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THE CANADA
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AN ADDRESS DELIVERED BEFORE THE FIRST-YEAR CLASSICAL ASSOCIATION UNIVERSITY COLLEGE, TORONTO.

BY H. RUSHTON FAIRCLOUGH, M.A.

ὁ τι καλὸν φίλον αἰεί.

AFTER much hesitation and debate, I have concluded that there is no text so appropriate for a short address to classical students as the line which, with the Greeks of old, often formed the burden of their songs—ὁ τι καλὸν φίλον αἰεί. These words you have well chosen as the motto of your new society, the Classical Association of University College. "The Beautiful is ever dear," and this association has come into being from a desire to cherish and foster and extend the influence of those beauties of classical antiquity which are still dear and precious even in the last decade of the nineteenth century, even in this ultima Thule of the world—Canada, our beloved country.

You who are but entering upon the classical course have often, no doubt, spoken in all sincerity of the beauties of the classics, though you have as yet encountered but a few of their glories. You are, perhaps, like those

who have just passed within the gates of a noble park, which stretches for many miles beyond. Even now you catch glimpses of loveliness, but yet unseen by you are countless beauties in hill and vale, in lakelets and streams, in wood and meadow-land. Happy will you be if you but push on to the brow of yonder distant height, whence you may look down with joy and pride upon the broad acres beneath.

In the famous funeral oration of Pericles, in the second book of Thucydides, the speaker eulogizes his native city, and dwells with pride upon her glories. "We love beauty," he exclaims, "linked with simplicity; we love knowledge, free from effeminacy." This remark is a retort to the frequent taunt of the Spartans that the devotion of the Athenians to art and literature made that people less manly, vigorous and warlike. They themselves, who cared not for such effeminate delights, but from their youth up were inured to physical hardships and suffering, displayed

a valour and heroic dignity of character with which the graces and refinements of life would have been incompatible.

If we abbreviate the reply of Pericles, so as to make beauty apply to both art and literature, and say that the Athenians loved beauty free from effeminacy, we shall still be giving the sense of the patriot's proud boast. Beauty free from effeminacy, beauty and strength—here we have a pithy characterization of Athenian genius.

Beauty may be weak and superficial. Mere prettiness may please our fancy, but if we find that the beauty is but on the surface, that there is no beauty behind, no loveliness of character, no strength of feeling, then the merely external beauty becomes to a thoughtful mind a cause of pain rather than of pleasure.

Such beauty is not what the Athenians loved; beauty of form was to them but the outward sign of an inward and spiritual beauty—that beauty of mind and soul which in the lofty idealism of Plato was an *εἶδωλον* or image or gleam of the divine Beauty itself. Such inward beauty did Socrates possess—he who was grotesque to look upon, with his upturned, outspread nose, his coarse lips, large mouth, thick neck and corpulent body.

Beauty, then, must be united with strength. Aphrodite is the natural spouse of Ares, and in literature, as well as in other spheres, is the combination to be maintained.

When tested by this standard, much of the popular literature of to-day is faulty. Most of it consists of petty trifles, the constant reading of which weakens our minds, and robs us of the power to enjoy the nobler, stronger fruits of great intellects. Many poets there are who charm for the moment with the sweet jingle of their lines, who give us "Ballades of Blue China," or "Magnolia Leaves," and other airy nothings, which sally forth

in dainty garb from publishers' counters, and for a season are the talk of the drawing-room circle at afternoon teas, but which are shortly to be found by the curious only in dusty corners of museums and public libraries.

But much of the literature of to-day is devoid of all beauty, for that which is ugly cannot at the same time be lovely. The numerous works of fiction which illustrate French realism and grovel in the revolting details of vice are so strong that they are positively rank, but they are a sure proof that the people who can tolerate and enjoy them have lost all sense of the truly beautiful.

Now it is because the great works of antiquity, which have stood the test of ages, and which it is our privilege to study and contemplate, are in a preeminent degree possessed of this duality of virtue—beauty and strength—that they must ever appeal powerfully to intellectual minds, and must ever be prominent factors in educational systems.

The classics are instinct with beauty because they are the intellectual creations either of that very race who worshipped beauty, that race whose ideal of beauty is the loftiest ever conceived by man; or of that mighty nation who engrafted upon her strength the best elements in the Greek mind, and was directly inspired by Greece herself.

The strength of the classics, their vigour and endurance, has been proven again and again in the world's intellectual history, and to-day the greatest writers and thinkers in every nation, nay, our languages themselves, acknowledge the power and vitality of the Latin and Greek classics.

