shoes.

As all this is permitted and required by officers trained in the earlier, more limited dress experience, it is to be presumed there is good reason for it. But the earlier lesson of how very light of baggage a company officer must travel is not now taught.

The most distinguishing feature of West Point is the drill. Its finest test is in the rapid conversion of new cadets into well-drilled soldiers who may be absorbed by the battalion of cadets with no material impairment of its precision and appearance.

I witnessed the drills of the new cadets from the beginning until they were qualified for guard duty and the most advanced participated in the battalion parades. The system pursued at West Point is far beyond any drill system that I have witnessed in this country, under somewhat favorable opportunities for observation. At West Point great attention is given to the setting-up drill, and unremitting exercise is the cure for the soreness of unaccustomed exercise. After the drills begin nothing can be forgotten through cessation.

Marked improvement was noticeable after three days' drilling three times a day. The work is severe on the attention and the body, but is so perfectly adapted to the healthy development of both mind and body that the fatigue is natural and productive of a repose that readily restores the normal condition. Under the closest scrutiny I failed to detect any lassitude indicating previous overexercise. As rapidly as drill followed drill, the new men came out fresh and always with more elasticity, vigor, and ease than on the previous drill.

When it is considered that their drills were during a part of the warmest period of last summer, and that these young men for the most part were unused to constant hard exercise in such weather, the results were remarkable.

Comment has at times been made by observers on the manner, and especially the harshness, of the drill corporals, who themselves are cadets of only one year's experience. Unless one thoroughly examines the drill system at West Point these corporals seem to be rather pretentious, overbearing, and severe. But they accomplish the requirement of keeping the recruit's constant attention, and those who have drilled new men, unbacked by the absolute authority there is at West Point, know how indispensable and yet how difficult it is to keep the attention of recruits on the movements and explanations of the drill.

In recent years cadet corporals have been appointed before their ability to drill new men has been tested. Formerly a number of the most military men in the class just closing its first year were turned out to drill new cadets, and from the most efficient of these drillmasters the cadet corporals were selected. As it is the business of the corporals to teach the new men the school of the soldier, the old plan would seem to be the best. Under the old plan I do not think all the corporals I saw drilling squads would have been selected.

Every profession, including the military, has a nomenclature, phraseology, and traditions, not taught as a part of the curriculum, but considered among the graces of professional accomplishment. I made note of questions I knew of being asked

cadets, but which received no satisfactory answer, and it seemed to me a want of information on such subjects indicated that professional inquiry needed stimulation among the cadets. At all events, the cadets to whom the questions were addressed exhibited considerable surprise as well as embarrassment at their own lack of information. The questions were asked by visitors in pursuit of information, and among those not answered by anyone were these: Why morning parade is called "troop parade;" why putting on a new guard is called "guard mounting;" why the flag comes down at retreat or sunset, and why the song of the Star Spangled Banner refers to the flag as floating all night; the origin and meaning of the morning and the evening gun; the origin and meaning of the sentinels calling the hours; why, when the flag is at half-mast, it is run up before it is run down at night; why the sentinel's challenge of "Who goes (or comes) there" has been changed to "Halt! Who is there?"

And, though probably asked in mere curiosity, these are not unimportant questions. In their answer may be found a large part of the history of armies and armed places, and concerning our own Army an explanation of the various influences that at various times have affected our military development. It does not seem impossible that this part of the accomplishment of a soldier might be agreeably taught in lectures on the military profession, its customs, traditions, and history.

Very respectfully,

J. M. WRIGHT.

The COMMITTEE ON DISCIPLINE AND INSTRUCTION.

REPORT OF MR. SIGOURNEY BUTLER.

BOSTON, *October 1, 1895.*

SIR: I have the honor to report to you, as chairman of the committee on discipline and instruction of the Board of Visitors to the United States Military Academy at West Point, that, pursuant to the vote of the Board of Visitors, I returned to the post and inspected the camp of the corps during the latter part of August, 1895, being courteously received by the Superintendent of the Academy, the Commandant of Cadets, and the tactical officers in charge.

(1) The camp is admirably located. Much time is saved by having the parades at guard mounting, infantry drill, and dress parade held on the small parade ground, immediately adjoining the encampment, instead of on the large parade ground.

(2) Generally speaking, the cadets seemed in splendid physical condition. I found, however, quite a number of cadets reporting at sick call, suffering from what was thought to be a slight attack of chills and fever. Probably these were only fugitive cases of malaria.

(3) I followed the entire routine of the day, and found it to contain enough strictly military work to keep the cadets well employed without being unduly exacting.

(4) The drills were well up to the high standard of proficiency that obtains in the corps. The fourth-class men, who had been but two months under instruction, had already acquired steadiness and a soldierly bearing.

(5) Guard mounting and the various duties of the sentry were well performed; the occasional mistakes of the fourth-class men were, of course, pardonable by reason of their having been under instruction but two months.

(6) The company streets and quarters were well policed, and the orderly conduct of the cadets at all times was very noticeable.

(7) Military courtesy was perfect.

(8) The commandant and the tactical officers show great consideration for the health, comfort, and pleasure of the cadets. For instance, on a hot morning, the fourth-class men were turned out for light-artillery drill without fatiguing blouses, and the

class in practical military engineering was allowed the same privilege. Again, at the time of my visit, a stage and proscenium were being erected at the color line for a theatrical entertainment, which the cadets were about to give with the approval and encouragement of the officers. I was led to believe, from every source of information, including the cadets themselves, that the cadets were happy and contented and had enjoyed their summer in camp most thoroughly.

(9) The uniform of the cadets might be modified in the interest of comfort.

(a) A great number of white trousers were surprisingly ragged and frayed at the heels. This must be due to the fact that the trousers, instead of being cut straight, are cut sailor fashion at the foot.

(b) The dress for summer drill, other than the parades, seems to be unsuitable. If white trousers are worn, the cadet incurs a considerable expense, both in buying the great number of trousers necessary and in keeping them clean; if the regulation clothing is worn, it is much too thick. For such drills and for fatigue, suits either of gray flannel or of gray duck of the regulation cadet-gray color, consisting of trousers and a drill jacket, would be useful. If made of duck, the suits can be washed, but would not need the incessant washing that must be given the white duck trousers.

(c) Except when full dress is required, russet leather shoes instead of black shoes would add greatly to the comfort of the cadets in summer. They would be quite as uniform in appearance as black shoes covered with the dust, which is almost inseparable from camp life.

I am, sir, very respectfully, your obedient servant,

SIGOURNEY BUTLER.

Maj. J. M. WRIGHT,

Chairman of Committee on Discipline and Instruction.

ARMAMENT AND EQUIPMENT.

Messrs. BLAIR, WASHINGTON, and MILLIKEN.

The BOARD OF VISITORS OF THE UNITED STATES MILITARY ACADEMY:

Your committee beg leave to report that they have made a personal examination of the armament and equipment of the Military Academy, and find the same in exceptionally good condition. The report of Captain Bruff, hereto attached, gives a statement in detail, showing what ordnance is now at West Point and the condition of the same. This officer makes several important suggestions, in which the committee concur and recommend their adoption, viz:

1. A continuation of the construction of models of service carriages.
2. A continuation of work in the museum.
3. The purchase of sample small arms of foreign nations.
4. The purchase of a sample rapid-fire gun each year of such leading type as may be useful in the instruction of cadets.
5. The construction of a butt or tunnel to catch the projectiles of the heavy guns.
6. The construction of platforms for the disappearing carriage and for the new siege gun and mortar carriages.

Your committee take occasion to repeat with emphasis what has been so frequently stated by previous Boards of Visitors, after observing the drill of the cavalry and light artillery using the same horses, that a very important part of the equipment of the Military Academy is the horses used by the cadets, and we are surprised to find that the recommendations of so many previous Boards of Visitors, for many years in succession, have been thus far disregarded by Congress. It is false economy to spoil a cavalry horse by putting him into the team of a caisson or piece. The cavalry service renders the horse unruly in the harness, and the work in the artillery makes the horse stiff and awkward under the saddle. Fifty good cavalry horses should be added to the equipment of this post.

Your committee also renew the recommendations hitherto made that the twenty-eight enlisted men of the cavalry detachment, while employed as artillery drivers, shall receive extra pay. An appropriation for this purpose was made in the law which expired June, 1895, but in some way was omitted from the present law making appropriations for the Military Academy for the fiscal year ending June, 1896.

To pay these men extra for this additional service rendered produces general satisfaction and is no more than simple justice.

Your committee specially recommends that appropriate legislation be passed restoring the post's military band to 40 pieces. The band consisted of this number for many years prior to 1874, when it was reduced to the present number of 24 pieces by an amendment in an appropriation bill. We think martial music is as essential to a thorough and complete drill as the uniform and equipment of the soldier, and that nothing induces more to inspire the cadet with the proper soldierly spirit. All fully equipped military bands consist of 40 pieces, and we see no good reason why the band at this most important post should not be equal, if not superior, to any other band in the service of the Government. The additional annual cost would be a comparatively insignificant sum in comparison with the good results that would inevitably follow.

FRANK P. BLAIR, *Chairman.*

JOSEPH E. WASHINGTON.

SETH L. MILLIKIN.

UNITED STATES MILITARY ACADEMY,
OFFICE OF INSTRUCTOR OF ORDNANCE AND GUNNERY,
West Point, N. Y., June 4, 1895.

SIR: In accordance with request contained in letter of this date from the Secretary of the Board of Visitors, and by direction of the Superintendent of the United States Military Academy, I have the honor to submit, for the information of your committee, the following statement with reference to the present armament and equipment of the Academy, and also certain recommendations in that connection:

The batteries.—These may be divided into seacoast, siege, and field batteries.

Seacoast batteries.—There are two of these, one called "the seacoast battery" and the other "Battery Knox." The seacoast battery, so called, is at the north end of the post looking north up the river. Battery Knox is on the eastern side of the post looking across the river.

The seacoast battery is used for the instruction of cadets in heavy gun drill and Battery Knox is unused except occasionally for saluting purposes.

Armament of seacoast battery.—The following guns and carriages are in place in this battery: One 8-inch steel breech-loading rifle complete, of the latest model, mounted on the barbette carriage provided for it, this carriage being also of the latest type; one 15-inch Rodman smoothbore, mounted on a front-pintle barbette carriage, strengthened, with hydraulic buffer; one 12-inch steel breech-loading mortar complete, of the latest model, mounted on the service mortar carriage, also of the latest type; five 8-inch converted rifles, mounted on front-pintle barbette carriages, strengthened, with hydraulic buffers. This battery has lately been remodeled, and it now contains a type or each of our service guns and carriages.

Armament of Battery Knox.—The following guns and carriages are in place in this battery: One 100-pound Parrott rifle, on old carriage; one 300-pound Parrott rifle, on old carriage; four 10-inch Rodman smoothbore guns, on old carriages; one 8-inch converted rifle, on old carriage. As this battery can not be fired owing to its location, and is never used except for saluting, no changes are needed in its armament.

The siege and mortar battery.—This battery is located at the north end of the post above the seacoast battery, looking up the river.

The following guns and carriages are in the siege battery: Six 4.5-inch cast-iron rifled siege guns, mounted on wooden carriages. These guns are obsolete and are no longer used except for drill purposes. They are to be replaced by four 5-inch steel breech-loading siege guns, and two 7-inch steel breech-loading howitzers, mounted on their carriages of modern type. Two of the four 5-inch guns with their carriages have already arrived and will soon be placed in position. The remaining guns and carriages will be delivered as soon as the carriages for them can be completed, which will probably be within the year.

The following mortars and beds are in the mortar battery: Six 10-inch smooth-bore mortars, mounted on their beds. These mortars are also obsolete, and are to be replaced by four 7-inch steel breech-loading siege mortars, mounted on their carriages of latest type, and by two 3.60-inch steel breech-loading field mortars, mounted on their carriages. The date of delivery of these mortars and their carriages is uncertain.

The field batteries.—There is one complete field battery, composed of six 3.20-inch steel breech-loading rifles complete, mounted on the latest type of field carriage, with limbers and caissons complete. This battery is used for light artillery drill.

There is also a battery of six 3.20-inch steel breech-loading field guns, mounted on the latest type of gun carriage, with limbers complete, but the caissons of this battery are of the old pattern, and belong to an old 3-inch battery. This battery is used for foot artillery drill.

