

ANNUAL REPORT

OF THE

BOARD OF VISITORS

TO THE

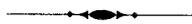
UNITED STATES MILITARY ACADEMY,

MADE TO

THE SECRETARY OF WAR

FOR

THE YEAR 1878.



WASHINGTON:
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1878.

REPORT

OF THE

BOARD OF VISITORS TO THE UNITED STATES MILITARY ACADEMY AT WEST POINT, JUNE, 1878.

SIR: The Board of Visitors appointed to attend the annual examination of the United States Military Academy at West Point for the year 1878, having discharged that duty, herewith submit the following report:

The provisions of law requiring the annual appointment of a Board of Visitors to the United States Military Academy at West Point, and specifying the duties which the members of such board virtually promise to perform by accepting an appointment on the same, are mainly embodied in sections 1327 and 1328 of Chapter 4, Title XIV, of the Revised Statutes of the United States; which sections read as follows:

SECTION 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 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 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 Board of Visitors appointed under the above provisions of law for the year 1878 were as follows:

Appointed by the President of the United States.

1. Prof. Charles S. Venable, of Virginia.
2. Hon. John C. Ropes, of Massachusetts.
3. Francis B. Wheeler, D. D., of New York.
4. Hon. David A. Wells, of Connecticut.
5. Capt. Samuel R. Franklin, of United States Navy.
6. Rev. James Lewis, of Michigan.
7. Brig. Gen. Christopher C. Augur, of the United States Army.

Appointed by the President of the Senate.

8. Hon. J. Donald Cameron, member of the Senate from the State of Pennsylvania.
9. Hon. J. T. Morgan, member of the Senate from the State of Alabama.

Appointed by the House of Representatives.

10. Hon. G. L. Fort, a Representative from the State of Illinois.
11. Hon. Van H. Manning, a Representative from the State of Mississippi.

12. Hon. William P. Lynde, a Representative from the State of Wisconsin.

The board as thus constituted assembled at West Point on Saturday, June 1, 1878, and organized by the election of the following officers:

Hon. David A. Wells, *President*.

Capt. Samuel R. Franklin, U. S. N., *Vice-President*.

Prof. Charles S. Venable, *Secretary*.

The president, in compliance with a vote of the board, also subsequently appointed the following committees:

1. *On discipline and drill*: General Augur, Captain Franklin, and Representative Manning.

2. *On education*: Dr. Wheeler, Mr. Lewis, Mr. Wells, Senator Morgan, and Representative Lynde.

3. *On commissary and mess*: Mr. Lewis, Professor Venable, Dr. Wheeler, and Senator Cameron.

4. *On fiscal affairs*: Mr. Ropes, Mr. Wells, Senator Morgan, and Representative Fort.

5. *On police, water supply, and sewerage*: Professor Venable, Mr. Lewis, Representatives Fort and Lynde.

6. *On public buildings and grounds*: Captain Franklin, Professor Venable, Mr. Lewis, Senator Cameron, and Representative Manning.

7. *Committee to attend the examination of applicants for admission to the Academy*: Dr. Wheeler and Mr. Ropes.

All the members of the board were in attendance during the greater portion of the time devoted to the investigation, and most of the members during the entire time of the examination of the first or graduating class. It is almost unnecessary to say that the board was the recipient of every attention from the Superintendent and all other officers or instructors connected with the Academy; and if the conclusions of the board are in any way superficial and imperfect, it is not because every facility was not afforded for the prosecution of the most thorough examination of every department in the line of its investigation.

UTILITY OF A BOARD OF VISITORS.

By referring to the section of the Revised Statutes (1328) above given, which defines the duties of the Board of Visitors, it will be seen that they are required to report to the Secretary of War the results of their investigation into the condition and administration of the Academy "for information of Congress." But as Congress, judging from the experience of all former Boards, does not desire to draw information from such sources, and as there is no evidence that the recommendations of any previous Board have ever had the slightest influence on the enactment of any law by Congress affecting the administration, educational course, or disbursements of the Academy, reduction of expenditures possibly excepted, and as there is evidence that the mere nod or whim of a Secretary of War, or a general-in-chief, has more influence than the combined opinions of all the boards that have ever been appointed,* the question as to the utility of an annual Board of Visitors and the desirability of

* In 1860 sixteen cadets recommended for dismissal by the Academic Board were reinstated by order of the then Secretary of War. During the subsequent year (August, 1861), Congress, doubtless having the above transaction in view, enacted "that no cadet who is reported as deficient in either conduct or duties, and recommended to be discharged from the Academy, shall, unless upon the recommendation of the Academic Board, be returned or reappointed, or appointed to any place in the Army before his class shall have left the Academy and received their commissions."

its perpetuation as a part of a system naturally suggests itself. Of what avail is it to expend time and labor in the preparation of a report, which, in common with most or all similar reports that have preceded it, is certain to be regarded by Congress and the public alike as of no account, but to which, nevertheless, by force of general statutes, the doubtful compliment of public printing is awarded? Or if, in respectful conformity to the obligation to report involved in the acceptance by the members of the Board of their several appointments for service, a formal document is to be submitted, why not merely state in the simplest phraseology, "that the Board assembled at the day designated, at a small and inconvenient, but well-managed hotel, where no intoxicating beverages whatever are sold; which hotel, indispensable to the comfort of most persons officially visiting West Point, Congress has graciously allowed to be built, in the main, from the proceeds of the sale of hoop-poles, cut in a long series of years from the government (mountain) lands adjacent; that the Board was received with marked courtesy by the Academic staff; that the examinations of the cadets were regularly attended; the public buildings and grounds, with the commissary and mess inspected; the discipline, course of instruction, and the practice and method of keeping accounts inquired into; that a particular investigation of the moral and religious condition of the cadets was especially intrusted to such members of the Board as have as their special mission the work of making men better; and that finding everything satisfactory, the Board, after some fourteen days' continuous attendance, adjourned, receiving in return from the public treasury, as compensation for their services, and for expenses of board and lodging, the sum of \$5 per diem, and eight cents per mile for traveling by the shortest mail-route from their respective homes to the Academy and return?"

Such a report is certainly technically allowable; and if compliance with form (as all previous experience suggests) is all that the Board of Visitors' report practically ever amounts to, such a summary of proceedings ought not to be objectionable to either Congress or the public. Wooden images standing in front of a shop, and directing attention to the business carried on within, are just as useful and a good deal cheaper than live men, employed in performing an equally mechanical and stereotyped duty.

The Board of Visitors at West Point for the year 1878, feel, however, that the sphere of service involved in the appointment of an annual Board is much larger and far more important than is embraced in the mere conformity to statute technicalities; and that the usefulness of such service is sufficiently great to fully justify its original institution by Congress (statute of 1848), and to also warrant its future continuance.

The United States Military Academy at West Point is a public institution, instituted and supported by the Federal Government for the instruction of young men intended to hold commissions in and direct the Army of the United States. No one familiar with the history of the country; no one capable of comprehending its entire circle of interests and contingencies; no friend of peace, however great may be his detestation of war, can reasonably doubt the wisdom of the motives that originally prompted to the foundation of the Academy, or of the policy which has ever since dictated its maintenance in a condition of high efficiency. The time may come when spears will be beaten into plowshares, and the nations will learn war no more; but that time has not yet come, and what is more, there are no present signs of its coming. The burden of all the speeches at the opening of the first great international industrial exhibition (the Crystal Palace) in London in 1851, was, that henceforth the doors of the

temple of Jans were to be closed for a lengthened or permanent period. But war since that epoch has been carried on almost continuously, and on a scale more gigantic and destructive than the world has ever before experienced.