But we study the classics not simply because they are themselves endowed with these virtues, but because they can also impart strength and beauty to the mind. The study of any literature is fruitful of good re-

sults. But in the study of the classics, the patient toil, the severe exactness of thought, the frequent exercise of judgment, the continuous process of adjusting to each other opposite types of language, the constant contact with great intellects—all of this gives to the mind of the student a strength, vigour and acuteness, which, in my humble opinion, can not be furnished equally well by any other instrument. Further, just as surely as the sun in spring-time awakens the dormant life of this earth, so to contemplate the life, thought and work of people far removed from the conditions of our own times, cannot but broaden our minds widen our sympathies and enlarge our views.

But over and above these undoubted results, there is a crowning virtue, which the *sensus communis* of man has declared it to be the peculiar power of the classics to impart. Refinement of mind, good taste, nice discrimination, power of expression, in a word, culture—this is the fairest fruit you can gather from a classical training, and so the grace and beauty inherent in the poetry, oratory and philosophy you study will reappear in yourselves; you will become refined and cultured men and women.

Classical study of to-day has a wider scope than the old-fashioned verbal scholarship. To-day it is a study not of the languages alone, but of the literatures, institutions, history, art, social life of the Greeks and Romans, not as standing by themselves, but as being the antecedents and interpreters of much of the complexity of our modern life. The classical student, then, must beware of narrowness; he should ever bear in mind the solidarity, so to speak, of classical studies. Though in his earlier years his principal aim should be to get a thorough command of his tools—the languages themselves—he should ever take a keen interest in

all sides of ancient life; he should learn what he can of the philosophy, the history, the politics, the art of the ancients, for it is only by so doing that he can see in proper perspective the various sides of our nineteenth century life. He should consider, too, the past in its relation to the present; he should be no mere anti-quarian, but should be able above all others to claim the right of interpreting the present in the light of his knowledge of the past.

It follows then that the classical student should take a keen interest in modern literature. Freeman, our greatest modern historian, pleading for the continuity of history, protests against the use of the terms ancient and modern. Literature too shows continuity. There should be no antagonism between classics and modern languages, the two should work in harmony. The classic is foolish who does not follow up his special studies by acquiring a knowledge of modern literature; the modern language student is even more astray if he fancies he can penetrate into the heart of modern literature without a fair knowledge of the ancient, especially Greek. Let me urge you to study in particular the great literature which, as Britons, we can claim as our national heritage. Read our great poets, especially if you are not fond of poetry. They will awaken your imagination, arouse your sensibilities, and give you a keener relish for intellectual life.

Am I wandering from my subject? I trust not. What I would have you keep before you is a lofty and beautiful ideal, which even though never fully realized, will draw you into right paths, and save you from disappointment and self-reproaches.

And the contemplation of the beautiful, whither will it lead us? Let the divine Plato answer with that exquisite passage in the Symposium:

"He who has been instructed thus far in lovely things, and who has learned to see the beautiful in due order and succession, when he comes towards the end will suddenly perceive a nature of wondrous beauty; a nature which in the first place is everlasting, not growing and decaying, or waxing and waning; in the next place, not fair in one point of view and foul in another, or fair to some and foul to others—but beauty absolute and simple, which, without diminution and without increase or change, is imparted to the ever growing and perishing beauties of all other things. He who under the influence of true love, rising upwards from these, begins to see that beauty, is not far from the end. And the true order of ascent is to use the beauties of earth as steps along which he mounts upwards for the sake of that other beauty; going from one to two, and from two to all beautiful forms, and from beautiful forms to beautiful exercises, and from the performance of

beautiful exercises to the learning of beautiful ideas, until at last he arrives at the end of all learning—the Idea of Beauty itself—and knows what the essence of Beauty really is. This is the life which is truly worth living, when a man has attained to the contemplation of beauty absolute; a beauty which if you once beheld, you would see not to be after the measure of gold and garments and youthful beauty. . . . But what, if a man had eyes to behold the true beauty, the divine beauty, pure and clear and unalloyed, not clogged with the pollutions of mortality and all the colours and vanities of human life? Do you not see, that in that communion only, beholding beauty with the eye of the mind, he will be enabled to bring forth, not images of beauty, but realities, and bringing forth and nourishing true virtue, to become the friend of God, and be immortal, if mortal man may?"*

* Jowett's translation.

SHAKESPEARE AS AN EDUCATIONIST.

BY D. F. H.

CRITICS have found in the marvelous production of Shakespeare a rich mine of wit and wisdom; but few writers have ventured to inquire into the views of the great dramatist on questions which still puzzle philosophic minds. It would, no doubt, be an interesting exercise of literary ingenuity to ascertain exactly what the gifted genius who gave us "Hamlet" thought upon the perplexing topic of the Rights of Woman. We know that Tennyson has dealt with that subject in "The Princess," and that his conclusion is unfavourable to the development of anything like a rivalry

between the two sexes. He tells us that

"The woman's cause is man's: they rise or fall
Together, dwarfed or godlike, bond or free."