In addition, there is a complete 3-inch battery, composed of six 3-inch muzzle-loading wrought-iron rifled guns, with limbers and caissons complete. This battery is not used for drill purposes, and is retained at the post mainly for saluting purposes.

Machine guns.—There are also at the post the following machine guns, which have been supplied partly by the Ordnance Department and partly by purchase from appropriations made by Congress. They are used in the practical instruction of cadets: One Gatling gun, caliber .45, model of 1875; one Gatling gun, caliber .45, model of 1883; one Gatling gun, caliber .30, model of 1892; one Gardner gun, caliber 45; one Maxim automatic gun, caliber .45; one Hotchkiss revolving cannon, caliber 1.50.

Rapid-fire guns.—There are also the following rapid-fire guns, which have been supplied by the Ordnance Department or purchased from appropriations made by Congress for the purpose. These guns are used in the practical instruction of cadets: One Hotchkiss mountain gun, caliber 1.65 inches; one Hotchkiss rapid-fire gun, 3-pounder; one Nordenfelt rapid-fire gun, 3-pounder; one Driggs-Schroeder rapid-fire gun, 6-pounder.

Additions to and changes in armament during the present year.—In the seacoast battery, one 15-inch Rodman smoothbore gun and carriage, one 13-inch smoothbore mortar and carriage, one old-pattern center-pintle barbette carriage, one 10-inch Rodman smoothbore gun and carriage, and one 200-pounder Parrott gun and carriage have been removed. New platforms have been laid for one 8-inch steel rifle, one 12-inch steel mortar, and three 8-inch converted rifles on front-pintle barbette carriages, and these guns and their carriages have been placed in position. This, in my opinion, renders the armament of the seacoast battery complete under present conditions, as the battery now contains a type of every service gun and carriage. The only exception to the above is, that the battery does not yet contain a disappearing carriage, but one of these is now ready and will be supplied by the Ordnance Department as soon as an emplacement can be provided for it.

No changes have been made in Battery Knox and none are contemplated, for the guns there can not be used.

In the siege battery no changes have as yet been made, but as previously stated, two 5-inch siege guns and carriages are ready to be mounted in this battery, and others will be put in as soon as they arrive. In the mortar battery all the old mortars are to be removed and replaced, as before explained.

During the year a Driggs-Schroeder rapid-fire gun has been received, and will be available for future instruction, and also a caliber .30 Gatling gun firing the new smokeless-powder cartridges.

The Department has now on hand eight caliber .30 rifles with a large supply of ammunition (smokeless powder). These guns have been used during the year by cadets in target practice. There are also on hand a number of Lee magazine rifles, which have been used in firing.

Foreign small arms.—During the year the Department has endeavored to purchase a sample small arm adopted by each of the principal foreign powers. So far only one has been actually obtained, through the kindness of Col. W. H. Ludlow, military attaché at London, but it is hoped that others will be obtained during the year. It is important that the Academy should have a sample of each of these arms, to enable the cadets to study, practically, their features, advantages, and defects, and compare them with our own gun.

Models of guns and carriages.—During the year models have been made of each of our service, field, siege, and seacoast guns. These models were made at the Watervliet Arsenal, and are of great importance and use, as they are kept in the lecture room where daily recitations are held, and the cadets are thus enabled to become thoroughly familiar with the details of their mechanism.

Models of service carriages for the 3.20-inch gun and the 10-inch gun have also been procured. These models were made at Watertown Arsenal. The present modern carriage is very complicated, as compared with the old ones, and when it is being studied the carriages themselves are not available for explanation. Hence, a working model giving all the details is very valuable, and I would respectfully recommend that appropriations for the manufacture of these models be continued till the Academy shall possess a working model of each service carriage.

Museum.—The work of fixing up the new museum in the academic building is now in progress, an appropriation having been made by the last Congress for this purpose. New appropriations will, however, be necessary to complete the work. The Academy has in its possession many valuable flags, trophies, and models, which should be properly displayed and cared for.

The value of such a collection is great, but to be properly available the articles must be placed in cases or on stands where they are readily accessible and can be cared for.

Target for heavy guns.—With the installation of modern high-power, long-range guns, some means must be employed to retain the projectiles on firing to prevent danger. The longest range available here is now about 2,100 yards, and the projectiles are fired against the face of a rock on the adjacent mountain.

These projectiles are liable to glance on striking and endanger the neighboring towns or the railroad. For this purpose a tunnel or butt should be constructed at the end of the range which will retain them.

RECOMMENDATIONS.

I would respectfully recommend that the following subjects receive the attention of the committee:

- (1) A continuation of the construction of models of service carriages.
- (2) A continuation of work in the museum.
- (3) The purchase of sample small arms of foreign nations.
- (4) The purchase of a sample rapid-fire gun each year, of such leading type as may be useful in the instruction of cadets.
- (5) The construction of a butt or tunnel to catch the projectiles of the heavy guns.
- (6) The construction of platforms for the disappearing carriage and for the new siege gun and mortar carriages.

The fifth and sixth items belong more properly to the department of practical engineering, and are only mentioned here to call attention to them.

With regard to the armament, I believe that in a very short time it will be completed, as the Chief of Ordnance is anxious to furnish modern guns and carriages as fast as they can be manufactured, and he has shown this by sending here the first 12-inch steel mortar and the second 8-inch steel rifle mounted in the United States.

Very respectfully, your obedient servant,

LAWRENCE L. BRUFF,

Captain, Ordnance Department, U. S. A., Instructor of Ordnance and Gunnery.

The CHAIRMAN COMMITTEE ON ARMAMENT, ETC., BOARD OF VISITORS,
(Through headquarters United States Military Academy.)

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., June 6, 1895.

Respectfully transmitted to Honorable Sigourney Butler, secretary Board of Visitors.

O. H. ERNST,

Colonel of Engineers, Superintendent.

[Second indorsement.]

ROOMS OF THE BOARD OF VISITORS, *June 6, 1895.*

Respectfully referred to Capt. F. P. Blair, chairman of committee on armament and equipment.

SIGOURNEY BUTLER, *Secretary.*

BUILDINGS, GROUNDS, AND LIGHTS.

MESSRS. MILLIKEN, WASHINGTON, and JANEWAY.

Your committee on buildings, grounds, and lights has the honor to report as follows:

Your committee, in company with the Superintendent, made a thorough and detailed inspection of the buildings. We found the general condition satisfactory.

In compliance with request of the committee the Superintendent submitted the following statement of what was needed, to wit:

Appropriations recommended.

(1) Guardhouse and gate near south boundary	\$10,000
(2) Reconstruction of interior of library building and making fireproof (rough estimate)	50,000

NOTE.—An architect is at work preparing the plans and estimates for this alteration. The estimate may vary very materially from that here given, but will probably not exceed it.

(3) Commissary storehouse	15,000
(4) Three sets officers' quarters, at \$10,000 each	30,000
(5) Clock tower, new Academy building	35,000
(6) Porch for cavalry barrack	4,200
(7) Sidewalk and approaches for new Academy building	5,000
(8) Sidewalk from railway station	3,500
(9) Moving old quarters near hospital	3,000
(10) Filter house and keeper's dwelling near new reservoir. (Plans and estimates for these are being prepared, and will be ready for the next Congress.) A rough estimate is about	10,000

O. H. ERNST, *Colonel and Superintendent.*

All the improvements asked for in the communication of the Superintendent are essential and important and should be made at the earliest day possible, but in view of the large appropriation which would be required your committee deem it expedient to recommend the most important for immediate construction.

The filter house and keeper's dwelling should be appropriated for and constructed, so as to be ready for use on the completion of the new reservoir.

It is unnecessary to discuss the importance of pure water. A thorough investigation shows that the proposed filter is an absolute essential to pure water at the Academy.

The gate and guardhouse near the south boundary is located at the junction of the two roads leading through the grounds at their connection with the public road leading down to the river, and it is of great importance to properly protect and police the grounds of the Academy.

The library contains a large number of exceedingly valuable books, which are now stored on shelves and in cases in the old library building, where many are inaccessible, and all are exposed to loss by fire. With proper changes this building could be rendered fireproof, and would be excellently fitted for the purposes of a library, furnishing ample space for the increase in the library for many years to come. The porch for the cavalry barracks, while not a necessity, is a very desirable improvement, and would provide for the greater comfort of the enlisted men, especially during the hot weather. The sidewalk and approaches for the new Academy building are essential to properly finishing this magnificent structure, and to make it accessible during inclement weather.

We found the work on the new reservoir in a very satisfactory state of progress, and believe that when completed it will furnish an ample supply of excellent water.

There is no complaint of the gas fixtures, of the gaslights, or of the gas plant coming to the knowledge of the committee, and the gas furnished seems to be of good quality and sufficient in quantity.

SETH L. MILLIKEN,
JOSEPH E. WASHINGTON,
EDWARD G. JANEWAY.

SUPPLIES AND EXPENDITURES.

Messrs. PETER HAIRSTON, FRANK P. BLAIR, and J. M. WRIGHT.

The BOARD OF VISITORS OF THE UNITED STATES MILITARY ACADEMY:

This department embraces the laundry, the store, and mess, under the efficient management of Capt. W. F. Spurgin, Twenty-first Infantry.

Your committee first visited the laundry, which they found equipped with modern machinery for doing the work efficiently and economically, the average cost per garment being less than 2 cents.

Your committee next visited the store. Here all the supplies except food needed by the cadets are furnished them at wholesale prices. The accounts of the cadets, with all the other departments of the Academy, are audited and paid here, and the cadets can at any time see their standing with the treasurer.

Your committee next visited the mess. They found there the food of the best quality, in sufficient abundance, and served in the best manner. No complaints reached the committee from any source. They recommend that the cold-storage room be enlarged and furnished with better cooling facilities.

Your committee can not commend too highly the great improvement effected by Captain Spurgin in the management of the cadet mess. Not only has the food been vastly improved in quality and quantity, to the personal knowledge of every member of your committee, but a reduction in cost to the cadets of almost 50 per cent has been effected by him.

We have no suggestions or recommendations to offer, save as to cold storage above mentioned.

Very respectfully,

P. HAIRSTON,
FRANK P. BLAIR,
J. M. WRIGHT.

FISCAL AFFAIRS.

Messrs. VILAS, BUTLER and MILLIKEN.

SIR: The committee on fiscal affairs have given such attention to the subject committed to their inquiry as opportunity has afforded, by personal inspection of the methods of the financial business of the Academy and by examination into the accounts, appropriations, and expenditures.

The subject has two divisions: First, the charge upon the General Government for the maintenance of the Academy; second, the expenditures on behalf of the cadets for their maintenance, subsistence, clothing, and other requirements. They are independent, and to be separately considered.

MAINTENANCE OF ACADEMY.

The institution at West Point has been for many years what its name indicates—a military academy for the instruction of youth in the art of war. Growing, however, in part, out of the theory of its original establishment as a military post for a corps of engineers and artillery, with the accompaniment of instruction to cadets, as well as from the facts that the instructors must chiefly be officers of the Army and instruction must require the aid of military engines and enlisted men to serve them, a considerable share of the expenditures made for the support of the Academy is provided for by Congress in the general appropriation for the support of the Army, as originally were all its charges.

The act for the support of the Military Academy, which has for many years been one of the regular appropriations by the Congress, makes no provision for the pay of officers employed in the government of the Academy, instruction and discipline of cadets, and command of the Army detachments there, except for nine professors, and the additions granted certain officers because of the service required of them, nor for the pay of enlisted men, except the extra-duty pay and the pay of the band and field musicians employed at the post. That part of its appropriation which is for such extra pay of officers and enlisted men of the Army, together with that for the payment of professors and cadets, is disbursed by the Paymaster-General; while the moneys set apart by it for the more direct expenses of the Academy, and for the improvement of the public property at West Point, are disbursed by the quartermaster of the post.

It has seemed to your committee that it would be a service, as useful as any it could render upon this branch of the subject, to inquire into and exhibit the entire charge upon the Government for the maintenance of this institution by collating the various expenditures made in this way by different officers for its support, the aggregate of which is not readily patent amid the diverse appropriations and various accounts; and the result ascertained appears especially interesting in connection with the resolution of the Board in favor of extending the advantages of the Academy to a greater number of cadets, and strongly confirmatory of the wisdom of that recommendation.