It is well, also, to remember that although civilization has continually advanced, few great civil reforms have been effected in modern times in any country without the intervention of the soldier and the instrumentality of the sword; and when, in exceptional instances, the appeal has not been made to the sword, the fear that sooner or later it would be, has always proved a most potent agency in the hastening of such reforms. It is, furthermore, not to be disputed that in no department of human knowledge has recent change and progress been greater than in military science, and that a course of carefully arranged and protracted study is now more than ever necessary for the attainment of proficiency in such science.

In his exile at Chiselhurst, a few weeks before his death, the Emperor Napoleon III, commenting on the results of the late Franco-Prussian war remarked that the world was not well informed as to the causes of the disasters therein accruing to the French armies; that they were not because the French military forces were deficient in anything in respect to equipment or discipline, but because they fought under an old and previously accepted, but now to a great extent obsolete system of military tactics and precedents; while the German commanders, on the contrary, rightfully accepted modern war as a system rather of engineering, the ultimate end of which was to concentrate on territory previously studied with the utmost care topographically, all the resources of the railroad and the telegraph equally with those of the breech-loading rifles and improved ordnance. And even more recently, the conflicts before Plevna, in the Turco-Russian war, seem to lead to the conclusion that great battles by daylight, where one party occupies a defensive position, are to be hereafter of very rare occurrence.

The position will doubtless be taken by some, that a military education, in the sense of that imparted by schools, is not necessary to the production of good soldiers, and that some of the most efficient military commanders and leaders of armies, in foreign as well as in our own recent wars, have not been men who were educated, or even intended, for the profession of arms, but have attained leadership and success mainly by force of native ability, and that circumstances and emergencies always call such men to the front as they are needed. But such an assumption, though true, is an unsafe one for a nation, possibly contending for existence, to rely upon, inasmuch as the hour and the man may not prove coincident. And even if it were otherwise, the self-educated commander would be the first to confess that his right arm was shorn of no inconsiderable part of its native strength, had he not the power to call for the execution of his orders upon those to whom all the details of modern military science, fortifications, engineering, gunnery, telegraphy, signal service, transportation, and the like, were familiar. And in this connection it is important to ask the attention of the public to a fact which is little familiar, and that is, that the graduates of the Military Academy at West Point do not, as is popularly supposed, hold the largest proportion of commissions in the Army; out of the 2,163 commissioned officers of the Army in January, 1878, but 42.1 per cent. being West Point graduates; while the present number of annual graduates from the Academy is not sufficient to supply the annual vacancies occurring in the list of officers (as the Army is now organized) from deaths, casualties, and resignations. And the reason why the Academy is now apparently

furnishing a surplus of graduates, is not because there is not a sufficient annual demand for officers in the Army, but because vacancies occurring in commissions have been and are supplied by appointments, and by promotions from the ranks, rather than from the graduates of the Academy. And a comparison of the organization of the Army of the United States with the armies of the leading nations of Europe—of Great Britain and Germany especially—would, therefore, probably show that in respect to the number of regularly trained and educated officers, the forces of the former are comparatively inferior to those of the latter.

The idea of establishing a national military academy in the United States had its origin in the circumstances that during the war of the Revolution, and for a long period subsequent, the country was "dependent upon foreigners trained in the military schools and armies of Europe for the knowledge of the science and art of war, necessary in the conduct of our military operations, whether defensive or offensive." And it was remarked by General Washington that the difficulties of that war would have been diminished and its duration shortened if that knowledge had been diffused through the Army. The first step toward founding a national military academy, moreover, was in consequence of a recommendation by Washington, as President, in his message of December, 1793; and in his last message, December, 1796, he further declared "that the desirableness of this institution (a military academy) had constantly increased with every new view he had taken of the subject." And his further recommendations under this head, which are as pertinent to-day as when they were submitted to Congress, more than three-quarters of a century ago, read as follows:

"The institution of a military academy is also recommended by cogent reasons. However pacific the general policy of a nation may be, it ought never to be without an adequate stock of military knowledge for emergencies. The first would impair the energy of its character, and both hazard its safety and expose it to great evils, when war could not be avoided. Besides that, war might not often depend upon its own choice. In proportion as the observance of pacific maxims might exempt a nation from the necessity of practicing the rules of military art, ought to be its care in preserving and transmitting, by proper establishments, the knowledge of that art. Whatever argument may be drawn from particular examples, superficially received, a thorough examination of the subject will evince that the art of war is at once comprehensive and complicated; that it demands much previous study, and the possession of it, in its most improved and perfect state, is of great moment to the security of a nation. This, therefore, ought to be a serious care for every government; and for this purpose, an academy where a regular course of instruction is pursued, is an obvious expedient, which different nations have successfully employed.—*Message, 1796.*"

What of economy in a pecuniary sense the establishment of the West Point Academy has brought to the nation in a single particular, is shown in the following distinct and explicit testimony given by General Scott to a national commission in July, 1860. "I give it," he says, "as my fixed opinion that but for our graduated cadets the war between the United States and Mexico might, and probably would, have lasted some four or five years, within its first half more defeats than victories falling to our share, whereas in less than two campaigns we conquered a great country and a peace, without the loss of a single battle or skirmish." The war with Mexico and the United States extended over a period of about two years, and cost the latter country in round numbers about 120 millions of dollars, or at the rate of 60 millions per annum. Assuming now the opinion of General Scott, as thus expressed, to have been warranted, and that the education and discipline of West Point really shortened the war with Mexico, even by so brief a period as two years, and saved our armies from a series of humiliating and costly defeats, *then*, considering the utility of the Military Academy from an exclusively

dollars and cents point of view, the institution is entitled to credit on the fiscal account between it and the nation by the sum of at least one hundred millions of dollars; as much so as if its graduates had earned the money and paid it directly into the National Treasury; or by a sum which, as near as can now be calculated, is more than eighty per cent. in excess of the aggregate cost of the academy proper, from the date of its foundation to the present time.*

Of course these facts and statements are not new, but they are of a nature that will bear and require repetition, especially when we consider that the United States for one-sixth part of their existence as a Federal nation have been in a state of war; and that for the future there is no good reason for supposing that the country is going to be any more exempt from the vicissitudes of nations than it has been in the past.