The intelligent student of literature will find that Shakespeare's conclusions were not very different from those arrived at by our present Laureate. In the closing scene of "The Taming of the Shrew," he makes Katharrina give utterance to sentiments entirely opposed to the theory of absolute feminine independence. According to Shakespeare, if we may assume that his heroine is here speaking

for himself—a wife should yield unquestioning obedience to her husband, for he is “her lord, her king, her governor.” To the husband is assigned the duty of protection. As Katharrina tells one of her female friends, her husband

“Commits his body

To painful labour both by sea and land,
To watch the night in storms, the day in cold,
While thou liest warm at home secure and safe ;

And craves no other tribute at thy hands,
But love, fair looks, and true obedience,—
Too little payment for so great a debt.”

Katharrina admits that she had at first striven herself

“To bandy word for word, and frown for frown ;”

but she has learned the folly of such antagonism, for she adds in words which the advocates of wifely lovingness may quote effectually :

“I see our lances are but straws,
Our strength as weak, our weakness past compare ;

That seeming to be most, which we least are,
Then veil your stomachs, for it is no boot,
And place your hands below your husband’s foot.”

Of course the late John Stuart Mill would not agree with this ; but Mrs. Lynn-Linton, and many other living writers of eminence, would probably assent to Shakespeare’s view.

Now let us see whether any definite opinions on the question of education are to be found in the works of the immortal poet, who, as Dr. Johnson puts it,

“Exhausted worlds, and then imagined new.”

It must be confessed that a dramatic framework helps to conceal the author’s individuality. Many persons refuse to accept anything in Shakespeare’s plays as the expression of his own opinions. But this is pressing the impersonal view of the drama much too far. When his characters are at their best, Shakespeare makes

them give utterance to his own thoughts, as may be seen from the universal truth of such noble passages as the following :—

“All the world’s a stage,
And all the men and women merely players,
And one man in his time acts many parts.”

“To-morrow and to-morrow, and to-morrow,
Creeps in this petty pace from day to day,
To the last syllable of recorded time ;
And all our yesterdays have lighted fools
The way to dusty death.”

“Conscience doth make cowards of us all.”

Who can doubt that words such as these welled from the very depths of Shakespeare’s soul? Jacques or Macbeth, or Hamlet, is here but a conduit-pipe for conveying the poet’s own philosophy to mankind.

This being so, let us turn now to the passages in which this great teacher—for surely he is that quite as much as if he were a professional metaphysician—refers to the training of the mind. “Love’s Labour Lost” is in itself a dramatic illustration of the folly of attempting to promote culture at the expense of the natural affections. The picture of Ferdinand, King of Navarre, binding himself and his courtiers by an edict to live for three years entirely devoted to study, and without even gazing at a woman’s face, is deeply interesting, and might well be compared with its counterpart—the picture of the female University in Tennyson’s “Princess.” There is a delicate humour in the dramatist’s treatment of the subject, which we miss in the Laureate’s somewhat laboured poem. The courtiers, Longaville and Biron, are evidently a little bored by their royal master’s asceticism. Longaville says :

“’Tis but a three years’ fast
The mind shall banquet though the body
pine :
Fat paunches have lean pates ; and dainty
bits
Make rich the ribs, but bankrupt quite the
wits.”

This sounds very like "sour grapes"; and it is pretty clear that Longaville secretly yearns for those "dainty bits" he affects to despise.

Biron openly grumbles, and blurts out in the king's presence:

O! these are barren tasks, too hard too keep,—

Not to see ladies, study, fast, not sleep!"

The king reminds this discontented courtier of his oath; and Biron sturdily rejoins:

"By yea and nay, sir, then I swore in jest. What is the end of study? let me know."

The king promptly explains:

"Why, that to know which else we should not know."

Biron immediately proposes to carry out this idea to the letter:

"I will swear to study so,
To know the thing I am forbid to know;
As thus—to study where I well may dine,
When I to feast expressly am forbid;
Or study where to meet some mistress fine,
When mistresses from common sense are hid;
Or, having sworn too hard a keeping oath,
Study to break it, and not break my troth.
If study's gain be this, and this be so,
Study knows that which yet it doth not know."

This, of course, is but a kind of light raillery—the foam, so to speak, of Biron's thoughts; for this courtier proves himself in reality a true philosopher. When the king rebukingly tells him that—

"These be the stops that hinder study quite,
And train our intellects to vain delight,"

his answer is exceedingly ingenious:

"Why, all delights are vain, but that most vain,
Which, with pain purchased, doth inherit pain;
As painfully to pore upon a book,
To seek the light of truth, while truth the while
Doth falsely blind the eyesight of the look.
Light, seeking light, doth light of light beguile,
So, ere you find where light in darkness lies,
Your light grows dark by losing of your eyes."