With this view your committee addressed letters of inquiry to the different officers who have command of detachments of enlisted men at West Point paid by the Paymaster-General of the Army, and the replies of those officers, with their full accompanying statements, are herewith appended. This was supplemented by information furnished through the Secretary of War by the Paymaster-General, which also accompanies this report as an appendix.

The appropriation for the support of the Military Academy for the year ended with June, 1895, carried—

For the payment of the instructional force.....	\$53, 226. 70
For pay of cadets.....	167, 000. 00
For the band.....	9, 240. 00
For field musicians.....	3, 257. 08
Total.....	<u>232, 723. 78</u>

The appropriation for the Academy for the year 1895 also carried for current and ordinary expenses, regular repairs, and some improvements to grounds, the further sum of \$175,231.30; and disbursement of this belonged to the quartermaster of the post, Capt. J. B. Bellinger, whose account of the expenditure accompanies this report. The total direct appropriation for the Academy was, therefore, \$407,955.08.

Of this sum the Paymaster-General had disbursed, up to August 31, 1895.	\$225, 337. 51
Captain Bellinger had disbursed.....	161, 837. 03
Total.....	<u>387, 174. 54</u>
Besides which the Paymaster-General paid from the Army appropriation.....	198, 754. 91
Making in the aggregate.....	<u>585, 929. 45</u>

as the entire cost to the Government of the maintenance of the Academy, so far as expenditures have been already made of the appropriations for the year. Some additional payments will be made, as indicated in Captain Bellinger's account, but the amount will be comparatively small, and the expenditures reported show the ordinary outlay.

Analysis of these expenditures, so far as these data render it possible, discloses the following as the cost of the respective items stated below:

To officers engaged in instruction and discipline of cadets.....	\$151,034.94
Other officers and men	95,374.91
Expenses of instructional departments.....	13,752.63
Ordinary expenses and repairs.....	51,719.05
Miscellaneous and incidental expenses.....	25,897.86
Band and musicians.....	10,896.04
Public buildings and grounds.....	66,812.42
Pay of cadets.....	167,702.38
Board of Visitors	2,739.22
Total	585,929.45

The cost of the Academy and the post for the last fiscal year, in addition to the pay of the cadets, was, therefore, \$418,227.07, including the permanent improvements upon the buildings and grounds, about \$40,000. Disregarding that expenditure, the maintenance of the Academy required an outlay of over \$375,000. But there can be no cessation of expenditures for buildings and grounds. They must be continual, and it is not probable the annual appropriation for that purpose will fall below \$50,000 at any time in the future. For the current year, to end with June, 1896, the amount granted under that head is \$71,772.55. The account of instruction and discipline is not answerable for the whole outlay which the Government must annually undergo. As a military post West Point requires peculiar expenditures, not academical in any sense, by which the total is much swelled. But, with just allowance, it remains very clear to your committee that the instructional system, whether considered with reference to its power or its cost, ought to profit a greater number of pupils.

So far as their observation and inquiries extended your committee found all appropriations prudently expended, and their examination of the office and accounts of Captain Bellinger gave entire satisfaction.

THE CADETS' BUDGET.

Your committee bestowed particular attention on the methods and accounts of the expenditures made on behalf of cadets out of their funds. The system which has been wrought out after many years' experience, with improvement during the administration of the present excellent officer, who is treasurer of the Academy and quartermaster and commissary of cadets, Capt. William F. Spurgin, seems to leave nothing wanting to its perfection, and the fidelity of its execution by him and his assistants is admirable. Some account of this system will not be misplaced here.

All receipts of money come either directly from the cadets, through their pay or deposit of moneys, or from funds resulting from accumulated savings from moneys of cadets in the past. The expenditures

are all made by the treasurer. Cadets are not permitted to expend money themselves. Their subsistence, clothing, and all other necessities to their ordinary life at the Academy are provided by the treasurer out of their funds. If any cadet desires to make any special personal expenditure he must first obtain leave from the Superintendent, upon which he contracts the obligation, which the treasurer pays for him and charges to his account. With each cadet a separate account is kept in which he is credited every two months with his pay received from the Government, \$45 per month, and with whatever sums may be deposited by his parents or friends, under leave of the Superintendent, for his benefit. He is debited with all disbursements made for him, and upon the termination of his relations with the Academy, by graduation, resignation, or otherwise, his account is finally settled, and the balance remaining to his credit paid. His subsistence is received in the cadets' common mess, and his proportion goes to his account with each settlement, once in two months.

The charge upon cadets for subsistence has been materially reduced during some years past, while its sufficiency and character have been much improved—a good result allowed on all hands to the efficiency of Captain Spurgin. In like manner, both improvement and decrease of cost have been gained to the cadets in the matter of clothing. All the articles which enter into the clothing and equipment of the cadet are provided under the direction of this officer as quartermaster and commissary of cadets, and, so far as your committee could discern, with advantage in every way to the young men concerned. The clothing is manufactured under his direction, the material prudently purchased, and the labor economically applied. The real cost of each article is accurately ascertained, embracing a just apportionment to cover the services of the workmen and clerks which constitute an element of production.

So, also, the expense of maintaining the laundry is apportioned with close accuracy to each article laundered, the cost being thus a moderate one. The system of accounts is such as to return to the cadets faithfully every dollar of their money employed, with whatever gain or profit, if any should happen to result, although the accuracy of the accounts leaves this but a small sum.

Three funds are distinguished and a separate account carried with each. The cadets' subsistence fund is charged with the actual expenditures made for provisions, fuel, and labor; the cadet quartermaster's fund with expenditures for materials and labor going into articles provided on that account; and the cadets' laundry fund with the actual cost of maintaining and conducting the laundry. At each settlement, occurring once in two months, the net balance to the debit of the subsistence fund is apportioned among the several cadets enjoying the benefit, and the share of each charged up to his personal account. All the salvages of the kitchen, together with receipts for such provisions

as may be sold to officers for their mess, are carefully secured to the credit of this fund. The statement appended exhibits the particulars.

Another fund, called the cadets' equipment fund, is also maintained, with a view of securing to the cadet upon graduation the means of providing himself with his equipment as an officer. For this each cadet is charged with \$4 per month, and the amount is, on graduation, expended for the purpose named. Should his connection with the Academy be severed before graduation, the entire sum is returned to him.

The average balance of this fund, to the amount of \$20,000, is invested in the bonds of the United States (of which \$10,000 are in 4 percents and \$10,000 in 2 percents extended), in order to gain what may be by way of interest, and the \$600 resulting from this investment goes to the credit of the subsistence fund and reduces its cost to the cadets. In past years several of the funds of cadets were invested in some buildings, one of which was originally used as a sutler's store and others for employees. These buildings now yield a moderate rental—about \$22.50 per month—which is applied to the credit of the cadet quartermaster's fund.

Accompanying this report is Major Spurgin's statement of the receipts on these several accounts during the year ended with April, 1895.

It requires but short contemplation to recognize the excellence to cadets of such a system, wisely and faithfully conducted, nor to discern that, however excellent the system, the value of it will still be largely dependent on the constant attention to every detail by the officer in charge, with unflinching good sense as well as rigid fidelity. The cadets now seem to enjoy every circumstance of advantage which such a combination can give, excellence in what is provided for them, and at the least possible expense; a fact which it is as pleasing to report as it is creditable to the officer.

WM. F. VILAS.
SIGOURNEY BUTLER.
SETH L. MILLIKEN.

Hon. JOSEPH WHEELER,
Chairman Board of Visitors.

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
OFFICE TREASURER, QUARTERMASTER, AND COMMISSARY CADETS,
West Point, N. Y., June 11, 1895.

SIR: In compliance with your verbal request of this date I have the honor to transmit herewith the following, exhibiting the disbursements and accruments to the

following accounts kept in the office of the treasurer of the United States Military Academy, for the year ended April 30, 1895, viz:

No.		Disbursements.	Accruments.
1	Athletic association.....	\$628.02	\$761.75
2	Cadet hospital.....	2,721.43	2,721.43
3	Cadet laundry.....	9,820.05	9,993.34
4	Cadet quartermaster's department.....	75,310.76	74,148.64
5	Cadet subsistence department.....	57,380.41	56,975.73
6	Confectionery.....	133.50	133.50
7	Dancing (instruction).....	515.00	515.00
8	Equipment fund.....	13,350.00	13,968.00
9	Hops and Germans.....	1,589.40	1,650.98
10	Young Men's Christian Association.....	258.99	294.80

The difference between disbursements and receipts in Nos. 4 and 5 is accounted for by increase of "stock on hand" in those departments not yet consumed or sold. I have the honor to also transmit herewith a tabulated statement of accruments to the cadet subsistence department for the year ended April 30, 1895, from the sources indicated in the headings of the said statement.

Very respectfully, your obedient servant,

WM. F. SPURGIN,

Captain Twenty-first Infantry, Treasurer United States Military Academy.

Hon. WM. F. VILAS,

Chairman Committee of Fiscal Affairs, Board of Visitors U. S. M. A., 1895.

(Through headquarters United States Military Academy.)

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., June 12, 1895.

Respectfully transmitted to Hon. W. F. Vilas, chairman committee on fiscal affairs, Board of Visitors.

O. H. ERNST,

Colonel of Engineers, Superintendent.

Accruments from various sources to credit of cadet subsistence department, from May, 1894, to April, 1895, inclusive.

Months.	* Sales to officers.	Scrap fat.	Grease.	Bread and scraps.	Rent.	Barrels.	Calf skins.	Interest on bonds.	Total.
May and June, 1894....	\$431.24	\$62.02	\$30.43	\$12.31	\$65.00	.....	.....	\$50.00	\$651.00
July and August, 1894....	438.34	23.70	.....	14.27	65.00	.....	.....	100.00	641.31
September and October, 1894.....	676.59	13.20	34.53	20.95	45.00	\$36.96	.....	150.00	977.23
November and December, 1894.....	632.05	14.90	35.88	18.07	25.00	.....	.....	150.00	875.90
January and February, 1895.....	494.38	28.75	.....	22.66	25.00	.....	.....	100.00	670.79
March and April, 1895..	500.44	20.68	50.18	24.62	25.00	.....	\$8.72	50.00	679.64
Total.....	3,173.04	163.25	151.02	112.88	250.00	36.96	8.72	600.00	4,495.87

* Sales to officers of dried meats, bread, eggs, potatoes, and butter.

The above is a correct statement of the accruments from various sources to the credit of the cadet subsistence department for one year—May, 1894, to April, 1895, inclusive.

W. F. SPURGIN,

*Captain, Twenty-first Infantry, Treasurer Military Academy,
Quartermaster and Commissary of Cadets.*

WEST POINT, N. Y., June 11, 1895.

WAR DEPARTMENT,
Washington, D. C., September 18, 1895.

SIR: In compliance with the request contained in your letter of the 6th instant, I have the honor to transmit herewith a list of officers who served at the West Point Military Academy during the year 1895, a statement showing the number of enlisted men on duty there during that year, and the amount paid to such officers and men from the general appropriation, and the appropriations for the support of the Academy during the fiscal year.

Very respectfully,

JOHN TWEEDALE,
Chief Clerk.

(For the Secretary of War in his absence.)

Hon. WILLIAM F. VILAS,
United States Senate.

Pay of officers on duty at the United States Military Academy during the fiscal year ended June 30, 1895.

[Reply to query No. 1.]