At the same time it is not to be denied that, by no inconsiderable portion of the people, West Point has been, and is now, regarded with something of a feeling akin to a suspicion and dislike. A part of this is undoubtedly due to the circumstance that the profession of arms in other countries has usually been antagonistic to civil liberty and the stability of free governments; and that the class of men educated exclusively with a view of following a military profession are, of necessity, by the nature of their training and the wearing of conspicuous insignia, made exclusive to a certain extent, and that thus an institution somewhat akin to an aristocracy seems to be established. General Scott, in 1860, speaks of the popular prejudice against the Academy as so widespread and general, "that it would certainly by this time have been abolished but for the admiration won by its graduates in the Mexican war"; adding, "that this generous and patriotic feeling is not likely to survive the present generation"; and that, "hence the necessity of finding some means of preventing or diminishing the annual growth of the popular prejudice in question." It should be noticed, however, that General Scott attributed the origin of this popular prejudice to the number of rejections of applicants for admission as cadets, and the still greater number of failures after admission "consequent upon inadequate preliminary training and bad habits contracted at home," "the result of defective family discipline so common throughout our country." But, be this as it may, the fact that West Point, because it is an exclusively military school, and for other reasons, is with many, an object of dislike and distrust, cannot be doubted. *And hence the importance, so long as the Academy is maintained, of sending to it annually, under the national authority, a board of visitors made up in the main of persons whose professions are not military or naval, and whose tastes, pursuits, and training are altogether civil, and antagonistic to the use of arms.* Such a board, made up of citizens living in widely diverse sections of the country, selected, it is to be presumed, because of their qualifications to judge and investigate, and invested with the largest powers to investigate and report, are thus annually educated in respect to every detail of this peculiar national institution, and are prepared to become centers for the correct education and intelligent direction of local public opinion. And the fact that an examination of the reports of successive boards of visitors for past years shows but little of importance in the way of recommendations, the material for reporting in one instance being so scanty that the question of cadet's whiskers and mustaches was discussed, is doubtless one reason why Congress has given so little attention to such reports. Had any striking abuses been detected the case would undoubtedly have been far different, and immediate and efficient action

* For the aggregate and present annual cost of the Academy, see section of this report entitled "Fiscal affairs."

on the part of the authorities would have resulted. To the majority of people who travel by the railroad express trains the monotonous and repeated tapping of the car-wheels at given intervals of distance seems almost an unnecessary ceremonial. But let the sound of the tapping be other than a monotone, and uncertain; let a flaw in the running machinery, even ever so small, be detected, and a mind must be indeed sluggish that does not appreciate the necessity for an immediate change in the conditions of that car for any further transportation.

GENERAL RESULT OF INVESTIGATION.

The result of the investigation by the Board of Visitors to the National Military Academy for the year 1878—and the investigation, both through special committees and the Board acting as a committee of the whole, is believed to have been in every respect thorough—has led to this general and, withal, remarkable conclusion, namely: *That there is at least one public institution in the United States of which it can be truly affirmed, that the more it is investigated the better it appears, and for the direct administration and control of which no person is believed to have been selected for any other reason than fitness to discharge the trust confided to him.* In face of no small part of the public and private record of the country for the last few years, such a conclusion ought to be to the nation in the highest degree gratifying, and as affording promise for the realization of such an ideal of efficiency and reform in other departments of the Federal Government as has heretofore appeared to many altogether ideal and visionary.

In saying this, however, the Board does not mean to be understood as entertaining or expressing the opinion that the West Point Military Academy is in all respects perfect; but they are of the opinion that but little of improvement remains to be effected by those immediately in control of, and responsible for, its administration; and that any changes looking to its betterment or increased future efficiency lie in the direction of an enlargement of the existing course of study, or are in the nature of mechanical accessories, the provisions for both of which are dependent upon Congressional legislation or money appropriation.

STANDARD OF ACADEMICAL ADMISSION.

Under the first head the Board are unanimously of the opinion that the efficiency of the Academy as a military educational instrumentality would be greatly enhanced by raising the standard of qualification at present required of candidates for admission. The evidence that has led to this conclusion may be thus briefly stated. At present the educational requirements for the fourth class (first year) of the Academy are exceedingly low—lower, in fact, than are requisite for the admission of freshmen to any of the leading universities or colleges of the country. These requirements are not in any degree within the control of the Academic Board, but are prescribed by statute, which statute (Title XIV, chap. 4, 1319) reads as follows:

Appointees shall be examined before they shall be admitted to the academy, and shall be required to be well versed in reading, writing and arithmetic, and to have a knowledge of the elements of English grammar, of descriptive geography, particularly that of the United States, and of the history of the United States.

A reference, furthermore, to the schedule of examining-questions (copies of which for the year 1878 are given in the appendix of this report, marked "A") will show that the examiners make the most of what

is permissive to them in the examination, and that the applicant is rigidly required to prove that he knows what the statute imperatively declares that he must know. But the result of the comparatively low educational requirements for admission, and more especially the failure to include in them a knowledge of elementary algebra and geometry, nevertheless is, that a large portion of the time of the cadet during the first year at West Point, and the superb machinery of instruction available there, which is equal or superior to anything of the kind elsewhere in existence, is necessarily devoted to acquiring and imparting a knowledge of what *can* be and is equally well taught at every respectable high school or academy in the country, leaving insufficient time during the succeeding three years' course for the prosecution of certain higher branches of study—civil and military engineering and tactics—to an extent which all authorities are agreed is most desirable, if not absolutely essential to a complete military education.

In further illustration, it may be noted that while in the examinations in military tactics the cadets were found proficient in the sphere of this special study, their knowledge at the same time seemed to be in a marked degree limited very closely to that sphere; or, in other words, that while they were conversant with the details of certain great military experiences—*i. e.* notable battles or campaigns—they were not well acquainted, or apparently unacquainted, with the military and civil antecedents and consequents of such experience. Now, while this additional knowledge, from a strict military point of view, is perhaps not indispensable, it is, nevertheless, evidently desirable; and the good and sufficient reason why it is not imparted at West Point is that the course of study already prescribed and deemed essential is sufficient to occupy all the available time of the cadet. History, civil or military, therefore, is not studied at the Academy,* although a fair knowledge of the history of the United States is a prerequisite for admission to it; and an officer of the Army of the United States, if he is ever to become conversant with history, must learn it independently during his intervals of study as a cadet (which are not great), or after his graduation.†

The defect here noted in the course of instruction at West Point is not a new matter, but, on the contrary, has long formed the subject of consideration and discussion. In 1854, with a view of providing a remedy, the length of the course was changed by Congress from four years to five. In 1858 it was changed back. In 1859 it was again made five years; and in 1861 once more fixed at four years; and this, too, notwithstanding a special commission, created by Congress in 1860,‡ after taking a large amount of testimony, reported "that, after a careful investigation, they had unanimously reached the conclusion that no reduction of time (from five to four years) could be made without injury to the best interests of the military service." At that time proficiency in reading, writing, and arithmetic were the sole educational conditions for the admission of applicants; and the commission were opposed to raising the standard by requiring, in addition, a knowledge of geography, grammar, and algebra; but the two first named branches were subsequently (1866) included in the requirements.

*At the French military school of St. Cyr, military history, military literature, and military geography constitute a very large part of the course of instruction.

†I have never known, during my eight years of service, a single instance of any officer studying theoretically his profession (when away from West Point) after graduating. They are usually scattered by single companies, and if concentrated are in the field in pursuit of Indians, and in consequence cannot have recourse to books."

‡This commission was composed of Jefferson Davis and Solomon Foote, members of the United States Senate; Henry Winter Davis and John Cochrane, members of the House of Representatives; and Major Robert Anderson and Capt. A. A. Humphreys, of the United States Army. Lieut. C. Ives, U. S. A., was appointed secretary.

General Scott proposed to remedy the difficulty under consideration by establishing a "preparatory school in the Academy—a fifth class—with a lower standard of preparatory knowledge, together with admission at an earlier age."

