

General Science and Miscellany.

NORMAL SCHOOL, TORONTO.

The half-yearly examination of this valuable institution, which seems destined to run a career of increasing usefulness, took place in this city, on the 17th, 18th, and 19th of April. Our limits necessarily compel us to a brief general notice. The examination, upon the whole, was creditable alike to the indefatigable teachers and their pupils, and was witnessed by large and respectable audiences with evident satisfaction. His Excellency the Governor-General's prizes for the two pupils evincing the greatest proficiency in Chemistry, Geology, Animal and Vegetable Physiology; more particularly in their bearings on the theory and practice of Agriculture, were presented by His Excellency in person. It will be seen that the second prize was divided between two competitors, one of whom was a female, both being considered by the judges on a par. The following report of his Lordship's remarks, we copy from a city paper.

His Excellency was then called upon to present the prizes. He said, that before doing so, he desired to express his acknowledgments to those gentlemen who had been good enough to act as judges on the occasion, without whose assistance, and the admirable manner in which they had been seconded by the labours of Mr. Hind, what he (Lord Elgin) had done, would have been entirely useless. When the public mind of England had been aroused to the necessity of popular education, it was thought that there would be no difficulty in finding a sufficient number of teachers for the schools then established, that where the demand was created the supply would speedily follow; and this was soon discovered to be a mistake, and that it was necessary to supply the want by carefully training them. It was satisfactory to think that in the early days of Canadian education, this fact had been recognised, and the desire to remedy it been evinced by liberal grants by Parliament to this institution and the attendance of large numbers of pupils. The prizes which he had offered were in one department only of the studies prosecuted in the institution; he hoped however, that they would not think from that circumstance that he was disposed to undervalue the other branches of instruction; he thought that the knowledge imparted should be as extensive as circumstances would admit, that the education of the persons who were to undertake the task of moulding the minds of the rising generation of the province, should be as high as possible, with a due regard, which should always be paid, to the great principle of religion and Christian morality. He did not undervalue other branches, but he had offered prizes to those who had attained most proficiency in the knowledge of scientific husbandry, because he believed that too little attention had hitherto been paid to it, and because it was one from which the Province might derive great benefit. He knew that there was a prejudice amongst practical men, against scientific agriculture, and it was not altogether unreasonable, as there had been, no doubt, a great many things set forth under high sounding titles, which were not founded on a sound basis, and had proved only sources of loss to their projectors; these failures, however, arose from not understanding thoroughly the true principles of the art. The difference between the two parties was simply this, the practical man judged of matters on a small scale,

the scientific man on a large one; the practical man was in danger of taking an exception for a rule, a consequence for a cause; both agreed in there being certain natural laws, by which they were obliged to act; but the practical man judged only from his own experience of these natural laws—he refused to believe or profit by anything which he had not seen. He adopted the fallacy of Hume, who said that all contrary to experience was false—that miracles were contrary to nature, and the history of them therefore untrue. He believed that in giving the practical man scientific information, they were not only giving him the means of a direct benefit to himself, but giving him a guard against the projects of mere speculators. One other reason actuated him in choosing this subject. He thought it of the utmost importance in this country to raise the character of the agriculturist, to make the pursuit honorable, that young men might not suppose that their time was thrown away in cultivating the soil. In Great Britain, all the leading public men, statesmen, and even warriors, the Consort of Her Majesty himself, were scientific agriculturists, and even in knowledge of detail could put practical farmers to the blush. In the neighbouring country also, he had lately seen that at a trial of a new plough, the gallant soldier, who now occupied the position of President of the Republic, handled the instrument with the skill of a workman. In this age no art would keep its place among honourable pursuits unless science was called to its aid and he trusted that those before him, in the positions which they would shortly fill, would inculcate on their pupils the great importance of its introduction into Canadian Agriculture. His Excellency concluded with an earnest prayer that they might be successful in doing so, and that God might bless them in all parts of the laborious duty in which they were about to be engaged. His Excellency then presented the prizes, which were in the form of very handsome books, to the successful competitors.

1st. Mr. Weston Herriman, of the Township of Whitby.

2nd. Mrs. Dorcas Clarke, of Pickering, and Mr. Finlay McNab, of North Elmsley, County of Lanark.

NATURAL PHILOSOPHY.

No. IV.

ON THE MECHANICAL POWERS.

There are six mechanical powers, viz., the *lever*, the *pulley*, the *wheel*, and *axle*, the *inclined plane*, the *wedge* and the *screw*. One or more of these enters into the composition of every machine.

In order to understand the power of a machine, there are four things to be considered. *Firstly*, the power that acts; this consists in the effort of men or horses, of weights, springs, steam, &c. *Secondly*,—the resistance which is to be overcome by the power. The effect of the power must always be superior to the resistance, otherwise the machine could not be put in motion. For instance, were the resistance of a carriage equal to the strength of the horses employed to draw it, they would not be able to draw it. *Thirdly*, we are to consider the centre of motion, or, as it is termed in mechanics, the *fulcrum*, which means a prop. And *lastly*, the respective velocities of the power, and of the resistance.

THE LEVER.

The *lever* is an inflexible rod or beam, that is to say one which is not supposed to bend in any direction.—For instance, the steel rod, to which a pair of scales