

7. If m shillings in a row reach as far as n sovereigns, and a pile of p shillings as high as that of q sovereigns, compare the values of equal bulks of gold and silver.

8. A rectangular parallelogram 26 feet long and 14 feet wide is immersed in a fluid, its shorter end coinciding with the horizontal surface, and its plane inclined to the surface in an angle of $56^\circ 35'$; find the pressure on each of the triangles formed by the diagonal.

9. Proposed by William Waddell, Shakespeare:

A uniform rod AB is 40 feet long, and weighs 50 lbs.; it has a weight of 80 lbs. attached at A , and a weight of 10 lbs. at B ; at what distance from A should a fulcrum be placed to produce equilibrium?

4. ON MATHEMATICS.

In the fewness and simplicity of its elements; in the abstruseness and infinity of its endings; and, in the usefulness and extensiveness of its applications; this science has no equal. It begins on our fingers and ends on the sands of the ocean. All magnitudes from a molecule to a mountain are alike to it; all magnitudes real or imaginary, from nothing and less to infinity, are calculated by it with unerring precision. No other science so severely tries, and none so thoroughly purifies the mind. Its immutability is remarkable: we can conceive gravity diminished one-half; we can conceive chemical affinities varied or reversed; but we cannot conceive how the three interior angles of a plane triangle could be more or less than two right angles. We have yet another attribute to name—*perfection*; one that renders the science far more like a celestial science than an earthly one. All its references are to perfect forms; but, we have no such things: our points are patches; our lines are lanes, differentials of areas and no lines at all; our circles are round ruffles, and our spheres and cones are covered with pits and points. I am convinced that neither Art nor Nature has made a perfect sphere: the rotundity of the discs on soup, are disturbed by the unequal lateral attractions consequent to the imperfectly formed vessel. Notwithstanding all this, there are motions far more exact than any formulæ we can make to represent these motions; hence we do not know the exact length of a natural year. Canada, like all other new countries, has hitherto been unfavourable for the prosecution of this beautiful science—the extraction of pine and hemlock roots needing more attention than the extraction of the square and cube roots; and, indeed, with all classes, the prosecution has been limited by professional necessity. The introduction of the science of mechanics among teachers was a cogent movement on the part of the Government; it affords teachers an amusing and useful application of formulæ whose use before was not clearly seen. The space allotted to mathematical correspondents in this journal affords them opportunities rarely to be had elsewhere; and the kind of problems appearing in it, from time to time, are extremely well selected; they are just hard enough to tempt trial, but not so hard as to discourage it.

JOHN IRELAND,
Teacher, S. S. No. 12, E. Garafaza.

VII. Extracts from Periodicals.

1. RESUME OF RECENT OPINIONS OF AMERICAN EDUCATORS.

The Western superintendents discuss the most important questions in American public school education with great vigour.

Moral Culture.—Scarcely any one, for example, has spoken so strenuously for moral training as Mr. Hopkins, of Indiana. According to him, "The leading object in the organization of any school system should be the moral culture of the children. . . . Did not the advocates of the free-school system promise the people that if they would take upon their shoulders the additional burden of taxation for its support, the same would be lightened by the diminution of crime? Is there any perceptible decrease of crime in Indiana? Is there any reasonable probability that there will be? It is becoming a grave question among those who take comprehensive views of the subject of education, whether this intellectual culture without moral is not rather an injury than a benefit. Is it not giving teeth to the lion and fangs to the serpent? That is the true system of training which adapts itself to the entire complex nature of the child. No free government can safely ignore this grave subject, for nations that lose their virtue soon lose their freedom."