The main objection to raising the educational standard of admission to the Academy seems to be that it would greatly limit the field of selection for cadets, and exclude from the institution and Army of the United States many sons of worthy but poor parents who have not been able to afford a good elementary education to their children, and so excite a popular prejudice against the Academy; the case of one officer (General McPherson), who made one of the most brilliant records of the late war, being especially cited as an instance in which a fine mind would have been lost to the public service had the standard of educational requirement at the time of his admission been higher than at present.

The answers to this and similar objections are: That the West Point Military Academy is in no sense a charitable or benevolent institution; that its object is especially to give education in a department of learning, which, save in very exceptional cases, will never be acquired without special teaching, and to put into and in control of the military forces of the country officers who in the time of emergency will not be found inferior in knowledge and experience to the officers of the armies of other nations, with whom they are liable to be brought into conflict and competition. It is an economic axiom, admitting of no exception, that the last thing a nation or individual can afford to do is to work with poor tools, and that in case of competition a nation or individual working in any art or profession with inferior tools will in the long run be obliged to succumb. With appointments made to West Point some ten or twelve months in advance of admission (as they now are), it seems unreasonable also to suppose that any young man of a really high order of natural talent, and a strong desire to enter the Academy, would allow so trifling an obstacle as an elementary knowledge of algebra and geometry to stand in the way of a realization of his aspirations and wishes.

The statute fixing the educational standard for admission to West Point was originally enacted as far back as 1812, and since that date it has been amended but once, namely, in 1866, and then to the extent merely of adding a knowledge of grammar and geography to the list of requirements; but during this time covered by these statutes the general standard of educational training in the country, especially of mathematical training, has been constantly, and of late years rapidly, advancing; so that, leaving 1812 entirely out of consideration, as an educational period comparatively in dark ages, it is without doubt the fact that the standard of training in the high schools and colleges of the country is now far higher, and the instruction far better at the present time, than it was even so recently as 1866, when the amendment to the statute of 1812 was enacted; so that while in former years candidates for admission to West Point in some sections of the country unquestionably did experience some difficulty in readily securing the services of teachers competent to do more than instruct them in reading, writing, and arithmetic and geography, such difficulties can hardly be said to exist at present, there being now, for example, in Virginia alone (a State in which, within little more than a decade, the very foundations of civil society may be said to have been broken up), some ten to fifteen high schools and academies preparatory for the University of Virginia, in which a course of mathematics is given which is in no degree inferior in thoroughness to that followed at West Point throughout its first year, or indeed up to the calculus, which enters into the academical course of the cadet in the

second year; and if such difficulties do at present exist in any State, or, in other words, if, in view of the educational land-grants made of late years by Congress, any State has not yet provided ample facilities for a good and *free* high school training of the children of any of her citizens who may desire to have it, the circumstance ought to be considered as a reproach, voluntarily assumed, to such State, and as working a disability in various spheres, and as if by natural law to her citizens; and this reproach and disability Congress ought not in any way, even indirectly, to countenance or encourage. Attention should also be called to the fact that the experience of the high schools and colleges of the country, and more recently and especially the experience of the United States Naval Academy at Annapolis, has demonstrated that candidates for admission to their courses have rapidly and readily adapted themselves to the increased requirements for admission so generally adopted in these institutions within a comparatively recent period. Probably not one in ten of the graduates of Yale or Harvard in 1860 could now pass with success the examination as at present instituted for determining admission to the freshman class of these universities; and the educational conditions for admission to the class of cadet-engineers at the United States Naval Academy not only embrace all that is required for admission to West Point, but, in addition thereto, algebra through equations of the first degree, plane geometry, rudimentary natural philosophy, and English composition. The term of the academic course at the Naval Academy for cadet-midshipmen was also increased by law, in 1873, from four to six years; and for cadet-engineers, in 1874, from two years to four.

Again, the claim that raising the standard for admission to West Point will work injustice to any class or any section of the country will, it is also believed, be found on examination to be far more superficial than real. As matters now are, real injustice is done to many applicants for admission to West Point, through the fact that many are admitted on the present entrance examination who subsequently find the mathematical studies of the first year beyond their mathematical capacity or preparation. The result is that such cadets are dropped at the middle or close of the first year, or later,* to the great mortification of themselves or their relatives, and at no small expense to the government; and the prejudice which accrues against the Academy in consequence of these dismissals is as great, and possibly more bitter, on the part of those interested, than what results from the primary rejections, and which latter, as before pointed out, General Scott thought might ultimately prove fatal to the institution. The prejudice in both cases, like many other against West Point, is obviously wholly unfounded and unreasonable; inasmuch as the sole object of the Academy is to turn out for the benefit of the nation men of large efficiency; and to effect such a result there must obviously be large and good material provided in the first instance for the instructors to work on. Grapes are not to be gathered from thorns, or figs from thistles, any more now than they were eighteen hundred years ago.† Inquiries under this head also

*About 35 per cent. of those who are appointed, and less than half of those who are admitted, finally graduate from the institution.

†My experience is that about one-half of each class are unable to understand the principles of mathematics to the course on mechanics, without some assistance from the instructor. The standard of the lowest sections is, in my opinion, quite below that of an engineer. I know of no remedy for this but to elevate the character of the material which we receive into the Academy. It is not possible to bring one-half, perhaps one-quarter, of those who now enter to the required degree of proficiency.—*Testimony of First Lieutenant* (afterward Major-General) *J. M. Schofield, Assistant Professor of Philosophy—Commission, 1860.*

revealed the fact that most of the cadets who pass successfully the examination of the first and subsequent years are men whose prior mathematical training in the schools has been carried far beyond the present requisitions for admission to the Academy. It is also pertinent to this discussion to state that the present requirements for admittance to the United States Military Academy are far below those for admission into the military and polytechnic schools of France, which embrace in the department of mathematics more than is studied in mathematics during the first year at West Point.*

For the above and other reasons the board unanimously voted to recommend to Congress that the standard of educational qualifications for admission to the United States Military Academy be raised at the earliest practicable moment, and they believe that the efficiency of the Academy and the usefulness of its graduates to the country will be greatly increased thereby. As such change will, however, necessarily involve a revision to a greater or less extent of the whole academic course of instruction, the proper step to be taken would seem to be for Congress to refer the whole subject to a commission to report amendments to the existing statutes and academic regulations.

WATER-SUPPLY, SEWERAGE, AND HOSPITAL.

In respect to the matter of water-supply, the board adopted the following resolution:

Resolved, That this board, after careful examination, is satisfied that the present water-supply of the post is wholly inadequate to the sanitary requirements of the cadets, officers, and men here stationed, or to furnish proper facilities for the protection of the public buildings and property in case of fire.