No.	Name and rank.	Military Academy pay.	Army pay.	Total.
1	Col. O. H. Ernst, engineers.....	\$375.00	\$4,125.00	\$4,500.00
2	Lieut. Col. S. M. Mills, captain, Fifth Artillery.....	1,480.00	2,520.00	4,000.00
3	First Lieut. J. M. Carson, jr., Fifth Cavalry.....	240.00	1,920.00	2,160.00
4	Capt. W. H. Miller, A. Q. M.; retired Oct. 1, 1894*.....		700.00	700.00
5	Capt. W. F. Spurgin, Twenty-first Infantry.....	700.00	2,520.00	3,220.00
6	First Lieut. Wm. Weigel, Twenty-first Infantry.....		1,920.00	1,920.00
7	Maj. G. H. Torney, surgeon; joined July 17, 1894*.....		3,344.45	3,344.45
8	Capt. C. F. Mason, assistant surgeon; joined July 16, 1894*.....		2,103.33	2,103.33
9	First Lieut. F. P. Reynolds, assistant surgeon; retired May 2, 1895*.....		1,342.22	1,342.22
10	Prof. P. S. Michie.....	4,500.00		4,500.00
11	Prof. C. H. Larned.....	4,500.00		4,500.00
12	Prof. E. W. Bass.....	4,500.00		4,500.00
13	Prof. S. E. Tillman.....	4,500.00		4,500.00
14	Prof. W. M. Postlethwaite.....	4,200.00		4,200.00
15	Prof. James Mercur.....	4,376.39		4,376.39
16	Prof. E. E. Wood.....	4,000.00		4,000.00
17	Associate Prof. W. P. Edgerton.....	2,800.00		2,800.00
18	Maj. J. W. Clous, judge-advocate.....		4,000.00	4,000.00
19	Capt. J. L. Lusk, engineers.....	691.67	2,767.67	3,459.34
20	Capt. L. L. Bruff, Ordnance Department.....	700.00	2,800.00	3,500.00
21	Capt. L. A. Craig, Sixth Cavalry; retired Aug. 13, 1894.....		327.66	327.66
22	First Lieut. A. B. Dyer, Fourth Artillery.....	700.00	2,100.00	2,800.00
23	First Lieut. J. P. Wisser, First Artillery; retired Aug. 13, 1894.....	83.61	250.83	334.44
24	First Lieut. S. W. Dunning, Sixteenth Infantry.....	650.00	1,950.00	2,600.00
25	First Lieut. S. E. Allen, Fifth Artillery.....		1,950.00	1,950.00
26	First Lieut. H. C. Newcomer, engineers.....	440.00	1,920.00	2,360.00
27	First Lieut. M. M. Patrick, engineers.....		1,920.00	1,920.00
28	First Lieut. S. D. Freeman, Tenth Cavalry.....		2,080.00	2,080.00
29	First Lieut. E. D. Smith, Nineteenth Infantry.....	108.35	2,042.84	2,151.19
30	First Lieut. W. P. Richardson, Eighth Infantry.....	600.00	1,800.00	2,400.00
31	First Lieut. T. H. Rees, engineers.....		1,920.00	1,920.00
32	First Lieut. W. H. Allaire, Twenty-third Infantry.....	650.00	1,950.00	2,600.00
33	First Lieut. R. L. Hirst, Eleventh Infantry.....		1,800.00	1,800.00
34	First Lieut. G. H. Cameron, Fourth Cavalry.....	520.00	2,080.00	2,600.00
35	First Lieut. W. A. Holbrook, Seventh Cavalry.....	480.00	1,920.00	2,400.00
36	First Lieut. H. Thayer, Third Cavalry.....		1,920.00	1,920.00
37	First Lieut. L. G. Berry, Fourth Artillery.....		1,800.00	1,800.00
38	First Lieut. T. B. Mott, First Artillery; retired Aug. 31, 1894.....	100.00	300.00	400.00
39	First Lieut. R. P. Davis, Second Artillery.....	530.00	1,800.00	2,330.00
40	First Lieut. E. Russell, Fifth Artillery.....		1,800.00	1,800.00
41	First Lieut. B. K. West, Sixth Cavalry.....	437.66	2,150.00	2,617.66
42	First Lieut. D. H. Boughton, Third Cavalry; retired Aug. 28, 1894.....	83.78	335.11	418.89
43	First Lieut. F. S. Harlow, First Artillery; retired Aug. 13, 1894.....	77.64	232.91	310.55
44	First Lieut. J. E. Kuhn, Engineers; retired Aug. 1, 1894.....	40.00	160.00	200.00
45	First Lieut. G. F. Barney, Second Artillery.....	379.17	1,950.00	2,329.17
46	First Lieut. E. B. Babbitt, Ordnance Department.....		1,920.00	1,920.00
47	First Lieut. J. C. W. Brooks, Fourth Artillery; retired Aug. 28, 1894.....		290.00	290.00

Pay of officers on duty at the United States Military Academy during the fiscal year ended June 30, 1895—Continued.

No.	Name and rank.	Military Academy pay.	Army pay.	Total.
48	First Lieut. J. A. Cole, Sixth Cavalry	\$200.00	\$1,920.00	\$2,120.00
49	First Lieut. C. DeW. Willcox, Second Artillery	600.00	1,800.00	2,400.00
50	First Lieut. A. F. Curtis, Second Artillery	600.00	1,800.00	2,400.00
51	First Lieut. A. H. Brown, Fourth Infantry	1,800.00	1,800.00	1,800.00
52	First Lieut. W. S. Biddle, Fourteenth Infantry	1,800.00	1,800.00	1,800.00
53	First Lieut. D. B. Devore, Twenty-third Infantry	1,800.00	1,800.00	1,800.00
54	First Lieut. J. D. Barrette, Third Artillery	1,800.00	1,800.00	1,800.00
55	First Lieut. F. McIntyre, Nineteenth Infantry; retired Aug. 13, 1894		215.00	215.00
56	First Lieut. H. Freeland, Third Infantry; retired Aug. 13, 1894		215.00	215.00
57	First Lieut. C. Stewart, Fourth Cavalry; retired Sept. 1, 1894		320.00	320.00
58	First Lieut. B. A. Poore, Sixth Infantry		1,800.00	1,800.00
59	First Lieut. P. E. Traub, First Cavalry		1,920.00	1,920.00
60	Second Lieut. M. D. Cronin, Twentieth Infantry		1,795.33	1,795.33
61	Second Lieut. C. D. Palmer, Fourth Artillery		1,777.00	1,777.00
62	Second Lieut. J. S. Winn, Second Cavalry		1,805.33	1,805.33
63	Second Lieut. M. C. Butler, jr., Fifth Cavalry	231.67	1,800.00	2,031.67
64	Second Lieut. C. D. Bromwell, Engineers		1,650.00	1,650.00
65	Maj. P. F. Harvey, surgeon; retired July 17, 1894		456.94	456.94
66	H. J. Koehler, master of sword	1,500.00		1,500.00
67	H. H. Clappi, teacher of music	1,080.00		1,080.00
68	Capt. James Parker, Fourth Cavalry; joined Aug. 13, 1894		2,473.33	2,473.33
69	Capt. W. B. Gordon, Ordnance Department; joined Aug. 20, 1894		2,411.11	2,411.11
70	Capt. George Montgomery, Ordnance Department; joined Aug. 20, 1894		1,515.59	1,515.59
71	Second Lieut. C. A. F. Flagler, Engineers; joined Aug. 20, 1894		1,514.57	1,514.57
72	Second Lieut. C. B. Hagadorn, Twenty-third Infantry; joined Aug. 20, 1894		1,326.12	1,326.12
73	Second Lieut. W. A. Bethel, Fourth Artillery; joined Aug. 20, 1894		1,332.73	1,332.73
74	Second Lieut. W. O. Johnson, Nineteenth Infantry; joined Aug. 20, 1894		1,326.08	1,326.08
75	Second Lieut. H. D. Todd, jr., Third Artillery; joined Aug. 20, 1894		1,326.08	1,326.08
76	Capt. J. B. Bellinger, A. Q. M.; joined Sept. 17, 1894 *		1,893.33	1,893.33
77	Asst. Surg. Charles Willcox; joined May 2, 1895 *		361.55	361.55
78	Capt. W. E. Wilder, Fifth Cavalry; joined May 15, 1895		407.77	407.77
	Total	47,654.94	113,124.88	160,779.82

* It is understood that all of the above-named officers are engaged in instruction or government of cadets, with the exception of those marked with a star.

T. H. STANTON,
Paymaster-General, U. S. A.

SEPTEMBER 13, 1895.

Amount paid to enlisted men on duty at United States Military Academy for fiscal year ended June 30, 1895, including amounts paid to discharged men for pay, travel pay, retained pay, and clothing; also estimated amount to pay rolls for June, 1895, Army appropriation for 1895.

[Reply to query No. 2.]

	Military Academy pay.	Pay of Army.	Total.
Military Academy band	\$8,147.92		\$8,147.92
Musicians and field music	1,832.27		1,832.27
Company E, Engineers Battalion		\$25,319.35	25,319.35
Ordnance detachment		3,686.40	3,686.40
Cavalry detachment		13,876.43	13,876.43
Army service men, Quartermaster's Department		26,860.60	26,860.60
Hospital corps		7,419.30	7,419.30
Noncommissioned staff		1,906.73	1,906.73
Total	9,980.19	79,068.81	89,049.00

[Reply to query No. 3.]

Amount paid to general service clerks and messengers: Pay for July and six days in August, 1894.....	\$589.22
Amount paid to civilian clerks and messengers for balance of year: (paid from Army appropriation).....	5,972.00
	6,561.22

[Reply to query No. 4.]

Amount disbursed to August 31, 1895, by the Pay Department out of the appropriation for the support of the Military Academy for the year ended June 30, 1895.....	\$225,337.51
---	--------------

T. H. STANTON,
Paymaster-General, U. S. A.

SEPTEMBER 13, 1895.

UNITED STATES MILITARY ACADEMY,
QUARTERMASTER'S OFFICE,
West Point, N. Y., August 7, 1895.

SIR: Agreeably to the request of Senator William F. Vilas, chairman committee on fiscal affairs, Board of Visitors, 1895, I respectfully submit herewith, for the information of that committee, statement of expenditures from appropriations for the support of the United States Military Academy for the fiscal year 1895, and a statement of the number of men in the detachment of army service men, showing their respective ranks, rates of pay, and allowances.

Very respectfully,

J. B. BELLINGER,

Captain and Assistant Quartermaster, United States Army.

The ADJUTANT, UNITED STATES MILITARY ACADEMY,
West Point N. Y.

[Indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
West Point, N. Y., August 9, 1895.

Respectfully forwarded to Hon. William F. Vilas, chairman committee on fiscal affairs, Board of Visitors, 1895.

O. H. ERNST,

Colonel of Engineers, Superintendent.

Statement of expenditures from appropriations for the support of the United States Military Academy, by Capt. J. B. Bellinger, assistant quartermaster, United States Army, for the fiscal year ended June 30, 1895.

Purpose.	Appropriation.	Expended.
<i>Current and ordinary expenses.</i>		
Repairs and improvements.....	\$16,000.00	\$15,996.48
Fuel and apparatus.....	20,000.00	19,989.91
Gas pipes, fixtures, lamp-posts, etc.....	1,500.00	1,498.23
Fuel for cadets' mess hall, shops, etc.....	3,000.00	3,000.00
Postage and telegrams.....	250.00	190.96
Stationery.....	800.00	797.90
Transportation of materials, etc.....	1,750.00	1,103.04
Printing.....	1,000.00	994.92
Clerk to the disbursing officer and quartermaster.....	1,350.00	1,350.00
Clerk to adjutant in charge of cadet records.....	1,500.00	1,500.00
Clerk to adjutant.....	1,000.00	1,000.00
Clerk to treasurer.....	1,500.00	1,500.00
Clerk to quartermaster.....	1,600.00	1,090.00

Statement of expenditures from appropriations for the support of the United States Military Academy, etc.—Continued.