The superintendent of Missouri quotes from the superintendent of Ohio on the same subject, "Is it reasonable to suppose that the silent example, or 'unconscious tuition,' of men and women teach-

ers of unsullied character is all that is requisite to make the youth of our schools honest, industrious, law-abiding, patriotic, able to discern clearly the exact boundary between right and wrong? Most certainly not. Our youth must receive direct, positive instruction in moral science, and be trained to make the demands of moral rules govern them in the conduct of their lives. The lips of our teachers must not be sealed, even if they do now and then allude to the existence of other truths than those upon which, by the universal assent of the civilized world, a science of morals can be founded. . . . The child may be taught to respect the rights and feelings of others; to obey its parents and those placed in authority over it; to be kind, truthful, frank, unselfish, chaste, courteous, respectful. As its education advances, it may be instructed in the truth of that morality which concerns the family, society, and the state. It may be taught to love the true and the genuine, to hate all shams and humbugs, to have faith in whatever is right, to be honest in business transactions, to respect those principles of honour upon which all good citizenship rests, and to cherish and practise those virtues which are the glory and beauty of character. Such instruction as this is not sectarian, and every true patriot and philanthropist will rejoice when it shall be required to be given in every school in the land."

Spirit and Deportment.—The Hon. Newton Bateman, of Illinois, would have children trained to be "gentle and refined in speech and manner, docile in spirit and modest in deportment, truthful, ingenuous and manly, obedient, respectful and affectionate toward their parents and teachers, and reverential toward God and to whatsoever things are sacred and holy. These things, it is true, are not so immediately within the control of teachers, but the influence, example and precept of the school-room should all tend that way." Finally, from distant and problematical Utah comes the same or even stronger admonition: "Are we not apt to be narrow in our educational ideas, and to give undue weight to intellectual culture? It has been truthfully said that the exaltation of talent, as it is called, above virtue and religion is the curse of the age. Education is now chiefly a stimulus to learning, and thus men acquire power without the principles which alone make it good. Talent is worshipped; but if, divorced from rectitude it will prove more of a demon than a god. . . . In teachers' institutes the importance of moral training should receive special attention."

Apropos of these teachers' institutes, which are held all over our country, and which our school authorities so steadfastly believe in, what the superintendent of Utah says on the subject will stand for what they all say: "An institute is a potent auxiliary in the aid of educational interests. It should develop the best methods of organizing, governing, and teaching the school, and elucidate the true order of mental development. It is needed to secure and maintain uniformity in school management and the conduct of school exercises, and is a current calendar by which the teachers throughout the Territory may be posted in relation to educational improvements. In one of the California school reports it is stated, 'In some counties the first real impulse to the cause of education dates from the first institutes held in them.' The superintendent of Missouri thus refers to them: 'I shall not be guilty of throwing a false colour on the report if I assert that the teachers' institute is second to no instrumentality used in the State to promote the improvement of the teachers. Even in its lowest estate it is good. It is good as a social power. It is good as an intellectual stimulus. It is good as a cultivator of earnest, liberal thought and discussion.' Or in other and still plainer language, we may say that, considered as a teachers' debating society, the institute has its value; but whether it does the work so fondly hoped for it, i.e., puts much real knowledge or many ideas that are good for anything into the empty heads of the young school-mistresses who attend it for a few days yearly, is another question. Quite as often they are treated to a temperance exhortation, or to a third-class elocutionary recitation as to anything really relating to their profession."

Trained Teachers.—Of course the want of trained teachers is the crying want of the West as it is of the rest of the country, and as it must be until male and female principals from our colleges and assistants from the high schools can be furnished in numbers sufficient to supply the majority of the schools. It is thought by many that severe systems of examinations will lighten the difficulty, but let us listen to the energetic protest of the superintendent of California upon this solution of the problem. "California," he says, "is justly held up as a bright example in first inaugurating the system of state examinations." Yet he admits that "it is not possible to insure even a modicum of literary culture on this system of examining teachers. Examinations are frequently dishonest. Not only the candidate resorts to dishonest means; the county superintendents themselves have been known to give candidates a few days' preliminary examinations upon the questions upon which they are required to pass. Indeed, the evil became so notorious, so cry-