From a letter addressed to the board, at their request, by Capt. O. H. Ernst, of the Corps of Engineers (and which will be found in full in the appendix to this report, marked B), and from other sources of information, it appears that during the dry seasons the ordinary supply of water for the post not unfrequently fails entirely, while the quality is at all times indifferent. "During the summer of 1876, for several weeks, the use of bath-rooms and water-closets was prohibited, the water-backs of all ranges were removed at considerable cost for plumbing, and at the front gate of each house was to be seen a barrel which was filled daily from a cart. During this time there were no means of checking a fire had one broken out, the health of the inhabitants was in danger from the poisonous gases from sewers and waste-pipes, and much labor needed for other things was absorbed in providing the daily supply, such as it was." In 1877 the regular supply of water was again exhausted, and water had to be repumped into the main from a spring near the level of the Hudson River, which is about 150 feet below the level of the principal buildings. "This expedient presented the necessity of removing the water-backs and of hauling, but it furnished no protection against fire, and would not

*The following testimony of Captain (afterwards Major-General) William B. Franklin, before the commission of 1860, advocating the maintenance of a five rather than a four years' term of study, presents in part the economic side of the question. "The cadet," he says, "could in the fifth year receive instruction which will be of the greatest use to him hereafter. He could in that year gain detailed information in the various branches of his profession that he will never be able to procure afterwards; for it is a well-known fact that young officers are often, very soon after their graduation, placed in charge of works and surveys requiring a practical knowledge which, so far, it has been impossible for them to obtain beforehand. They get it by hard work in the field or in the office, but I believe it is the experience of every officer that much valuable time would have been saved had this knowledge been imparted to them by competent instructors before they had been placed upon the duty requiring it."

have answered the other purposes for any considerable length of time." A good and adequate supply of water for all the academical buildings and grounds can, however, readily be obtained from a small mountain lake or pond, situated about four miles from the post, and at an elevation above the post of about 715 feet. And this lake and the necessary lands adjoining can now be purchased by the government, and all the expenditures for conducting a supply of 400,000 gallons daily to the post be defrayed at a cost which will not be in excess of \$40,000. (For estimates of the detail of these expenditures, reference is again made to a letter of Captain Ernst in the appendix.)

Sewerage.—The sewerage of the Academy and grounds is imperfect and defective. Some years since a complete system of sewerage was commenced, but owing to inadequacy of appropriations the work was never completed; and the system to-day is not what it should be in respect to either recognized sanitary requirements or desirable convenience. Congress, however, since the session of the board, has taken action on the subject, and by making an appropriation adequate to remedy existing defects, has anticipated the recommendations which otherwise the board would have submitted. But the completion of this sewerage system increases the necessity for an adequate water-supply to the post, for without it the channels for the transmission of the sewage are liable to become mere traps for the retention of filth and the generation and transmission of poisonous gases.

Hospital.—Increased and better hospital accommodations being needed for the cadets, the construction of a new building for such purposes was authorized by Congress, and work on the same commenced in 1874. The original appropriation was not, however, sufficient to complete the building, and the structure has now remained some years unfinished, unsightly, and in a condition in which the work already done is continually deteriorating. At the last session of Congress an additional sum was appropriated, but considerably less than it is estimated will be required to complete the external walls and roof in the main building and one wing. Whether this new hospital construction is or is not, in respect to cost or design, all that it should be, are not questions which the board has considered; but they are of the opinion that it is obviously the part of wisdom and economy, now that Congress has passed on the question of its necessity, and now that the structure is nearly completed and the greater part of the expenditure pertaining thereto has been incurred, to go on and finish it at the earliest practicable moment. And they accordingly recommend to Congress that a further appropriation be made for the purpose; the estimate for the amount required being \$36,000, exclusive of gas-fixtures, plumbing, and heating apparatus.

An early completion of the new hospital is also desirable from another point of view. The accommodations for officers, especially officers who have families, stationed at West Point, are at present insufficient and unworthy of a great government; two families in some instances being quartered in small frame buildings which any thriving artisan in any of our large towns and cities would not accept as comfortable for more than one. On the completion of the new hospital, the old one can be turned to good account for quarters, and thus to some extent relieve the crowding and lack of accommodations now experienced.

FISCAL AFFAIRS.

Nothing about the United States Military Academy at West Point is more satisfactory than its fiscal system and management, the disburse-

ments and appropriations being under the charge of Capt. R. F. O'Beirne, and the specific accounts of the Academy and the cadets under Lieut. S. M. Mills; each cadet being credited with his pay of \$540 per annum and charged with the cost of his living, clothing, text-books, and other obligatory or permissive expenditures, down to the cost of the oath of office before a notary public, which he is required to take before receiving his warrant of appointment.

The report of the committee charged with the special examination of this department of the Academy, submitted to and accepted by the board, is as follows:

The committee on finance and accounts have acquainted themselves with the methods pursued by Lieut. S. M. Mills, treasurer of the Military Academy, and express their entire approval of them. They are gratified to find the clothing and other supplies furnished to the cadets are furnished at a very low cost, and they are satisfied that is due in great measure to the good judgment of that officer, and to the labor expended by him in this direction. They are also pleased and surprised to find that in the administration of this office it is possible always to inculcate, and to a great extent to enforce, habits of prudence and economy among the cadets. They feel themselves obliged to recur again to the subject of the general amount of work which the duties of this office as now performed involve, and they earnestly recommend that Congress provide employment of a clerk, whose duty it shall be to assist the treasurer, and whose compensation shall not exceed \$1,200 per annum. Such a clerk was formerly allowed when the work of this office was less than it is at present, but latterly the authorization and appropriation have been discontinued. The committee examined the accounts of Capt. R. F. O'Beirne, the disbursing officer of the post, and desire to express themselves fully satisfied with the carefulness and attention bestowed upon the laborious and complex work of this office by such officer.

It speaks volumes for the credit of the fiscal system of the post and for the fidelity and capacity of the officers intrusted with the disbursements that the expenses of the Academy are, as a rule, perhaps invariably less than the sums authorized by Congress to be expended; and that the ordinary and miscellaneous expenses for the fiscal year 1878 were \$24,084 less than was expended for similar purposes during the fiscal year 1876.

COST OF THE UNITED STATES MILITARY ACADEMY AT WEST POINT, IN THE AGGREGATE, AND PRESENT ANNUAL EXPENDITURES.

It is important to ask attention at this point to the aggregate cost, so far as it can be ascertained, of the United States Military Academy at West Point since its foundation, and also to the present annual expense to the nation of maintaining the institution—matters in respect to which the general public have little definite information.

Under the influence and in accordance with the recommendations of Washington, Congress, in 1798, created a regiment of artilleryists and engineers in addition to the then existing Army, and provided for the supplying of it with books, apparatus, and a corps of four instructors; the intent being to lay the foundations for a national military school. The scheme was not carried out with success, mainly by reason of a lack of competent instructors; and the necessity of a supply of educated officers for the Army becoming more and more apparent, Congress by a further act, in 1802, definitely established a national military academy, and fixed upon West Point as its location. As first instituted, the academic corps of officers and cadets was very limited (not exceeding twenty); until 1812, when the Academy was reorganized, and an increase of cadets to the number of 236 authorized. The annual expenditures must also, and of necessity, have been comparatively small; but how much in the aggregate and in detail cannot now probably be stated. Since 1815 the information under this head is, however,

more definite; and for the sixty-three years prior to and ending June 30, 1878, the total cost of the West Point Military Academy proper to the nation has been estimated at \$10,998,083, or an average of \$174,572.76 per annum. If we estimate the expenditures on account of the Academy for the first twelve years of its existence, or from 1803 to 1815, at \$50,000 per annum, an estimate probably above rather than below the actual disbursements, the total cost of the Academy proper, from the period of its foundation to the present year (1878), may be estimated at \$11,598,000. But of the total sum appropriated by Congress since 1815 for the support and maintenance of the Academy, \$1,210,200.38 has been on account of "buildings and grounds"; and the repairs and improvements have kept the buildings at all times in at least as valuable condition as when new. So that the present value of the buildings alone cannot fairly be estimated at a less sum than one million of dollars.