Purpose.	Appropriation.	Expended.
Department of tactics:		
Tan bark or other proper cover for riding hall.....	\$600.00	\$600.00
Repairing camp stools and camp furniture.....	100.00	99.85
Repairs and improvements of dressing rooms.....	220.00	219.82
Furniture for offices, etc.....	100.00	99.15
Stationery for use of instructor, etc.....	150.00	111.81
Books and maps, etc.....	75.00	31.24
Plumes for cadet officers, etc.....	75.00	72.25
Silk and worsted sashes, etc.....	220.00	207.00
Foils, masks, belts, etc.....	250.00	249.34
Soap used in scrubbing cadet barracks.....	50.00	49.97
Extra pay of 23 enlisted men of the cavalry detachment employed on additional duty with the instruction battery of field artillery, etc.....	560.00	560.00
	2,400.00	2,300.43
Department of civil and military engineering:		
Models, maps, etc.....	1,000.00	989.19
Extra pay of enlisted man employed as draftsman.....	256.00	256.00
	1,256.00	1,245.19
Department of natural and experimental philosophy:		
Additions to apparatus to illustrate the principles of mechanics, acoustics, optics, and astronomy.....	800.00	800.00
Books of reference, scientific periodicals, etc.....	400.00	324.91
Repairs to observatory building and clocks.....	300.00	290.27
Pay of mechanic assistant.....	1,000.00	1,000.00
	2,500.00	2,415.18
Department of mathematics:		
Repairs and materials for preservation of models and instruments.....	25.00	
Text-books, books of reference, etc.....	125.00	120.71
One office desk and chair.....	75.00	63.50
Bookcases.....	75.00	75.00
Table of logarithms.....	25.00	25.00
Contingencies.....	25.00	25.00
	350.00	309.21
Department of history, etc.:		
Text-books, books of reference, etc.....	150.00	149.38
Department of chemistry, etc.:		
Chemicals, chemical apparatus, etc.....	500.00	500.00
Rough specimens, fossils, etc.....	500.00	500.00
Repairs and additions to electric, magnetic, pneumatic, thermic, and optical apparatus.....	500.00	500.00
Pay of mechanic employed in chemical and geological section rooms, etc.....	1,000.00	1,000.00
Models, maps, and diagrams, etc.....	180.00	134.97
Contingencies.....	100.00	100.00
	2,780.00	2,734.97
Department of drawing:		
Drawing material for the use of instructors, etc.....	250.00	247.93
Repairs to models, desks, etc.....	75.00	74.39
Cleaning and renewal of plaster models, etc.....	50.00	50.00
Models in flat and relief for second and third classes.....	100.00	100.00
Books and periodicals.....	100.00	94.24
Binding periodicals, etc.....	30.00	28.80
Photographic material and apparatus.....	150.00	149.77
Ten prismatic compasses for reconnaissance work.....	150.00	150.00
Eighty reconnaissance boards.....	280.00	280.00
One case of drawing instruments.....	75.00	75.00
Twenty new drawing boards.....	50.00	50.00
Thirty new steel rulers.....	90.00	90.00
Twenty new steel triangles.....	50.00	50.00
	1,450.00	1,440.23
Department of modern languages:		
Stationery, text-books, and books of reference for the use of instructors, etc.....	445.50	436.06
Department of law:		
Stationery, text-books, books of reference, and books for use of instructors, etc.....	250.00	239.87
One typewriter and typewriting supplies.....	100.00	100.00
	350.00	339.87

Statement of expenditures from appropriations for the support of the United States Military Academy, etc.—Continued.

Purpose.	Appropriation.	Expended.
Department of practical military engineering:		
Purchase and repair of instruments, transportation, purchase of tools, implements, and materials, and for extra-duty pay of engineer, soldiers, etc	\$1,200.00	\$1,199.86
Department of ordnance and gunnery:		
Purchase and repair of instruments, models, and apparatus, and purchase of necessary materials, etc	450.00	450.00
Extra pay of 1 ordnance soldier as draftsman and lithographic printer	143.50	141.25
Extra pay of 1 ordnance soldier as machinist	143.50	141.25
Extra pay of 1 ordnance soldier as clerk	143.50	137.25
Manufacture or purchase of models of the new steel guns for field, siege, and seacoast services for cadet instruction	* 1,500.00	.....
Manufacture or purchase of models of the new steel carriages for field, siege, and seacoast services for cadet instruction	* 2,000.00	.....
Stationary for office of the treasurer, United States Military Academy	4,380.50	869.75
Extra pay of 2 enlisted men employed as clerks in the offices of the adjutant and commandant of cadets, respectively	50.00	49.67
Extra pay of 4 enlisted men as printers	284.25	279.75
Extra pay of 1 enlisted man as watchman	626.00	596.00
Extra pay of 1 enlisted man as trumpeter	159.60	159.59
Extra pay of 1 enlisted man employed in the philosophical department	127.75	124.60
Extra pay of 1 enlisted man employed in the chemical department	156.50	156.00
Extra pay of 2 enlisted men (cavalrymen) when performing special skilled mechanical labor	156.50	140.50
Extra pay of 1 enlisted man employed as saddler	313.00	294.50
Extra pay of 1 enlisted man employed in the department of drawing	156.50	153.00
Expenses of the Board of Visitors, including mileage	156.50	156.50
	3,000.00	2,739.22
Total current and ordinary expenses	73,098.60	68,210.90
<i>Miscellaneous items and incidental expenses.</i>		
Gas coal, oil, candles, etc	5,000.00	5,000.00
Water pipe, plumbing, and repairs	1,500.00	1,499.73
Cleaning public buildings	1,000.00	999.13
Brooms, brushes, pails, tubs, soap, and cloths	200.00	200.00
Chalk, crayons, sponges, slate, rubbers, etc	300.00	299.48
Compensation of chapel organist	200.00	198.67
Compensation of librarian	120.00	120.00
Pay of engineer of heating and ventilating apparatus for the academic building, etc	1,500.00	1,500.00
Pay of assistant engineer of same	1,000.00	1,000.00
Pay of 3 firemen	4,800.00	4,799.79
Pay of librarian's assistant	1,000.00	1,000.00
Pay of landscape gardener	500.00	336.00
Pay of superintendent of gas works	1,500.00	1,500.00
Pay of 1 civilian plumber	900.00	900.00
Pay of 1 scavenger	720.00	720.00
Increase and expense of library	2,000.00	2,000.00
Repairing books and for furniture	200.00	200.00
Furniture for cadet hospital	100.00	100.00
Contingencies for Superintendent of the Academy	1,000.00	1,000.00
Renewing furniture in section rooms, etc	500.00	500.00
Repairs, upholstering, and carpeting the Academy chapel	1,500.00	1,500.00
Contingent funds to be expended under the direction of the academic board, etc	1,000.00	527.01
Purchase of instruments for band	600.00	596.63
Purchase of music for band	250.00	180.89
Purchase of springs, pads, strings, and other articles for band instruments	150.00	138.33
Total miscellaneous items and incidental expenses	27,540.00	26,813.71
<i>Buildings and grounds.</i>		
Repairing roads and paths, etc	500.00	497.21
Continuing construction of breast-high wall in dangerous places	500.00	499.65
Waterworks, etc	500.00	499.87
Continuing construction of one new reservoir	25,000.00	24,146.61
Heating and supplying river water for swimming tank in new gymnasium	6,000.00	1,301.04
Broken stone and gravel for roads	1,500.00	1,499.12
Maintaining and improving the grounds of the post cemetery	1,000.00	999.97
Repairing cooking utensils, etc., in the cadet subsistence department	326.00	326.00
Repairs of chairs, tables, etc., in cadet subsistence department	50.00	50.00

* Guns and carriages manufactured by Ordnance Department United States Army. Money to be transferred to that department in payment therefor.

Statement of expenditures from appropriations for the support of the United States Military Academy, etc.—Continued.

Purpose.	Appropriations.	Expended.
Painting, kalsomining, whitewashing, etc., in cadet mess building.....	150.00	149.98
Reflooring cadet mess hall.....	4,000.00	3,873.00
General repairs to cadet laundry, etc.....	300.00	300.00
Painting, and for general incidental repairs and improvements to cadet quartermaster's department building, etc.....	300.00	298.16
Completing the modernization and improvement of the plumbing and sewerage of the post.....	5,000.00	4,472.35
Furnishing and erecting in the natatorium of the gymnasium, in complete working order, 6 slate-lined compartments with 6 combination shower, spray, and needle baths, etc.....	850.00	734.26
Asphalt road and walk in front of and around the new gymnasium.....	2,000.00	1,998.50
Repairs, new machines, and fixtures for gymnasium.....	300.00	.14
New balls and pins, repairs to bowling alley.....	150.00	3.07
Completing the plumbing in the new sinks and bathrooms for cadets, etc.....	1,200.00	1,092.78
General repairs to cadet barracks, etc.....	2,840.00	2,838.22
Repairs and improvements, etc., needed at the cadet hospital.....	2,788.70	2,785.34
Improvements, additions, and repairs required at the soldiers' hospital, etc.	1,262.00	1,090.93
Outbuildings at the soldiers' hospital, with stalls for 4 cows.....	200.00	200.00
Repairs and improvements to barracks of the detachment of army-service men, Quartermaster's Department, etc.....	4,000.00	73.75
Improving the surface drainage of married enlisted men's quarters in Logtown.....	500.00	.....
Painting the exterior of five double-frame houses in Rugertown.....	1,000.00	999.83
Repairs to ordnance laboratory, etc.:		
New spouting on all buildings.....	300.00	299.47
Water-closet in laboratory yard.....	175.00	175.00
Covered way from cavalry stable to riding hall.....	400.00	399.38
Necessary paint, including cost of labor, for exterior of cavalry stable.....	480.00	422.40
New mangers and general repairs to interior of cavalry stable.....	1,460.00	1,459.89
Building a breast-high masonry wall on east side of road from north gate to entrance of post cemetery.....	1,000.00	.....
New sewer from Rugertown to connect with new sewer from new soldiers' hospital to river.....	2,800.00	2,466.31
Removing piling of the old south wharf.....	500.00	269.00
Continuing repairs to road from south gate to the southern boundary line of reservation, etc.....	3,000.00	2,995.72
Improving and extending the present electric fire-alarm system of the post.....	700.00	684.35
Repairing fuel house belonging to the barracks of Company E, Battalion of Engineers.....	75.00	73.90
Reflooring and interior painting of barracks of Company E, Battalion of Engineers.....	1,000.00	999.78
Necessary repairs to engineer boathouses.....	100.00	99.57
Necessary repairs to engineer equipment shed.....	200.00	199.02
Placing gas pipes and gas fixtures throughout the barracks of Company E, Battalion of Engineers.....	300.00	299.80
One steam road roller.....	4,000.00	3,275.00
Completing one platform for new 8-inch rifle, one platform for new 12-inch breech-loading mortar, and three front-pintle platforms in the seacoast battery.....	1,966.00	1,964.05
Total buildings and grounds.....	80,672.70	66,812.42

EXPLANATORY NOTE.—The column "Expended" shows the amount of orders given for supplies or services which have been charged against the several appropriations, rather than the actual amount disbursed, up to June 30, there being a large number of bills outstanding and unpaid on that date which should be included to properly show the expense for the year.

The balances pertaining to the several appropriations under the heading "Buildings and grounds" and to the appropriation "For expenses of the Board of Visitors," etc., under the heading "Miscellaneous items and incidental expenses," do not lapse upon the close of the fiscal year—June 30. They will be expended in payment of accounts properly chargeable to each. All other balances will be covered into the Treasury after outstanding accounts against them are paid.

J. B. BELLINGER,

Captain and Assistant Quartermaster, United States Army.

WEST POINT, N. Y., August 1, 1895.

[Then follow the muster and pay roll of the United States Military Academy detachment of army service men of the Quartermaster's Department, commanded by Capt. J. B. Bellinger, assistant quartermaster, United States Army. This muster and pay roll is in detail, and shows the annual expenditure for the detachment, which consists of 1 first sergeant, 6 sergeants, 8 corporals, and 99 privates, with 1 sergeant and 1 private additional retired. For this detachment the average yearly allowance was \$3,455.49; subsistence, \$4,552.73; fuel, \$575.69; extra-duty pay, \$11,826.15; pay, \$21,547.23; the total muster and pay roll footing up \$41,957.29.—S. B.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., July 26, 1895.

SIR: I have the honor to acknowledge the receipt of your letter of the 22d inst., addressed to Lieutenant Carson, adjutant Military Academy, who is absent on leave, asking for the number, rank, and rates of pay of the enlisted men of the United States Army, in the service during the fiscal year ended June 30, 1895, and under his command, and also if there are any other enlisted men of the Army or employees at the Military Academy who are not paid out of the regular annual appropriation for the support of the Academy. In reply I have the honor to say that the United States Military Academy band, consisting of 1 teacher of music, who is a civilian, and 24 musicians who are enlisted, and the United States Military Academy detachment of field musicians consisting of 1 sergeant and 14 field musicians, all enlisted, are under the command of the adjutant of the Academy and are provided for in the United States Military Academy appropriation bill, their pay being as follows: 1 teacher of music, \$1,080 per annum; 6 musicians, first class, \$34 per month each; 6 musicians, second class, \$20 per month each; and 12 musicians, third class, \$17 per month each; 1 sergeant, detachment of field musicians, \$18 per month, and 14 field musicians, \$13 per month each.