A few lines lower down, we come upon a really glorious passage, which may be regarded as the poet's eternal protest against pedantry of all kinds.

"Study is like the heaven's glorious sun,
That will not be deep-searched with saucy looks:

Small have continual plodders ever won,
Save base authority from other's books.
These earthly godfathers of heaven's lights,
That give a name to every fixèd star,
Have no more profit of their shining nights
Than those that walk, and wot not what they are.

Too much to know, is to know naught but fame,

And every godfather can give a name."

When towards the close of the play, the absurd proposal of his royal master fails, Biron philosophizes in much the same strain:

"Why, universal plodding prisons up
The nimble spirits in the arteries.
As motion and long-during action, tires
The sinewy vigour of the traveller."

Later on, he put the point thus:

"Learning is but an adjunct to ourself,
And where we are, our learning likewise is."

He then dilates on the power of the affections to quicken the senses and kindle the imagination. The moral is obviously that study, without love, is cold and barren. Love, as Biron says,

"Lives not alone immured in the brain,
But with the motion of all elements,
Courses as swift as thought in every power;
And gives to every power a double power,
Above their functions and their offices."

Prosaic comment on the deep poetic wisdom of this delightful comedy can add nothing to its effect. To quote the passage with which the play close, "The words of Mercury are harsh after the songs of Apollo."

Let not the dryasdust order of critics imagine that Shakespeare was too unlearned to pronounce any valuable judgment on the question of education. It has been said, no doubt—and perhaps truly—that the Bard of Avon "knew little Latin and less Greek." But assuredly he under-

stood human nature thoroughly, and could gauge, as no mere pedagogue could gauge, the capacity of the human mind. In "The Taming of the Shrew," he makes Tranio prescribe an excellent method of study for his young master :

" Only, good master, while we do admire,
This virtue and this moral discipline,
Let's be no stoics, nor no stocks, I pray,
Or so devote to Aristotle's checks
As Ovid be an outcast quite abjured :
Balk logic with acquaintance that you have,
And practise rhetoric in your common talk ;
Music and poesy used to quicken you ;
The mathematics and the metaphysics—
Fall to them as you find your stomach serves
you :

No profit grows where is no pleasures ta'en
In brief, sir, study what you most affect."

Is not this the golden rule which should guide education? Could the matter be put more pithily and powerfully by any professional educationist? "Study what you most affect." In other passages, the great dramatist has put forward the same views in somewhat different language; but the quotations above given are sufficient to convince all rational persons that Shakespeare placed the cultivation of the intellectual powers on a proper

footing. The profound common-sense of this truly "ocean-minded" poet is quite as remarkable as his wonderful imagination. We may have made much progress in science since the early years of the seventeenth century, when the greatest of the world's dramatists passed away; but have we added anything to the wisdom with which his works are filled? Have we formulated a sounder philosophy of life? Surely the recent protests of educated men and women against the abuses of competitive examinations are good evidence of the fact that those who devote themselves to the difficult art of teaching have yet much to learn themselves before they are masters of their work. If every schoolmaster pondered over the couplet,

" Too much to know is to know naught but
fame,
And every godfather can give a name,"

he would soon cease to be a pedant, and would see that the accumulation of words is worthless, unless it be accompanied by real knowledge, earnest sympathy, and unflinching love of truth.—*Educational Times.*

THE SIMPLIFICATION OF ELEMENTARY MATHEMATICAL TEACHING.

BY G. HEPPEL, ESQ., M.A.

IN submitting to your notice some suggestions as to the improvement of elementary mathematical teaching, I should like at the outset to disclaim any pretensions to originality. It would be a rash and presumptuous undertaking for any one, except he were of the highest eminence, to set up his own opinions and his limited experience in opposition to an established system. The case is, however, far different when he is merely echoing the recommendations

and the warnings that have, from time to time, been given by those whom we justly hold to be our best guides. Under the protecting shelter, therefore, of the authority of leading mathematicians, past and present, I am asking your attention while I attempt to explain how our school methods in algebra and geometry have come to be what they are, to show in what respects they are inadequate to our needs, and to suggest the general directions of the alter-

ations that are desirable. There is little need to say anything about arithmetic. In this subject there is freedom ; there is no stereotyped system ; the best methods, on the whole, prevail, and the views of particular teachers differ mainly on mere points of detail. But of the mutual relations of arithmetic, algebra and geometry, there is need to say very much, and it will be, perhaps, the best introduction to the subject of this paper to sketch the origin and progress of a great mathematical war that went on, during the last part of eighteenth and the beginning of the nineteenth century, between the supporters of different views as to what algebra really is, and how it is related to arithmetic.