For the fiscal year ending June 30, 1878, the total expenditure on behalf of the Academy proper was \$250,126.43, comprising the following items:

For pay of cadets	\$140,224 50
Expenses, travel, &c., cadets discharged	1,642 50
Pay of professors	34,800 00
Pay of officers of the Army (acting as instructors) in addition to Army pay	6,200 00
Pay of other instructors and Military Academy band	11,579 00
	<hr/>
Total from Military Academy appropriation	194,446 00
For current and ordinary expenses, fuel, apparatus, repairs, improvements, printing, stationery, postage, transportation of materials, clerk-hire, expenses several departments of instruction, &c.	40,893 89
For miscellaneous items and incidental expenses, gas, oil, water supply, library, chapel furniture, renewals, hospital furniture, repairs, firemen, engineers, &c.	13,278 94
For buildings and grounds	1,507 60
	<hr/>
Total cost Academy proper	250,126 43

There was also expended during the fiscal year ending June 30, 1878, from the Army appropriations, on account of the officers and troops of the Army on duty and stationed at the Academy, including pay of officers and men, cost of subsistence of enlisted men, cost of cavalry horses for instruction of cadets, forage, staw, fuel, &c., the further sum of \$187,814.12. This, added to expenditures of the Academy proper, makes the total amount expended at the Academy for the fiscal year 1878 \$437,940.55.

Considered apart and without reference to the magnitude of the scale upon which the operations of a great government are necessarily conducted, such an aggregate of expenditure doubtless to many seems large, and as affording a field for the exercise of further measures of national retrenchment and economy. The circumstance, moreover, that these expenditures are singled out from other military and naval appropriations and made the subject of a special bill (Military Academy appropriation bill) at each session of Congress, also tends to bring them conspicuously each year before the public, and, speaking comparatively, to invest them with an undue and exaggerated importance. The institution of a few comparisons may be, therefore, both interesting and instructive.

Estimating the cost to the Federal Government of all the lands, buildings, apparatus, library, and other appurtenances for instruction at West Point at \$2,000,000, this sum does not represent more than 50 to 75 per cent. of the cost of a single one of the great iron-clad vessels which the various nations of Europe have been of late years, and are

now, constructing; it does not represent the cost of any one of the numerous first-class granite or brick forts which have been erected during the last half century at our harbor mouths, and which armored ships and rifled ordnance have of late years rendered comparatively worthless; it does not equal the expenditures which have been bestowed on any one of the principal navy-yards of the country, from Portsmouth to Pensacola, one-half of which, probably, could be profitably dispensed with.

Again, the annual cost of the maintenance of the United States Military Academy *proper* at West Point, as before shown, is at present about \$250,000. This is about one-fourth of the cost of a regiment of infantry, and about equal to the cost of keeping an old ship of the line, or a present first-class armored naval vessel in commission. As a part of the military system of this country, which no patriotic and intelligent citizen would at present for a moment think of discarding, the annual cost of maintaining the national Military Academy is therefore, as before claimed, comparatively insignificant.

To further assist to a correct judgment on this subject, attention is also here asked to the concurrent expenditures of Great Britain and of France on account of military education. Thus, the annual expenditures authorized by Parliament under the head of "military education" in Great Britain is at present about \$900,000; five exclusively military educational institutions or colleges being maintained, in addition to two asylums for the education of soldiers' children, viz, the Royal Military Academy at Woolwich, the Royal Military Academy at Sandhurst, the Staff College at Sandhurst, the Department for the Instruction of Artillery Officers, and the National Military Medical School.

France, before the Franco-Prussian war, maintained eight military colleges or schools, which were subdivided into fifteen. The total cost of these schools was about 3,000,000 francs (or \$600,000) per annum, of which the Special Military School (or College), St. Cyr, absorbed 1,285,938 francs (\$259,189) per annum, or about the same as the West Point Academy *proper*; the Polytechnic School, 664,300 francs; the School for Artillery and Engineers, 99,500 francs; the Cavalry School, 236,425 francs; and the School for Musketry, 36,270 francs. The Polytechnic School has 51 professors and teachers, the Special Military School 47 attached commissioned officers of different arms of the service, 19 other instructors and 72 "administrators," and the School for Cavalry 240 instructors, and from 30 to 40 farriers. About 1,500 pupils holding positions analogous to the United States Military Academy cadets are under constant national military education, besides graduates and officers of the line detailed for special educational courses. In Germany, the system of national military education is understood to be even more extensive and thorough than it is in either Great Britain or France.

CONCLUSION.

Reviewing the above recommendations, it will be seen, as before stated, that with the exception of raising the educational standard for admission to the Academy, and the revision of the subsequent four years' course of instruction, which would be contingent upon and made necessary by such change, there is, in the opinion of the Board, but little present demand or large opportunity for improving the existing condition of affairs at the national military school at West Point, save through the granting of some additional appropriations by Congress. The Board fully recognize, however, that the financial condition of the

country and the present temper of the public alike demand the practice of the most rigid economy in respect to all national expenditures, and that therefore it would be inexpedient, if not useless, for them to ask for any material departure from such policy on the part of Congress in determining the next appropriation for the maintenance of the Academy. With the exception of the recommendation of the allowance of an extra clerk in aid of the fiscal offices of the post, which at the outside will not involve an increase of expenditure in excess of twelve hundred dollars, the Board have accordingly not recommended the increased appropriation of a single dollar for the Academy over and above the average amount usually granted, except with a view of promoting economy conjointly with efficiency. Thus, for example, there can be no profit in respect to either money, morals, or humanity, for the government to omit to provide West Point with a proper system of water-supply and sewerage, and thereby imperil the health and lives of the cadets and other occupants of the post. There can be no saving to the Treasury in refusing to anticipate the possible invasion of the Academy by infectious or contagious diseases by omitting to provide good and sufficient hospital accommodations in the event of such contingencies; especially when the bulk of all necessary expenditures has been already incurred. And, finally, it is financiering in opposition to all business experience and principles to expose two or more millions of public property to almost certain destruction by fire in order to save the expenditure of a few thousands in providing such a supply of water as in addition to its other benefits would render any extensive conflagration almost impossible. Economy that works in such a sphere is fitly characterized by the old and coarse proverbial expression, "saving at the spigot and wasting at the bung." The nation may temporarily be feeling poor, but it is not so poor that it cannot afford to do well what it finds necessary or expedient to do at all.

A reform in the laws for the assessment and collection of the internal revenues on distilled spirits and tobacco, based on the combined experience of time and nations, and a prevention of the frauds and losses in the importation and entry of sugars, silks, gloves, and many other like articles of foreign production,* would in a single year give to the national Treasury funds, in addition to what it now receives, sufficient to defray all the expenses of West Point, and possibly of the Naval Academy, for the remainder of this century; and this, too, without imposing a single additional burden of taxation upon the people. And if the impediments to national production and exchange which now result from the acceptance of bad fiscal theories and the maintenance of bad laws could be removed, the people of this country would be too prosperous and wealthy, and too busy in promoting their own comfort and material abundance, to criticise their chosen representatives, if in providing for the work the government finds it is necessary to do, the inclination is to the side of liberality rather than to close-fisted and calculating parsimony.