In the case of enlisted men they receive increase of pay for continuous service provided for by law.

Besides the band and detachment of field musicians and the civilians provided for in the United States Military Academy appropriation bill, there are at these headquarters 5 civilian clerks and 1 messenger (formerly known as general-service clerks and messengers when they were enlisted), who are provided for in the army appropriation bill. Of these, 2 clerks receive \$1,100 per annum each, 3 clerks receive \$1,000 per annum each, and the messenger receives \$720 per annum.

There are three members of the post noncommissioned staff, United States Army, commanded by the adjutant Military Academy, on duty at the United States Military Academy, viz, 1 post quartermaster-sergeant, under the orders of the post quartermaster and quartermaster, Military Academy; 1 commissary sergeant under the orders of the post commissary of subsistence, and 1 commissary sergeant under the orders of the quartermaster and commissary of cadets. They are enlisted men, and each receives \$34 per month, with increase of pay for length of service.

Those enumerated above with the detachment of Hospital Corps (commanded by Major Torney); Company E, battalion of Engineers (commanded by Captain Lusk); detachment of cavalry (commanded by Captain Parker); detachment of ordnance (commanded by Captain Bruff); detachment of army-service men (commanded by Captain Bellinger), and civilian employees in the various departments of the Academy are provided for either in the Army bill or in the Military Academy bill.

There are a number of civilians employed in policing and cleaning cadet barracks, sinks, baths, etc., who are paid by assessments upon cadets; and clerks, tailor cutter, tailors, shoemakers, laundrymen, laundresses, and laborers employed in the cadet quartermaster's department who are paid either from the advance upon the cost on the articles sold in that department to cadets or from fixed charges for tailor, shoemaker, and laundry work for cadets.

The charge to cadets for subsistence includes the expense of hire of cooks, waiters, laborers, etc.

Every year during encampment cadets receive instruction in dancing, for which purpose an instructor is appointed and also necessary music furnished. This expense is paid by assessment upon the cadets receiving instruction.

The dentist for cadets is paid by individual cadets for work actually performed according to established schedule.

Very respectfully, your obedient servant, W. E. WILDER,
Captain, Fourth Cavalry, Acting Adjutant.

Hon. WM. F. VILAS,
*Chairman Committee on Fiscal Affairs,
Board of Visitors, 1895, Madison, Wis.*

(Through the Superintendent United States Military Academy.)

P. S.—I inclose letter from the acting treasurer Military Academy containing tabulated statement of the civilian employees paid by cadets.

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
West Point, N. Y., July 31, 1895.

Respectfully forwarded to Hon. Wm. F. Vilas, Madison, Wis.

O. H. ERNST,
Colonel of Engineers, Superintendent.

WEST POINT, N. Y., *August 6, 1895.*

Hon. WILLIAM F. VILAS,
Chairman Committee on Fiscal Affairs, Board of Visitors, Madison, Wis.
(Through headquarters United States Military Academy.)

SIR: I have the honor to inclose herewith a statement showing information called for in your letter of July 22, 1895.

Very respectfully,

JAS. L. LUSK,
*Captain, Corps of Engineers,
Commanding Company E, Battalion of Engineers.*

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
WEST POINT, N. Y., August 7, 1895.

Respectfully forwarded to Hon. Wm. F. Vilas, chairman Committee on Fiscal Affairs, Board of Visitors.

O. H. ERNST,
Colonel of Engineers, Superintendent.

[Then follows a statement of the enlisted strength of Company E, Battalion of Engineers during the fiscal year of 1895, with rank, rates of pay, and allowances. This statement shows 10 sergeants, with pay ranging from \$39 to \$43 per month; 12 corporals, with pay ranging from \$22 to \$27 per month; 2 lance corporals, with pay \$18 and \$19, respectively, per month; 2 musicians with pay, \$13 per month; 39 first-class privates, at pay ranging from \$13 to \$26 per month; 33 second-class privates, at pay ranging from \$13 to \$18 per month.

Captain Lusk also appends the ration allowance and the money allowance for clothing.

The total amount of all pay and allowances for the year to the company is not stated.—S. B.]

Average number of men detailed for duty with the United States Military Academy detachment of cavalry during the fiscal year ended June 30, 1895, rank, rate of pay, and allowances :

Rank.	No. of men.	Cost of rations.	Cost of pay.	Cost of Clothing.
First sergeant	1	\$91.25	\$372.00	\$35.18
Sergeants	5	456.25	1,346.14	208.92
Corporals	4	365.00	886.43	222.12
Trumpeter	1	91.25	156.00	28.73
Farrier	1	91.25	252.00	35.62
Saddler	1	91.25	252.00	39.12
Blacksmith	1	91.25	180.00	20.90
Wagoner	1	91.25	200.30	25.79
Privates	49	4,432.23	8,568.34	1,829.42
Total	64	5,800.98	12,213.21	2,445.80

M. C. BUTLER,
*Second Lieutenant, Fifth Cavalry,
 Commanding Detachment of Cavalry.*

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
West Point, N. Y., August 2, 1895.

Respectfully forwarded to Hon. Wm. F. Vilas, Madison, Wis.

O. H. ERNST,
Colonel of Engineers, Superintendent.

UNITED STATES MILITARY ACADEMY,
 OFFICE OF INSTRUCTOR OF ORDNANCE AND GUNNERY,
West Point, N. Y., July 25, 1895.

SIR: In compliance with your letter of 22d instant, I have the honor to inclose herewith number, names, rank, pay, and allowance of clothing for one year to the members of the ordnance detachment under my command during the fiscal year ended June 30, 1895.

Very respectfully, your obedient servant,

LAWRENCE L. BRUFF,
*Captain, Ordnance Department, U. S. A.,
 Instructor Ordnance and Gunnery, Commanding Detachment.*

Hon. WM. F. VILAS,
Chairman Committee on Fiscal Affairs Board of Visitors, 1895.

Number, names, etc., of detachment of ordnance during fiscal year ended June 30, 1895.

No.	Name.	Rank.	Pay per month.	Allowance for clothing per year.	Extra-duty pay.
1	John Mahedy	Sergeant	\$40.00	\$29.93	.....
2	James E. Hickey	Corporal	26.00	29.93	.....
3	Andrew Shelton	do	28.00	24.45	\$81.25
4	James F. Berrill	First-class private.	19.00	27.37	2137.25
5	James Gruver	do	23.00	27.37	.....
6	Michael Hine	do	17.00	39.05	.....
7	James Lane	do	24.00	27.37	.....
8	James Pollard	do	22.00	39.05	.....
9	Robert Power	do	22.00	27.37	.....
10	Eliy Rekes	do	17.00	27.37	.....
11	C. A. Schopper	do	21.00	27.37	\$141.25
12	James Stautier	do	17.00	27.37	60.00
13	Theobald Wagner	do	24.00	27.37	.....

¹ Machinist, extra pay at 50 cents per day.
² Clerk, extra pay at 50 cents per day.

³ Draftsman, extra pay at 50 cents per day.

UNITED STATES MILITARY ACADEMY.

OFFICE OF THE POST SURGEON, CADET HOSPITAL,
West Point, N. Y., July 26, 1895.

SIR: In compliance with the request contained in your letter of the 22d instant, I have respectfully to inclose herewith a tabulated statement of the number, etc., of enlisted men of the hospital corps, United States Army, on duty at West Point, N. Y., giving rank, pay, and allowances.

Very respectfully, your obedient servant,

GEO. H. TORNEY,

Major and Surgeon, United States Army, Post Surgeon.

Senator WM. F. VILAS,

Chairman Committee on Fiscal Affairs,

Board of Visitors, Military Academy, Madison, Wis.

(Through adjutant, United States Military Academy.)

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., July 31, 1895.

Respectfully forwarded to Hon. William F. Vilas, Madison, Wis.

O. H. ERNST,

Colonel of Engineers, Superintendent.

Number, etc., of enlisted men of the Hospital Corps, United States Army, West Point, N. Y., during the fiscal year ended June 30, 1895.

Rank.	No.	Pay per annum.	Clothing allowance per annum.	Money value of ration per annum.	Grand total.
Hospital stewards	2	\$1,236.00	\$81.00	} \$890.00	.....
Acting hospital stewards.....	4	1,344.00	} 715.00		.....
Privates.....	13	3,108.00			.....
Total.....	19	5,688.00	796.00	890.00	\$7,374.00
On duty at cadet hospital.....					11
On duty at soldiers's hospital.....					8

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., July 30, 1895.

SIR: In reply to your communication of yesterday, I have the honor to submit the following:

There are employed at the cadet laundry:

1 superintendent and engineer.....	per month..	\$90.00
1 assistant engineer.....	do.....	40.00
1 clerk.....	do.....	50.00
1 matron.....	per hour..	.12½
1 chief mangler.....	do.....	.12½
2 assistant manglers.....	do.....	.11½
1 collar and cuff ironer.....	do.....	.11½
1 wringer.....	do.....	.11½
36 laundresses.....	do.....	.11½

At the cadet quartermaster's department:

1 superintendent	per month..	\$110.00
1 clerk	do.....	60.00
1 cutter	do.....	80.00
1 janitor	do.....	25.00
1 teamster	do.....	20.00
1 bushelman	per hour..	.25
8 tailors (for new work by the piece, for busheling)	do.....	.25
6 tailoresses (for new work by the piece, for busheling)	do.....	.20
2 cobblers (paid by the job).		

At the cadet subsistence department:

1 chief cook	per month..	60.00
1 assistant cook	do.....	35.00
1 baker	do.....	50.00
1 assistant baker	do.....	22.00
1 fireman	do.....	18.00
1 scullion	do.....	15.00
1 potato peeler	do.....	15.00
1 yard man	do.....	15.00
1 gardener	do.....	20.00
2 assistant gardeners	do.....	15.00
1 head waiter	do.....	28.00
14 waiters	do.....	17.00
4 pantry girls	do.....	13.00

In policing barracks, etc.:

1 head policeman	do.....	50.00
9 policemen	do.....	40.00

The instructor in dancing receives \$400 for the season, and the two musicians \$50 each; hire of piano, \$15.

The dentist was paid during the last fiscal year \$1,153.

The number of laundresses and waiters varies from time to time according to the amount of work necessary to be done and the number of cadets present; the numbers above stated were of those employed in June, 1895.

Very respectfully,

A. B. DYER,
First Lieutenant, Fourth Artillery,
Acting Treasurer United States Military Academy.

THE ADJUTANT UNITED STATES MILITARY ACADEMY,
West Point, N. Y.

HYGIENE AND ATHLETICS.

DR. E. G. JANEWAY, COL. PETER HAIRSTON, and Maj. J. M. WRIGHT.

The committee on hygiene and athletics visited the cadet hospital and the hospital for enlisted men with Surgeons Torney and Mason. As a result of these inspections the committee would recommend that an operating room be provided, arranged according to the requirements of the day, for the cadet hospital, having floors, walls, and fittings properly arranged for disinfection, and of such nature as shall be as impermeable as possible and the most readily cleansed.

No hospital at this time is considered perfect unless provided with a suitable operating room. It is no excuse to say that few operations occur, as at any time a number may become necessary in a short period. Moreover, the cadets should have an object lesson in the case of the Government to see that everything is done in the best possible manner, especially where life is at stake.

In the enlisted men's hospital a new floor will make the room satisfactory at present, though not thoroughly complete. (See Dr. Mason's communication.)

The committee would, moreover, recommend that as soon as practicable new floors be laid in the wards, and eventually throughout the hospital. Large cracks exist between the different boards forming the floor, in which, without the greatest care, dust, containing infecting organisms, can accumulate. Hard wood, thoroughly seasoned, should be used for this purpose. The committee are glad to report that the surgeon in charge has already one room refloored in this manner.

The committee would also suggest that in each hospital the present water-closets be replaced by the best siphon closets to be obtained. Moreover, they would recommend that the urinals in the closets for enlisted men be rearranged so that there shall be drainage from the floor, with means for appropriate flushing. The floor should be of light color, in order that soiling may be easily noticed.