Every one who reads the "Arabian Nights" knows something of the Caliph Haroun Al Raschid and the magnificence of his court. He was not only great in war, but was a zealous promoter of literature and the arts. He opened communications with Charlemagne, and sent him presents—among these a curious water-clock, the description of which shows to what height mechanical skill must have attained in those times. Golden balls fell down at the completion of the hours, and twelve knights came out of as many doors, while the hour was sounded by attendants clashing cymbals. After the death of Al Raschid there was for some time a contest for the succession between Amin and Mamun, two of his sons. Mamun ultimately succeeded, and his reign was the Augustan age of Arabia. Colleges were founded, literature and science were advanced, and, under the auspices of the Caliph, a treatise was written by Mahommed Ben Musa, which he entitled "Al Jebr e al Mokabalah." According to Dr. Rosen, the translator, this means completion and reduction ; according to De Morgan, in the Eng-

lish Cyclopedia, it means restoration and reduction. The words are intended to signify the completion of the square in a quadratic equation and the subsequent determination of the solution. Scarcely anything except the solution of quadratic equations is contained in this treatise, and these equations are applied to answer questions concerning commercial matters and legacies. There are no signs or letters used, and an average section of the treatise is similar to what would now be an attempt to put the solution of a problem in quadratic equations from Hamblin Smith' or Todhunter into plain English words without signs or symbols, but illustrated by a figure of the same kind as those in the Second Book of Euclid.

Far away in India, there were at this time treatises on the same subject, much more advanced, comprising nearly all that is usually read in schools, except the Binomial Theorem, and some things beyond, such as indeterminate equations, not merely of the first, but also of the second degree. But, as these Indian treatises were not known in Europe till comparatively recent times, it is from Ben Musa's work that we derived the name Algebra, and the general characteristics of the science as then understood.

Vieta, who was born in 1540 and died in 1603, after devoting the greater part of his life to public business under Henry III. and Henry IV. of France, turned his attention to mathematics. To him we owe the representation of numbers by letters and the wonderfully increased power given by this notation. Following him, our English mathematician Harriot laid the foundations of the theory of equations, receiving from the Earl of Northumberland a pension of £300 a year to enable him to prosecute his researches. After Harriot

rapidly came a succession of mathematicians by whom the science of algebra was further developed, and its meaning and objects enlarged, till Newton at last gave it the extent and form which, until quite recent times, it has steadily retained.

This development and enlargement did not, however, remain unchallenged. The new wine could not be kept in the old bottles, and there were some men of eminent attainments who were pre-Harriotites, just as we have had pre-Rafaellites in art. The two most representative men in this reactionary movement were William Frend and Baron Masères. Frend was second wrangler and second Smith's prizeman in 1780. Masères was fourth wrangler and first Chancellor's medallist in 1752, and was afterwards Baron of the Exchequer. The arguments of these men had best be stated in their own words. The following are extracts from the Preface to Frend's "Principles of Algebra," 1796:—

"The first error in teaching the principles of algebra is obvious on perusing a few pages only in the first part of Maclaurin's 'Algebra.' Numbers are there divided into two sorts, positive and negative; and an attempt is made to explain the nature of negative numbers by allusion to book debts and other arts. Now, when a person cannot explain the principles of a science without reference to metaphor, the probability is that he has never thought accurately on the subject."

"To attempt to take a number away from a number less than itself is ridiculous. Yet this is attempted by algebraists who talk of a number less than nothing—of multiplying a negative number into a negative number, and thus producing a positive number—of a number being imaginary. Hence they talk of two roots to every equation of the second order,

and the learner is to try which will succeed in a given equation; they talk of solving an equation which requires two impossible roots to make it solvable; they can find out some impossible numbers which, being multiplied together, produce unity. This is all jargon, at which common sense recoils; but, from its having been once adopted, like many other figments, it finds the most strenuous supporters among those who love to take things upon trust, and hate the labour of a serious thought."

"Again, we should do worse by writing down any of the above marks without numbers. Thus, $- \times - = +$ is as nonsensical in algebra, as in common language to say, 'Take-away into take-away equals add.'"

In the Preface to the "True Theory of Equations," 1799, also by Frend, we find the following:—

"From the age of Vieta, the father, to this of Masères, the restorer of algebra, many men of the greatest abilities have employed themselves in the pursuit of an idle hypothesis, and have laid down rules not founded in truth, nor of any sort of use in a science admitting in every step the plainest principles of reasoning. If the name of Sir Isaac Newton appears in this list, the number of the advocates for error must be considerable. It is, however, to be recollected that, for a much longer period, men scarcely inferior to Newton in genius, and his equals probably in industry, maintained a variety of positions in philosophy which were overthrown by a more accurate investigation of nature, and if the name of Ptolemy can no longer support his epicycles, nor that of Des Cartes his vortices. Newton's dereliction of the principles of reasoning cannot establish the fallacious notion that every equation has as many roots as it has dimensions."