Finally, in reviewing the reports of previous Boards of Visitors to the West Point Military Academy, this notable and curious circumstance reveals itself, namely, that every board previously acting and made up of selections of citizens from all sections of the country, from all parties and religious denominations, and representing a great variety of professions,

* In a letter addressed to the chairman of the Committee of Ways and Means of the House of Representatives, under date of the 5th June, 1878, the Secretary of the Treasury states the belief to be well founded, "that under the present tariff the annual loss to the revenue upon importations of silks and gloves amounts to more than three millions of dollars."

business, or occupations, has gone away from its work unanimously recommending the Academy to the confidence and support of the people of the country. And the present Board, while cordially reaffirming this judgment of their predecessors, would further add, that they feel confident, if the people of the United States would but examine for themselves into the origin, development, and present working of the Academy, and the service of its graduates, and not allow themselves to be unduly influenced by those who speak without adequate information, or worse, by those whose mission it would seem to be to induce the people to believe lies,* then West Point, in place of being in any degree an object of popular prejudice and suspicion, would, on the contrary, be rather an object of pride to the whole nation, an institution of whose graduates it is no small compliment to say *that they neither steal nor tell lies.* †

Signed in accordance with the vote of the board, October, 1878.

DAVID A. WELLS,
President.
SAML. B. FRANKLIN,
U. S. N., Vice-President.
CHAS. S. VENABLE,
Secretary.

To the Hon. SECRETARY OF WAR.

* The following paragraph, forming part of a long communication on the cost of the Army of the United States, which was conspicuously published in one of the influential and widely read newspapers of New York, while this report was in course of preparation, September 13, 1878, offers a striking illustration of the lack of correct popular information respecting the West Point Military Academy, or, more probably, of how efforts seem to be deliberately made, from time to time, to excite unreasonable prejudices in the popular mind against this institution:

"If the staff of West Point were cut down to-morrow to six teachers, and the cadets in number to one from each State, chosen by public competition from the State schools, public and private, we would save three millions a year in salaries, and have a better Army than we have now."

Now, when it is remembered that the entire annual cost, direct and indirect, of the West Point Academy *proper*, and for pay and subsistence of the military forces stationed at that post, is less than *fifteen* per cent. of the amount which it is here claimed could be saved to the nation by a reduction in the number of cadets and instructors, the absurdity of the above statement becomes at once apparent. And yet this statement was published as truth, suffered to pass uncontradicted, and was probably accepted by no small number of readers as a matter about which there could be no contradiction.

† Whatever be the political sentiments of Frenchmen—Republicans, Legitimists, or Imperialists—there is a common feeling of pride and favor for the French national military school of St. Cyr and for the polytechnic school of France, and to have graduated creditably from either of these national educational institutions is an honor that adheres to a citizen of France for the remainder of his life.

APPENDIX.

A.—Schedule of questions used in the examination of applicants for admission to the United States Military Academy at West Point, June, 1878.

EXAMINATION IN ENGLISH GRAMMAR.

Time allotted, two hours.

DIVISION I.

1. What is English grammar?
2. What is a verb? What are its properties?
3. Give the first person singular of all the tenses in the indicative mood of the verbs *Drive, Smite*.
4. State the difference between a transitive and an intransitive verb. Give an example of each.
5. What is a participle?
6. Construct a sentence (or sentences) illustrating the use of the participle as a part of a verb, as an adjective, and as a verbal noun.
7. Name the interrogative pronouns, and give the rule for their use in reference to persons and things.
8. How must pronouns agree with the nouns for which they stand?

DIVISION II.

Directions.—In parsing, rules are not to be given. Each word must be fully parsed, so as to show *what it is*, and its *relation* to other words in the sentence.

Parse the following sentence:

Young men entering military life should be actuated by the highest motives that govern humanity, and learn to fear dishonor more than death.

DIVISION III.

Correct all the errors in the following sentences:

1. Who should I trust if not he who I have lived with?
 2. Everybody ought to follow the dictates of their own conscience.
 3. By no means be not seen.
 4. Each have their own faults.
 5. He done it, for I seen him do it.
 6. He writes like I do.
 7. No one does it more easily than her.
 8. Neither he or I were in fault.
 9. Between you and I he acted very unwisely.
 10. Was it you or him that did it? It was me.
 11. Each of the States are represented.
 12. I was not there nor my sister neither.
 13. I ought to have told him to have gone and got it.
 14. Henry is older, but not so tall as James.
 15. England expects every man to do their duty.
 16. Every one of your arguments are absurd.
 17. A too great variety of studies weaken the mind.
 18. Every man should act suitable to his station in life.
 19. Henry learned me to skate.
 20. He did not act with that loyalty as was expected.
 21. I was once thinking to have written a poem.
 22. Lake Superior is the largest of any lake in the world.
 23. Which of your four brothers is the younger?
 24. The general with all the soldiers were taken.
- N. B.—The candidate will name the text-books on this subject which he has studied.

EXAMINATION IN GEOGRAPHY.

Time allotted, two hours.

1. What river of the United States flows into the Gulf of California?
In what direction does it flow?

2. Name the five great lakes on or near the northern boundary of the United States
What river carries their waters to the ocean?
In what direction does it flow?
Name its principal tributaries.
 3. Name the longest river of the United States.
What are its three principal tributaries?
 4. Where is Great Salt Lake?
Where is Lake George?
Where is Lake Champlain?
Lake Michigan?
 5. Bound Kentucky; name and locate its principal city; name also its political capital.
- [NOTE.—In bounding States—the 5th, 6th, and 7th questions—name the adjoining States, as well as the water-boundaries, rivers, &c.]
6. Bound South Carolina, and name its principal city, and name also its political capital.
 7. Bound Missouri, and name its principal city.
 8. What is the political capital of New York? Of Ohio? Of Illinois? Of Missouri? Of New Hampshire? Of Virginia? Of Louisiana?
 9. How many States in the Union?
Which is the largest State in area?
Which is the smallest State in area?
Which has the greatest number of inhabitants?
 10. Name the Pacific States.
Name the Gulf States in order, beginning on the east.
Name, in order, beginning at the north, the Atlantic States.
What States border on the British possessions or on the great lakes?
 11. How many Territories belong to our Union?
Which one touches the Pacific Ocean?
Which ones touch old Mexico?
 12. Name the principal mountain ranges of North America. Locate them.
 13. Going all the way by water (excluding canals) from Saint Paul, Minn., to West Point, N. Y., through what bodies of water would you pass?
And along what States would you pass?
What three large cities would you see?
 14. Locate the following bays:
Baffin's.
Hudson's.
Raritan.
Delaware.
Chesapeake.
 15. What gulf separates North from South America? What land connects them?
 16. What is the principal river of South America and into what does it flow? Give the latitude of its mouth, about.
 17. What and where is the principal mountain range of South America?
 18. Locate the following capes:
Cape St. Roque.
Cape St. Lucas.
Cape Farewell.
Cape North.
Cape Mendocino.
Cape Race.
 19. Name the three principal oceans of the world.
Which is the largest?
 20. How many continents or grand divisions on the globe?
Which is the largest?
Which the most civilized?
Which the least civilized?
 21. Name the five principal powers of Europe and five of the lesser powers.
 22. What are the principal mountains of Europe and where are they?
 23. Into what does the Danube flow?
 24. Into what does the Rhine flow?
 25. What water separates Ireland from England?
And what separates England from the Continent?
 26. Where is the Black Sea?
Where is the Baltic?
The Adriatic Sea?
 27. What sea is between Africa and Asia?
What isthmus connects Africa and Asia?
 28. What high mountain range in the northern part of India?
 29. What large islands in the Indian Ocean are crossed by the equator?