The committee commend the condition of the hospitals in other respects, and the method adopted by Surgeon Torney in keeping a medical history of each cadet. The needs above alluded to are wants appreciated by the surgeons in charge, but for which they are obliged to wait pending a proper appropriation.

The question of a hospital for infectious diseases has been discussed with the surgeon in charge of the post, and it is his belief that isolation can be more effectually secured by erecting a tent or tents in a suitable place than by having a permanent building provided for this purpose. As for disinfection, a tent isolation hospital can be destroyed by fire if necessary. In view of these facts the committee is willing to leave the provisions for dealing with contagious diseases as at present, more especially as no demonstrated need for such permanent structure has been brought to its attention. Moreover, the committee commend the whole medical care of the post, believing it to be thoroughly satisfactory. Universal testimony establishes the sufficiency of the food supplied under the care of the present able commissary, Capt. W. F. Spurgin.

The two greatest dangers to the health of any group of people from food lie in the water and milk supplied. As regards the former, such provision is being made in the construction of a new reservoir as will, with the provision for filtration of all the water, render this as safe as practicable. An appropriation is asked to secure this filtration of all water supplied to the post under the committee on buildings and grounds. It behooves the committee on hygiene only to enforce the necessity for such provision in order to prevent the outbreak of such diseases as might be traceable to an impure water, viz, diarrhea, dysentery, malaria, and typhoid fever. This latter disease is only possible from communication of a stream by some transient passer-by affected with the disease.

The attention of the Board of Visitors has been drawn to this subject, by the amount of vegetable matter present in the bottom of the pitchers of washing water each morning.

The ice supply is taken from the reservoirs for drinking water, and, so far as can be learned, is mainly now, and in the future will be, practically free from any liability for blame as regards ill health.

The milk supply of any post situated in a rural district should be a subject of constant supervision. Such investigation should cover the following points: The health of the cows giving the milk, the condition of the water supply of each dairy furnishing milk, not only of the well, spring, or stream which is said to be used, but also of any which under any circumstances might be used, and of the method and place of milk storage. Your committee would suggest that it shall be a rule that the cows of each dairy furnishing milk to this institution shall be carefully examined by competent veterinary surgeons; second, that the water supply of each dairy furnishing milk to this institution shall be carefully examined as regards the possibility of its becoming at any time contaminated, and that in case such contamination is remotely possible no milk be taken until such changes have been carried out as will prevent any liability.

It is recommended that the proprietor of each dairy shall agree to inform the proper authority immediately upon the occasion of any sickness occurring either in his family, his hired people, or his boarders, and also in his herd of cows.

This recommendation is made in order that the surgeon of the post may investigate as to the nature of the disease, and may study the possibility of contamination of the milk, and may be able either to exclude the milk from use at the post during continuance of sickness or lay down such rules as shall prevent contamination of milk.

It is recommended that an appropriation be made for the employment of a veterinary surgeon, under the control of the surgeon, for an inspection of cows.

In the main, so far as can be learned, the hygienic condition of buildings and grounds is good. The main sources of complaint exist in the quarters of the enlisted men. There are two barracks, a row of wooden houses for enlisted married men, the guardhouse, and the bakery not in a perfect sanitary condition. They would need either rearrangement for some or reconstruction and destruction in the case of the wooden buildings. This has long been recommended, but appropriations have failed because other more or equally important matters involving expenditure had precedence.

The committee find that the athletic teaching is in a satisfactory state, and agree as regards football with the conclusion reached by the Superintendent as related in his report for 1894. We can not find that during the past year anything has occurred in the play at this post to warrant prohibition of the game. We would believe that the best result in this regard can be obtained by allowing its continuance under the close scrutiny of the Superintendent and of the physician in charge as regards either physical detriment or scholarly impairment of such nature as to call for its suppression.

The drill in the gymnasium illustrated the result of the teaching in bringing about a high average of muscular development.

EDWARD G. JANEWAY.
J. M. WRIGHT.
P. HAIRSTON.

SOLDIERS' HOSPITAL, UNITED STATES MILITARY ACADEMY,
West Point, N. Y., June 10, 1895.

SIR: In compliance with your verbal request, I have the honor to submit the following memoranda in reference to the sanitary condition of the buildings inspected by you:

Guardhouse.—Insufficient light and ventilation; inadequate size.

Bakery.—Insufficient size; inadequate ventilation.
Engineer barrack.—Attic used as a squad room in winter.
 Very respectfully, your obedient servant,

CHAS. F. MASON,
Captain and Assistant Surgeon, United States Army.

Dr. E. G. JANEWAY,
Chairman Committee of Hygiene and Athletics, etc.
 (Through military channels.)

[First indorsement.]

CADET HOSPITAL, UNITED STATES MILITARY ACADEMY,
West Point, N. Y., June 10, 1895.

Respectfully forwarded to the adjutant United States Military Academy.
 GEO. H. TORNEY,
Major and Surgeon, United States Army, Post Surgeon.

[Second indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,
West Point, N. Y., June 10, 1895.

Respectfully transmitted to Dr. E. G. Janeway, chairman committee on hygiene.
 O. H. ERNST,
Colonel of Engineers, Superintendent.

UNITED STATES MILITARY ACADEMY,
 SURGEON'S OFFICE, CADET HOSPITAL,
West Point, N. Y., June 7, 1895.

SIR: In compliance with your verbal request, I have the honor to invite your attention to the following improvements deemed necessary in the cadet hospital. They are enumerated in the order of their importance, and, as far as practicable, the amounts required for their completion are set forth:

OPERATING ROOM.

Removing floors, wall, and ceiling.....	\$50.00
Concrete filling for floor.....	80.00
Tile floor.....	400.00
Lining walls with enameled brick.....	850.00
Blocks and tiling.....	450.00
Iron beams, window casing, and sash with plate glass.....	250.00
Iron frame and sash for skylight.....	200.00
Hot and cold water connections and wash-out trap.....	60.00
Seimens' gas burner, with connections.....	50.00
Total.....	2,390.00
10 per cent for contingencies.....	239.00
Grand total.....	2,629.00

It is proposed to convert the southeast corner room of the third floor into an operating room, and, in its reconstruction, to make it conform to all the requirements of modern surgical technology in the treatment of diseases and injuries. At this time there is no proper place in this hospital suitable for the performance of surgical work under strict aseptic or antiseptic conditions.

It is recommended that the appropriation for the purpose above indicated be made immediately available upon the passage of the Military Academy appropriation bill for the fiscal year ended June 30, 1897.

15,000 feet hard pine flooring, for reflooring the wards, rooms, and halls of the building, at \$50 per M..... \$750.00

100 days' labor of carpenter in laying same, at \$3 per day.....	\$300.00
The floors of the building have not been renewed since its construction. In many places the surfaces are irregular, and nearly all the seams are widely opened.	
Repair of chimneys	\$100.00
Repointing of joints of stonework of walls.....	150.00
Repainting of all exterior wood and ironwork.....	300.00
Repainting of walls and interior woodwork.....	900.00
Repainting of roof of annex.....	15.00
4 boxes of window glass, at \$3.....	12.00
12 locks for doors, at \$1	12.00
Granolithic pavement for area in rear of hospital.....	900.00
45 gallons turpentine and 100 pounds paraffin for polishing floors.....	35.00
30 pounds ammonia chloride for batteries.....	5.00
2 lamps for posts at bottom of entrance stairs.....	75.00
Material for rebronzing of radiators.....	30.00
Speaking tube between office and dispensary.....	30.00
Wire screen for dispensary counter.....	50.00
2 doors for dispensary, open ironwork.....	45.00
Door for entrance hall, open ironwork.....	75.00
4 benches for entrance hall, for cadets at sick call.....	80.00

Respectfully submitted.

GEO. H. TORNEY,

Major and Surgeon United States Army, Post Surgeon.

Dr. E. G. JANEWAY,

Chairman of Committee on Hygiene, etc., Board of Visitors, West Point, N. Y.

(Through adjutant United States Military Academy.)

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., June 8, 1895.

Respectfully transmitted to Dr. E. G. Janeway, chairman of committee on hygiene, etc.

O. H. ERNST,

Colonel of Engineers, Superintendent.

SOLDIERS' HOSPITAL, UNITED STATES MILITARY ACADEMY,

West Point, N. Y., June 7, 1895.

SIR: In compliance with your verbal request, I have the honor to submit the following statement of alterations and improvements deemed necessary to put the soldiers' hospital under my charge in proper condition.

(1) Such changes in the steam-heating plant as will make it adequate to heat the entire hospital in accordance with the original plans. As it is now the north ward can not be heated except by the use of a stove.

(2) Removing the dark-colored tiles in the wash room and replacing them by those of a light color; removing the present water-closet bowls, which have an insufficient flush, and replacing them by siphon bowls; removing the present urinals, which allow dripping on the floors, and replacing them by vertical stone slabs with a floor flush.

(3) Removing the floor of the operating room and replacing it by a new one without any cracks between the flooring to collect dust and retain disease germs.

Very respectfully, your obedient servant,

CHAS. F. MASON,

Captain and Assistant Surgeon, United States Army,

in Charge of Soldiers' Hospital.

Dr. E. G. JANEWAY,

Chairman Committee on Hygiene and Athletics.

(Through military channels.)

[First indorsement.]

CADET HOSPITAL, *West Point, N. Y., June 8, 1895.*

Respectfully forwarded through adjutant United States Military Academy.

GEO. H. TORNEY,

Major and Surgeon, United States Army, Post Surgeon.

[Second indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., June 10, 1895.

Respectfully transmitted to Dr. E. G. Janeway, chairman committee on hygiene.

O. H. ERNST,

*Colonel of Engineers, Superintendent.*WEST POINT, N. Y., *June 8, 1895.*

SIR: Complying with your oral request, I have the honor to submit briefly my views upon the water supply of the post of West Point:

Quantity of water.—The daily consumption of water for all purposes is about 325,000 United States gallons. There is no apparent reason for any increase in the near future. The volume of storage is at present insufficient to meet this demand, and some restriction of consumption and an excessive drawing down of the main reservoir are necessary. The new reservoir now under construction will provide an ample volume and render it possible to have on hand, at the beginning of any dry season, a quantity at least equal to the total annual consumption. This feature of the question may therefore be said to be settled upon a good basis.

Quality.—The source of supply is the rainfall taken from streams and ponds, which are fed from gathering grounds of almost ideal excellence. There is no reason for apprehending pollution from animal sources.

The streams all go entirely dry during seasons of drouth, and dependence must be had upon stored water for several months. This stored water, as well as that obtained from the running streams when they are low, contains vegetable matter in suspension and a moderate quantity in solution. To remove this vegetable matter as far as practicable, as much of the daily consumption as possible is subjected to sand filtration through a filter bed of the Kirkwood pattern. The filtered water appears to be entirely unobjectionable.

Unfortunately the size of the existing filter bed is only about one-fourth what it should be in order to secure the best results.

By direction of the Superintendent, I am now engaged in studying the question of increased filtering capacity, with a view to submitting estimates to be laid before Congress at its next session.

With the completion of the new reservoir and of the proposed addition to the filtering plant, I believe that the water delivered for daily use will be all that is to be desired.

Very respectfully, your obedient servant,

JAS. L. LUSK,

Captain, Corps of Engineers, in Charge of Water Supply.

Dr. E. G. JANEWAY,

*Chairman Committee on Hygiene and Athletics,**Board of Visitors to the United States Military Academy.*

(Through headquarters, United States Military Academy.)

[First indorsement.]

HEADQUARTERS UNITED STATES MILITARY ACADEMY,

West Point, N. Y., June 10, 1895.

Respectfully transmitted to Dr. E. G. Janeway, chairman committee on hygiene.

O. H. ERNST,

Colonel of Engineers, Superintendent.

ADDRESS OF HON. SETH L. MILLIKEN.

The Board of Visitors, for some reason which I can not understand, or, more likely, for no reason at all, have designated me to address you upon the occasion of your graduation—an occasion which you feel to be of the greatest importance to yourselves; indeed, marking a crisis in your careers.

I have so much faith in the good will to myself, of the members of the Board that I believe they considered this honor a kindness to me, and I take it as such; but I feel no less assured that when I shall have concluded my remarks you will not believe their action in this respect to have been a kindness to you. Other gentlemen on the Board much more intimately connected with this institution than myself—themselves a part of its honorable history—could have, and should have, performed this duty much better and more to your satisfaction than I can do it.