Masères, in one of his mathematical tracts, speaking of Euler's "Alge-

bra," finds it "to abound with errors and difficulties arising from a most complete adoption and very frequent use of this perplexing and absurd doctrine of negative quantities, for which he seems to have an uncommon attachment."

Some of these extracts are quoted by Dean Peacock in his "Report on the Present Position of Certain Branches of Analysis," published in the third volume of Transactions of the British Association for the Advancement of Science, in 1833. That they were not merely the inconsiderate utterances of a couple of crotchety men is clear from the way in which the Dean speaks of Frend and Masères in the report just mentioned. He says:—

"The arguments which they made use of were unanswerable when advanced against the form under which the principles of algebra were exhibited in the elementary and all other works of that period, and which they have continued to retain ever since, with very trifling and unimportant alterations; and the system of algebra which was formed by the first of these authors was perfectly logical and complete, the connection of its parts being capable of strict demonstration; but there were a great multitude of algebraical results and propositions, of unquestionable value, of unquestionable consistency with each other, which were irreconcilable with such a system, or, at all events, not deducible from it; and amongst them the theory of the composition of equations, which Harriot had left in so complete a form, and which made it necessary to consider negative and even impossible quantities to have a real existence in algebra, however vain might be the attempt to interpret their meaning."

I believe that Dean Peacock was the first, at least of English writers, to put this matter on a right footing.

He distinguished between arithmetical and symbolical algebra, and, in his statement of the principle of the permanence of equivalent forms, explained what was the relation between the two: It will perhaps be better not to give a rigid technical enunciation of this principle, but to state its meaning in general terms, without aiming at minute accuracy.

In a most interesting and instructive little book, called the "Common Sense of the Exact Sciences," compiled from the posthumous papers of the late Professor Clifford, it is shown that all the principles and processes of arithmetic depend ultimately on the fact that if you count a number of objects, the result is the same, whatever be the object you begin with, and whatever be the order in which you count them, provided that you leave no one out and count no one twice. This fact leads up to the laws known as the associative, distributive, commutative and index laws. Roughly, these may be described to be that, if you combine one set of quantities with another by addition or multiplication, it is immaterial whether you do it piecemeal, one bit at a time, and then another, or whether you do it all at once; that subtraction neutralizes addition, and division multiplication; that $4 + 3$ is the same as $3 + 4$; that 4×3 is the same as 3×4 ; and $2^3 \times 2^4 = 2^7$. These rules we find to be universally true for all cases that are possible in pure arithmetic. Accordingly we find that 4 multiplied by $(9 - 7)$ is $36 - 28$ or 8. The generalized statement of this in algebra would be that c multiplied by $(a - b)$ is $ac - bc$. We cannot tell, however, whether this combination of symbols represents something possible or something impossible in arithmetic, inasmuch as if b is greater than a , the whole statement becomes arithmetically unmeaning. Thus, to say that 4 multiplied by

(7 - 9) is 28 - 36 is absolute nonsense when viewed in the light of mere arithmetic. To be met by this perplexity we need not, however, go so far as to consider operations that lead to negative quantities, or have anything to do with algebraical symbols. A young child's arithmetic book gives a sufficient instance of the same principle. To talk of 7 divided by 4 and say it is equal to $1\frac{3}{4}$ is nonsense in pure arithmetic. It is no use to say that 7 lbs. of beefsteak or 7 yards of ribbon may be divided, and it is conceivable that they may be divided with absolute accuracy among four persons. For, though we can weigh the steak and measure the ribbon, we cannot count the share in either case, and counting, not weighing or measuring, is the business of arithmetic. Of the $1\frac{3}{4}$, we know what is meant by 1, and if $\frac{3}{4}$ is to obey the laws just mentioned, it must be three times as much as $\frac{1}{4}$. We are reduced, therefore, to the symbol $\frac{1}{4}$, and if we define it to be such that four times $\frac{1}{4}$ is unity, we may henceforward work with it as we should with any integral number. If I may be excused, just for once, for intruding personal matters, I may say that this view of fractions, and afterwards of negative quantities and fractional, negative and zero indices, is adopted in an "Arithmetic" of mine published in 1864, now utterly forgotten; but I should not have dared to speak of fractions in this way now, were it not that Professor Clifford says in the "Common Sense of the Exact Sciences," 1885:

"But suppose I say: Divide 21 by 4. To this there is no answer. There is no number in the sense in which we are at present using the word—that is to say, there is no whole number—which being multiplied by 4 will produce 21; and if I take the expression $21 \div 4$, and speak of it as meaning something, I shall be talking nonsense, because I shall have put

together symbols whose realities will not go together.

"The things that we have observed here will occur again and again in mathematics; for every operation that we can invent amounts to asking a question, and this question may or may not have an answer, according to circumstances.