30. In going all the way by water, and by the Suez Canal, from Calcutta to St. Petersburg, along what waters will you pass?

The candidate will state the text-book, or books, that he has studied upon this subject.

EXAMINATION IN ARITHMETIC.

Time allotted, three hours.

DIVISION I.

1. Find the number of times $\frac{7}{8}$ of $\frac{5}{6}$ of a cubic yard contains 1377.57 cubic inches.

2. Reduce $\frac{9\frac{1}{2} - \frac{1}{2}}{63} \times \frac{4\frac{1}{2} - 3\frac{1}{2}}{\frac{1}{3}}$ to a simple fraction.

$$\frac{28}{28} + 1\frac{1}{2} \quad \frac{\frac{1}{3}}{\frac{2}{21}}$$

3. Reduce $5\frac{1}{2} + \frac{7\frac{1}{2}}{0.5} - 0.725$ to an equivalent decimal.

$$\frac{4 + 3.45}{2\frac{1}{2}}$$

4. 5 cubic feet of gold weigh 98.20 times and 2 cubic feet of copper weigh 18 times as much as a cubic foot of distilled water, how many cubic inches of copper will weigh as much as $\frac{1}{4}$ of a cubic inch of gold?

5. If a person travels $15\frac{3}{4}$ miles a day, and receives 2.76 shillings for each 19,360 feet passed over, how many gallons of wine, at 132.8 farthings a pint, could he buy with the money received, after traveling 7 days, 10 hours, 4 minutes, and 48 seconds?

DIVISION II.

1. Define the least common multiple of two or more numbers, and give the rule for obtaining it.

2. Define the greatest common divisor of two or more numbers, and give the rule for obtaining it in the case of two small numbers.

3. Define a fraction, and explain the difference between a common fraction and a decimal fraction.

4. Explain why multiplying the denominator of any fraction is equivalent to dividing the fraction by the multiplier.

5. Give the rule for obtaining the value of a denominate fraction in integers of lower denominations.

6. Give an example of each of the following, and in the same order as indicated: an improper fraction, a simple fraction, a compound fraction, a complex fraction, and a mixed number.

7. Give the rule for reducing a common fraction to an equivalent decimal, and explain why the resulting decimal will be equal to the common fraction from which it is obtained.

8. Explain how to change any fraction to an equivalent fraction having a given fractional unit. Illustrate by finding how many 17ths there are in $\frac{4}{3}$.

9. State when four numbers are in proportion, and give an example.

10. Give the rule for reducing a compound denominate number to a decimal of a given denomination.

(The candidate will state the text-books in this subject that he has studied, and write his number in a legible hand.)

EXAMINATION IN HISTORY.

Time allotted, two hours.

1. Give the names of four of the principal Spanish discoverers and explorers in America, and the countries visited by them, together with the dates of their explorations.

2. Give the same facts of three English explorers prior to 1620.

3. Who explored and named the Gulf and River of Saint Lawrence and for whom did he claim the country?

4. Give dates and important facts connected with the settlement of the following-named colonies, stating the different settlements therein, by whom made, the motive of immigration, and under whose auspices established:

1. Virginia.

2. Massachusetts.

3. New York.

4. Maryland.

5. How many colonial wars between France and England and by what names are they severally known?

6. Where and when was the treaty of peace between Great Britain and the United States signed after the war of Revolution, and what were the geographical limits assigned by its provisions?

7. When did slavery exist in the New England States?

8. When were the Articles of Confederation between the colonies agreed to by Con-

gress and when ratified? When did the Constitutional Convention meet, who was its presiding officer, and how long before the Constitution was fully ratified by all of the States?

9. What were the causes of the war of 1812 and its results?

10. When was the city of Washington taken by the British and what were the circumstances of its capture?

11. State the limiting dates of the following administrations and the principal events occurring therein:

1. Jackson. 2. Polk.

12. What was the political condition of the country at the beginning of the civil war; what great questions were at issue, and what parties brought forward candidates for the Presidency? Who were these candidates?

13. What States adopted ordinances of secession?

14. What men composed the Cabinet of President Lincoln during his first administration and what office did each hold?

15. When was the emancipation proclamation issued?

16. What movement of the Confederate forces resulted in the battle of Gettysburg; when was it fought, and what its effect?

17. What campaign preceded the surrender of Lee; what was the last important battle of the war, and when did Lee surrender?

Name the text-books you have studied upon this subject.

B.—Estimates of cost for an additional water-supply for the United States Military Academy at West Point.

WEST POINT, N. Y., June 10, 1878.

Hon. DAVID A. WELLS,

President Board of Visitors, West Point, N. Y. :

SIR: In compliance with your verbal request of yesterday, I have the honor to submit the following remarks upon the necessity, estimated cost, and adequacy of the proposed additional water supply for this post.

This proposed supply is to be obtained from "Round Pond," a small mountain lake, situated about four miles west of the post.

1.—NECESSITY.

In the summer of 1876, for several weeks, the use of bath-rooms and water-closets was prohibited, the water-backs of all ranges were removed, at considerable cost for plumbing, and at the front gate of each house was to be seen a barrel, which was filled daily from a cart. During this time there was no means of checking a fire, had one broken out; the health of the inhabitants was in danger from the poisonous gases of sewers and gas-pipes, and much labor needed for other things was absorbed in providing the daily supply, such as it was. This state of affairs is liable to occur every summer. In 1877 the regular supply was again exhausted, and water had to be pumped into the main from a spring near the level of the river, which is about 160 feet below the level of the principal buildings. This expedient prevented the necessity of removing water-backs and hauling, but it furnished no protection against fire, and would not have answered the other purpose for any considerable length of time.

2.—ESTIMATED COST.

For purchase of lake	\$3,000 00
For purchase of adjoining lands, 41 acres, at \$40	1,640 00
For right of way to post	350 00
For syphon and appendages	2,053 00
For 328 tons of 6-inch water-pipe, at \$33	10,824 00
For laying 20,698 feet of same, at \$1	20,698 00
For contingencies	1,435 00
Total	40,000 00

3.—ADEQUACY.

The present consumption of water at this post is less than 100,000 gallons daily. The area of Round Pond at the surface is 11.43 acres; its depth near the middle is 29 feet; the quantity of water available, placing the outlet 23 feet below the surface, is forty-eight million gallons. It will therefore furnish 400,000 gallons daily—four times the present consumption—for four months, which more than covers the dry season. Its depth can be increased to 10 feet by a short embankment and at a small cost, should that be desired in the future.

The water has been analysed under the direction of the post surgeon, and pronounced of good quality.

The height of the lake above the reservoir at the post is 715 feet.

I remain, sir, very respectfully, your obedient servant,

O. H. ERNST, U. S. A.,

Captain of Engineers.