But if my remarks have no other virtue they shall have that of brevity. I have no purpose to inflict upon you a formal oration. I feel that would be out of place and painful to you under any circumstances, even if I were prepared to do it. You see before you your homes, as Moses saw the promised land, and you want to have no delay made by public speeches or anything else in your immediate efforts to reach them.

I will not treat you, as did the fellow who after wearying his audience with a four hours' speech, said, "Gentlemen, I am talking to posterity," when one of his hearers responded, saying, "Yes, and they will be here before you get through talking."

But I can not but congratulate you upon your graduation, not so much because it is to relieve you of your hitherto arduous duties and give you an opportunity to walk out into the open ways of life, but because you have had the ability to achieve it.

The graduation of any class from the United States Military School is significant. It is significant of the character, the active brain, the industry, the faithfulness, and manly stamina of those who stay here and achieve it. While you have come triumphantly through the rough pathway which every graduate of this institution has to travel, many have fallen by the wayside, unable to surmount the difficulties and carry the burdens which all are obliged to encounter and bear if they would reach the goal for which all have started. You have achieved a victory in the first important effort of your lives. Your first campaign has been a success.

This excellent institution, so wisely designed and to-day so skillfully and fairly managed, more than any other tests the capacity and industry of the students who enter it. There is no partiality shown here; no aristocracy of birth or wealth or social standing. Every cadet is put upon his metal, and the fittest survives.

When upon his deathbed Alexander the Great was asked to whom he bequeathed his kingdom he replied, "To the strongest." He knew the strongest would get it, if indeed it should hold together for any one, after his hand of genius, which had created and sustained it, should be taken from it.

You have survived all the perils of your four years' course here, and arrive at the line of graduation because you have been the strongest—the strongest in will, in determination to succeed, the strongest in effort.

You know it is said, on excellent authority, that "the race is not to the swift nor the battle to the strong." Of course, it is not always; circumstances may sometimes defeat the best and wisest efforts; but, barring accidents and Divine interposition, the strongest win the battles and the swiftest the races.

This you have done, and when you shall have left this preliminary field of contest you will find that in the great battle of life which is before you, into whatever pursuit you may enter, whether you shall enter the army or follow any other avocation, you will have always a contest upon your hands, and the same virtues of courage, energy, patience, fidelity, and persistence which have so well served you here will be necessary to your success there.

Many a man has lost his fish in landing them; many a harvest, however well planted and attended to, has been lost in garnering it. Many a battle has been fought and its fruits lost by neglect after the victory had been won.

You have, by perseverance and industry, won your first victory. Fail not to remember, and every day realize, that to build successfully upon the solid foundations which you have laid here, you must continue to exercise the same virtue by which you have so well laid the substructure.

A man may by temperance, enterprise, activity, and wisdom build himself a fortune, but if when he has accumulated it he forgets to exercise the virtues by which he has accumulated it, then it will take unto itself wings and fly away. So if when you shall have left these classic grounds whose history must have inspired in no small degree your energy and ambition, you shall slacken your efforts and forget to utilize the splendid discipline which you have here received, then what you have done will go for naught, and failure will be the consequence.

But I have little fear that you will do this. The power of applying the mind continuously to good work, so well inculcated here, can hardly be neglected and lost by those who have had the virtue to acquire it.

You have noble examples to inspire you. About these grounds to-day cluster the heroic spirits of many generations of your countrymen whose lives have shed luster upon the land which we love. George Washington, who never achieved any astounding victory like Jena or Caunæ, but whose great wisdom, whose patriotic spirit, whose persistency in the pursuit of the cause committed to him, and whose fidelity to his trust and faith in the ultimate success of his country's effort made him one of the grandest characters of all mankind and gave to his cause a permanent victory which greater geniuses have failed to achieve, once had his headquarters here, and so have many others whose achievements and sacrifices sowed in blood the good seed winnowed from Europe's great political chaff pile and made it fruit in the free institutions which we to-day enjoy. You must have caught their spirit upon this classic ground.

Do not lose it when you leave here, whether you shall enter the Army or follow the pursuits of peace. That spirit is the breath of patriotism—it can not but fill your souls with an appreciation of your institutions. With this spirit in your hearts you can not fail to be the proud defenders of your country wherever you may be, whether in the struggle of war or in the quiet pursuits of civil life.

In any field of endeavor you will find opportunities enough to show your love of your country and its institutions by your efforts to strengthen their hold upon the hearts of the people, promote their progress, and enhance their dignity and honor in the eyes of mankind.

And who so fit to do it as you? Here you have had an opportunity to drink from the fountain head of patriotism. It has been inculcated by every lesson which you have learned—taught to you in order to fit you better to serve your country in the most arduous and dangerous duty which it ever calls upon its sons to perform. The sunrise gun but voices the spirit of patriotism and a readiness to enter upon the sternest service at your country's command. Wherever you may be located among the people you will be regarded as living emblems of the nation's fidelity to its own integrity, and the maintenance in all their purity of the principles of liberty and law which have made our country the wonder, the envy, and the hope of mankind.

The marvel of our growth, of the power of the individual, and of the appliances of science in our land above what they are in any other country, I have not time to state to you in detail, but they are enormous, and they are all the natural growth from our free institutions. It is the light of liberty which has shown our people the way to the achievement of such results of beneficence as are the causes of amazement to the slow and plodding people of despotic countries.

When our forefathers declared their independence, and through seven years of sacrifice, suffering, and brave achievement secured their liberty and established freedom and just government for themselves and

their posterity, they gave to the wheels of progress and civilization an accelerated motion never known before. The light of liberty carried with it everywhere the light of intelligence. Under the protection of freedom's sword the schoolhouse was erected, and to-day we have forty-one millions of educated people, something that no other nation has or ever had. The statue of "Liberty Enlightening the World" is but emblematic of what the principle of freedom, embodied in our Constitution and laws and inspiring our people, is doing for mankind.

France is free, and stronger, richer, and happier than at any other period of her existence; Brazil has thrown off the panoply of monarchy and put on the robes of a republic; the Governments of the Old World are growing more liberal, and there is hardly a people within the pale of civilization which has not been impregnated with the leaven of liberty by the inspiration which they have received from the salutary and impressive example of free and progressive America.

Then, young men, we pray that you, who have been educated to be peculiarly the guardians of the Republic, may never forget that liberty is the soul of our institutions and our laws, and that fidelity in maintaining them is the first duty of both the soldier and the citizen. This lesson has been most faithfully taught you here. Let no negligence cause you to forget, and no temptation induce you to disregard it.

Let your patriotism be as firm as the giant mountains which surround you, and as enduring as the broad river of beauty which runs at their base. Let the escutcheon of your country be the dearest of all emblems to your hearts. Think of all that it signifies, and the stirring memories which it must arouse in the minds of all true soldiers and good citizens of the nation. Why, young gentlemen, who can look upon that grand old banner of the Republic, whether it flaunt its gay colors in the sunlight, or hang, bullet pierced and battle worn, at the masthead, there, the record of brave deeds upon many a heroic field of battle? who can remember its history—the exploits and achievements of our countrymen which it has witnessed; what a grand story it could tell if it had consciousness and a tongue; what perils it has encountered; how it has passed them all and floats more proudly in the face of the nations to-day than ever before—without a prayer in his heart that it may never be trailed in the dust of defeat and dishonor, but in the future, as in the past, yet for thousands of years to come still victoriously brave the battle and the breeze.

Love of country, pride in the achievements which have shed luster upon it, is an attribute of every civilized people which has or has had a country to love and revere. I will venture to say that among all the immigrants which have come to our shores you have rarely found one whose eye has not kindled and his heart quickened at the mention of his native land.

When the heather of Scotland, its rocks and its cairns, its friths and its lakes, its glens and its mountains, its great men and its heroic his-

tory cease to live in the heart and animate the soul of every Scotchman, wherever he may be, then the nature of that people will have radically changed. Just call his attention to them and see how quickly he will manifest his feeling of affection for them, and he will not let you go before he has sensibly betrayed his pride in his heritage in the fame of the sweet songs of Burns, the exploits and achievements of Wallace and of Bruce.

The Frenchman will tell you that there is no land like beautiful France, no history like her history, no record of heroic achievement like that which she has displayed from the days of Charles Martel and Charlemagne to the last great battle of the mysterious and wonderful Napoleon.

The Dutchman will point to the dikes and canals and many monuments of his country with patriotic pride. And the Irishman—yes, the Irishman, whatever be his condition, whether he be carrying a hod, digging a ditch, or living in prosperity and wealth—is ever ready, upon the smallest provocation, to throw up his cap for his own green isle of the ocean.

And so they all do. They love their country because it is their country; because it is the place where they first saw the light of existence; because it is the land of their lineage and language and the scene of all great and glorious effort in which they can claim a heritage.

We love our country for all this. We love it for its grandeur; for its great rivers, its broad prairies, its gigantic mountains, its splendid scenery, its fields of fertility, and its mines of wealth. We love it for its institutions of learning and beneficence, for its unprecedented spirit of enterprise and unparalleled progress in all that a people desire and a nation should be proud of; but above everything else, we love our country because it is the land of liberty, the asylum of the oppressed—the one great home and fortress of freedom upon all the face of the globe—and on this account, not for ourselves alone, not alone even for our children and our children's children, but for mankind, we will fight for its existence, labor for its prosperity, and contend for its honor and glory.

Indeed, we know that to maintain our institutions is necessary, in order to uphold the exalted position of our country, insure its advancement, and conserve the manhood of our people. For while men make institutions, the latter reciprocate in turn and make the strength.

Russia, that before the days of Peter the Great, was a nation of poltroons, and in the early campaigns of that monarch saw its armies driven like scattered sheep before the columns of Charles XII, of Sweden, by training and discipline under the influence of strong institutions, has become one of the solidest and bravest nations upon earth.

Rome, once the mistress of the world; the land of heroes; she who by her intrinsic, manly stamina could cope with the blazing genius of Hannibal; could produce her Cæsars and Scipios and Catos by the

swarm, after the overthrow of the grand old republic and the destruction of her institutions, while still, to be sure, gathering up for a few generations the splendid fruits which the republic had ripened, began to decay, and ceased not the process till she became a land of bigotry and of beggars.

Greece, yes, classic Greece, in the rich halo of whose hallowed memories we so much delight to linger, her physical powers excelled only by her mental conceptions which may almost with truth be said to have been divine, saw the deathblow to her manhood in the destruction of her institutions, and she has been dying all down through the ages, like the expiring dolphin, showing in her transition the varied colors of beauty with which genius in her lifetime had endowed her.

Why, to-day the sun gilds her marble mountains and warms the green sides of her valleys as in days of yore, but the stout hearts which once defended them and the quick spirits which caught their impressions and transferred them into language or upon chiseled stone are gone.

The river of her sacred nine still flows, but no more do the muses frequent it. The place of her Delphic oracle still remains, yet none presides or worships at it.

There is the same beauty scenery, the same hills and streams, the same blue sea, the same gorgeous sun to shine upon it, and the same kind heavens to bend over it all. And it is all as lovely and impressive as ever. Yes, beautiful and inspiring it is still, but it is the beauty of splendid ruin, the inspiration of the great, brave, regretted dead who, even from their ancient tombs, can effect our spirits. "Tis Greece, but living Greece no more." Her institutions have departed and the manhood of her people has decayed. Oh! let us hope, and let it be our effort, too, so far as within us lies, and especially your endeavor, young soldiers of the Republic, that vice, corruption, and want of patriotic feeling may not ripen our institutions for destruction's scythe, so that the friends of humanity shall one day here lament over the sad spectacle of an effete people walking among the ruins of a once great and glorious nation, but let them rather look up to behold and admire its still standing columns of strength and beauty shadowing a brave, virtuous, sturdy race.

To this end you have been educated at the nation's expense in this most excellent institution. Its thorough discipline and instruction in all that goes to develop the brave and patriotic elements of your natures must have prepared you to be your country's steadfast supporters and gallant defenders in every future emergency whenever your services shall be demanded.

Indeed, I can not but feel assured, while looking upon your manly bearing and knowing something of the training which you have received here, that in the career which is before you you will not disappoint the highest expectations and fondest hopes of your countrymen.