

#### 4. THE SCHOOL-HOUSE AN INDEX.

Persons traveling through a place, judge of it by its external appearance, and in like manner they judge of the interest manifested in the education of youth, by the appearance of the school-houses. Will a good farmer make no improvements in his buildings, and modes of farming? Will he plow with the old straight beam and wooden mould-board, and haul his hay on a sled, and go to mill with his grist in one end of the bag and a stone in the other for balance, because his great-grandfather did, and always got along well enough in the world? Some people are very much troubled about their money, where they can invest it, and have it safe. I think the best investment would be in building good school-houses for the education of the rising generation. It would certainly pay a larger per cent. of profit to the town than any railroad stock in the country, and if it did not directly increase the value of real estate, (which I think it might,) it would largely increase the number of good citizens, which would add immensely to the value of the town. If I had the means, and desired to hand my name down to posterity as a public benefactor, I can think of no better and surer way of doing it, than by establishing good schools for the education of the youth. Our country needs more men of large and generous culture and it is a noble work to train men for her, at this hour of her need.

J. D.

#### 5. MILITARY INSTRUCTION IN SCHOOLS.

At the recent Educational meeting at Cleveland Mr. Tappan presented the report of the Committee on military education: The report opened with the proposition that it is the duty of the State to give a military education to every boy in the State. The truth of this proposition was argued, first from the fact that it is the duty of every man in the State to be a soldier, and boyhood is the best time in life to gain the education necessary to make him a soldier. Another reason urged was that a military education is good in itself. It is an excellent educational method, because it is thorough. In answer to the objection urged against a military education, viz., that it will make the nation warlike and give to it a military character, it was stated as an historical fact that within the last half century more money has been spent and more pains taken by France, Russia, and latterly by England, to give a military education to the youth of these respective countries, and to make military preparation, than was ever taken before; yet there has not been a time for centuries when we have had such a long peace as within the last fifty years. From the close of the wars of Napoleon until the breaking out of the war of the Crimea, there was, we may say, nothing of war in Europe. So far as history can teach, then, we are taught that a thorough military preparation secures peace; that the nation which is prepared for war is not inclined hastily or rashly to rush into war. A nation prepared for any emergency that may be required for self-defence, like a great man, is less likely to be quarrelsome than a nation not thus prepared. The large mastiff is always more peaceable than the pestilent little terrier. Thorough education makes a great nation; and military education is the most thorough of all.

The first requisite of a good soldier is that he must be a good man. Virtue gives courage. It is a common notion that a free man must be broken in before he becomes an efficient soldier. The greatest generals have always taken the utmost care to cultivate the intelligence of their soldiers, and to reward every noble and manly action. If, then, we educate boys for soldiers, the foundation is to be laid in all those virtues which unite to make the genuine good man. After this, the most important item to the soldier boy is his physical education. First in this, teach him how to take care of his hands, legs, and body. This may be done perhaps by gymnastics. A child thus trained can do many things which another of equal strength cannot do merely for want of practical skill. The boy who has been to a school of Free Gymnastics and there has learned to take care of himself enters a room with ease and grace. Another important thing taught by this method of gymnastics is the habit of immediate, exact, implicit obedient to commands. This cannot be taught too soon.

Until children are twelve years of age, no particular education in military movements of any kind whatever should be given. From twelve to sixteen years of age the boys of the school should be taught marchings, facings, and company evolutions, as laid down in our books on military tactics, except the manual of arms. Boys would take pride in it as a preparation for the work of men, and for the defence of their country, its rights and institutions.

After the age of sixteen give them arms and let them be taught the manual of arms. It is true that a great many of the boys of this age do not attend school, but soon after this age the law finds them and subjects them to sundry penalties if they do not attend the militia schools. We have now many returned soldiers, unfit by wounds or ill health for further service, who could give military

instruction in every township of the State at a trifling expense. One such teacher in a township would be able to visit occasionally every school, enough to give some lessons to the boys from twelve to sixteen; and he could every year hold a military training school for some weeks for the youth from sixteen to twenty years of age. Attendance should be required by fine and penalties, as we do now under the militia system. This military instruction continued for twenty years would give the country virtually a standing army of well drilled, free men.