"If we write down the symbols for the answer to the question in any of those cases where there is no answer, and then speak of them as if they meant something, we shall talk nonsense. But this nonsense is not to be thrown away as useless rubbish. We have learned by very long and varied experience that nothing is more valuable than the nonsense which we get in this way; only it is to be recognized as nonsense, and by means of that recognition made into sense.

"We turn the nonsense into sense by giving a new meaning to the words or symbols which shall enable the question to have an answer that previously had no answer."

The first cases where new meanings have to be given are so simple and easy to be understood, that these seem to have crept in almost without notice, till critics like Freund demanded that the foundations of algebra should be examined. While the war I have described was going on, two French mathematicians, Clairaut, and afterwards Cauchy, came forward and attempted to show that negative quantities might be used in arithmetical algebra. But they found no favour from either side. Masères, the champion of the arithmetical system, attacked Clairaut, and Dean Peacock, the founder of the symbolic system, attacked Cauchy. I may as well mention that Mahommed Ben Musa assumes, without proof, that minus \times minus gives plus, and that he states the definition of multiplication, often known as De Morgan's, that it is doing with the

multiplicand what you would have to do with unity in order to get the multiplier.

A much less easy case occurs when we consider the solution of quadratic equations, as imaginary quantities come on the scene asking to be recognized. The recognition was conceded, but these imaginary quantities remained for many years perfectly without meaning, till, as Dean Peacock tells us in the Preface to his "Algebra," in its first form, 1830, the first attempt he could find of the interpretation of $\sqrt{-1}$ was given by M. Buée in the Philosophical Transactions for 1806. It was very imperfect, giving, however, the idea of perpendicularity. A much more thorough interpretation was given in Warren's "Treatise on the Geometrical Representation of the Square Roots of Negative Quantities," in 1828.

To recapitulate, then, the view generally accepted is that certain laws are suggested by our experience of numbers, which are applicable, with limitations, both to arithmetic and geometry, and that these laws, when made to apply to symbols without limitation, lead to results which we may not be able to interpret, but which, when capable of interpretation, are productive of new mathematical truths of the greatest importance. As Mr. George B. Halstead says, in an essay on "Algebras, Spaces and Logics," in the seventeenth volume of the *Popular Science Monthly*, New York, 1890: "An algebra is an abstract science or calculus of symbols combined according to defined laws." Here the indefinite article, *an* algebra, suggests that there may be other sets of defined laws than those derived from number; and, in fact, in the algebra of quaternions, Sir William Hamilton threw overboard the commutative law, so far as certain symbols denoting vectors were concerned, and *uv* was no longer equal to *vu*,

but was equal to minus *vu*. Merely noticing, by the way, this other algebra, and for the future using the word *algebra* to mean exclusively the one the laws of which are derived from number, we may say that arithmetic suggests, algebra combines, and finally arithmetic and geometry interpret, so far as their limited power extends, and the limited state of human reason and experience allows. Professor Sylvester, in his address to the British Association in 1869, after pleading for the use of the term *mathematic* instead of *mathematics*, just as we say *arithmetic*, and not *arithmetics*, says:—

"Time was when all the parts of mathematic were dissevered, when algebra, geometry and arithmetic either lived apart or kept up cold relations of acquaintance, confined to occasional calls upon one another; but that is now at an end; they are drawn together, and are constantly becoming more and more intimately related and connected by a thousand fresh ties, and we may confidently look forward to a time when they shall form but one body and one soul."

Before concluding this description of the road by which we have arrived at the modern idea of algebra, there is one point still unsettled, which it is necessary to notice. The symbol \sqrt{a} presented no difficulty to the arithmetical algebraists, for, having been defined as representing the quantity which, when multiplied by itself, gave *a*, it could, with their views, have only one value. They would say that there was but one square root of 9, and that was 3. Those on the other hand who recognized negative quantities, and the laws according to which they are combined, had to admit that 9 had two square roots, plus 3 and minus 3. The question, therefore, arose whether $\sqrt{9}$ was to represent two things or one thing. The general succession of leading text-

books, Maclaurin, Saunderson, Wood, Colenso, left this point, to a great extent, unsettled. Todhunter in this, as in many other points, pursued a singular course. His "Algebra" (I mean the larger "Algebra") is virtually two books, not one. While all the main part of the work is based on old definitions, methods, and processes, there are yet scattered through the book passages enough to form a modern "Algebra" when put together consecutively. These passages, however, are placed, it would almost seem purposely, where no student would be likely to find them. For example, while the whole book contains 814 articles, the articles 805 and 808 treat, in such a condensed form as to greatly diminish their value, of matters which it is of the greatest importance that the student should know at the very outset of his studies in algebra. With respect to \sqrt{a} , the chapter on surds is finished, the succeeding chapter on quadratic equations is nearly finished, before the difficulty about the meaning of the symbol is cleared up, and then rather by implication than by definite state-