### IV. Papers on Science and Natural History.

#### 1. APPARENT SIZE OF THE CELESTIAL BODIES.

The new experiments of Mr. Alvan Clark, on the photometrical comparison of the sun and stars, are very curious and interesting. If we place a convex lens of the known focal distance of one foot between the eye and a star of the first magnitude, and find, when the lens is removed to a distance of eleven feet, that the star is reduced in appearance to a sixth magnitude, or just visible, it is clear that as the star has undergone a reduction of ten diameters, it would be visible to the natural vision if removed in space to ten times its present distance, supposing no absorbing or extinguishing medium to exist there. A concave lens can be used for such experiments, the measurement commencing then at the lens itself. Reductions have been obtained in these ways of well-known stars, and give Castor as visible when reduced 10.3 times, Pollux eleven times, Procyon twelve, Sirius twenty times, the full moon three thousand, and the sun one million two hundred thousand times. Mr. Alvan Clark has actually seen the sun under such a reduction, attended by circumstances which led him to believe that to be about the limit at which the human eye could ever perceive our great luminary. He has an underground dark chamber, two hundred and thirty feet in length, communicating at one end with the surface of the ground by an opening five feet deep, in which a lens of any required focal distance can be inserted,—one of a twentieth of an inch focus, with its flat side cemented to one face of a prism, has been employed by Mr. Clark. No light whatever can enter the chamber, except through the little lens. A common silvered mirror over the opening receives the direct rays of the sun, and sends them down the opening into the prism, by which they are directed through the little lens into the chamber. An observer at the opposite end of the cellar sees the sun reduced in apparent size 55,200 times, and its light, then, in amount, varies but little from that of Sirius. Upon a car moveable in either direction is mounted another lens, with a focal distance of six inches. The eye of the observer being brought in a line with the lenses, he sends the car by a cord into the chamber to the greatest distance that he can see the light through the six-inch lens.

At noon, with a perfectly clear sky, the sun is thus visible at twelve feet away from the eye. The distance between the two lenses being two hundred and eighteen feet, the reduction by the small lens, if viewed from the point occupied by the car-lens, would be 52,320 times, and that again is reduced by the six-inch lens twenty-three times, making the total reduction 1,203,360 times. There seems no reason to doubt—setting aside the idea of an extinguishing medium in space—that our sun would be only just visible to a human eye at 120,000 times the present distance; or at 100,000 times away it would rank only as a pretty bright star of the first magnitude, although its parallax would be double that imputed to any star in the whole heavens, or only half as far away as the nearest. Because the sun's intrinsic splendor proves to be less than that of those stars whose distances have been measured, Mr. Clark does not think it necessarily follows that its light or size is less than the average of existing stars; for, in the case of there being a diversity in size or brilliancy amongst the stars in space—as is most likely—those that would be visible would, of course, be the largest and brightest, while, by the laws of perspective, the smaller ones would be lost to view. Such would be the case equally with telescopic stars as well as those evident to the naked eye. The number of stars visible within a given area of space, by the aid of the more powerful telescopes, is far less in proportion to the power of the instruments than those visible in like areas to the unassisted eye or with smaller telescopes; and this fact has given rise to the idea of an extinguishing medium to light in space; but upon the above hypothesis, the result might equally arise from the diminution in perspective, as in this way we should see the whole, both great and small, of the stars in the nearer distances with moderate powers; while, though great and small did exist in the far off regions bounding the remotest reach of our most powerful telescopes, it would be only the great stars that we could see, and those only as the most minute specks of light. A vast number of smaller or more moderate lights may then exist amongst those whose extraordinary splendor