ment. In Chrystal's "Algebra" \sqrt{a} is taken to mean the positive root of a , and confusion is thus avoided. But in the article on Algebra by the late Professor Kelland, in the last edition of the *Encyclopædia Britannica*, we are virtually told that, if u and v be rational integral functions of x , the four equations $\sqrt{u} + \sqrt{v} = c$, $\sqrt{u} - \sqrt{v} = c$, $-\sqrt{u} + \sqrt{v} = c$, $-\sqrt{u} - \sqrt{v} = c$ are, algebraically speaking, the same equation; while Todhunter and Chrystal both tell us they are four different equations. It may be mentioned that Professor Kelland, in his Preface to his "Algebra" opposed the views of Dean Peacock as to the foundations of algebra, and in many points showed his sympathy with some of the views of Freund and Masères. Two of the most recent text-books are those by Charles Smith and by Rouse Ball. Smith follows Kelland, while Ball follows Chrystal. Whatever may be the best way of regarding this matter, it is at any rate important for teachers that the point should be finally settled.—*The Educational Times*.

(To be continued.)

TEACHERS' SALARIES AND PENSIONS.

THE status of public school teachers in this country illustrates in many respects the peculiar inconsistencies of American character and policies. We regard our institutions as the sum of human perfection until it is clearly proved to us that they are not, and we receive the evidence with the air of having made a flattering discovery. Within the memory of a generation we seriously believed that our schools were the unrivalled models of the world; the knowledge that this is a mistake has not disconcerted us. This complacency is not wholly without reason. So far as principles go, our own school system is indeed matchless; it contains

potentially all that idealists have dreamed or philosophers formulated, but its practical elaboration is as yet far below their grand conceptions. The perfection of details, which is necessarily a work of time under all circumstances, goes on the more slowly with us on account of our local independence and our very general absorption in personal affairs. The sort of negative policy which characterizes our dealings with public school teachers does not, however, grow entirely out of our national complacency or our universal devotion to business. We are all Jeffersonians to the extent that we have a hatred and a horror of caste, and we fancy a con-

nection between this abhorred thing and a State teaching service. Even teachers have shared this feeling, and although anxious to see their work placed on a secure and dignified basis, have not wished that it should be differentiated by peculiar public marks from other professions. While, however, the open avowal of a vital connection between the teaching service and the State is evaded, in that very connection lies the real explanation of everything that has thus far been done to maintain the service. The support of normal schools by public funds, the public examination of teachers, State diplomas, State supervision, and so on, are all declarations that something far more abiding and uniform than the law of supply and demand regulates, and must regulate, the work of the schools. If this were not a profound and well recognized truth, every other trade and profession would be clamouring against what is already done for teachers as class legislation.

The drift of events during the last ten years, especially the passion for organized effort which has developed on every hand, has done much to allay undue sensitiveness as to caste and distinctions, and meanwhile the evils arising from the partial recognition of the public responsibility for an efficient teaching service have had their effect. We have at least passed the *laissez faire* stage, and are now quite ready to consider what the State should do, that it has not done, to render the service which it almost monopolizes decently remunerative and permanent. Practically, at this time, the State has the monopoly of elementary instruction among us, and if it does not do the work well it injures itself and defrauds everybody. We may be positively sure that no work is well done in this world, least of all in this American world, which pays only a miserable pittance, and offers no chance for securing a com-

petence. How far this charge can be made against the work of public instruction in this country it is difficult to say, the scale of salaries here being more variable than anywhere else, with the possible exception of England. In Massachusetts, for example, the average is high, viz.: for men \$108.85 per month and for women \$45.93, with an average school year of 8.55 months. This gives an average annual salary for men of \$930.66 and for women of \$392.70. In North Carolina, on the contrary, the average salary for men is only \$24.57 a month and for women \$21.95, with an average school year of 3.17 months. This gives an average annual income for public school service of \$77.88 for men and \$69.58 for women. In the one State, the service has the essential characteristics of a recognized, well-defined profession; in the other it is largely a make-shift for eking out an uncertain income. Between these extremes there is almost every possible gradation. Obviously the policies that are practicable in one State are out of the question in another.

It must be admitted, however, that few States afford an average salary sufficient to insure living expenses and a fair margin for the future. Until this level is reached the service lacks a most important element, whether security or efficiency be considered. It is the recognition of this weak point that is giving strength to the movement in certain States for securing teachers' pensions. This movement follows the precedent of all foreign nations in which public instruction is treated as a State service. It is perhaps not wise to reason too closely from such precedents to our own country, the conditions of labour, the standards of living, and the purchasing power of money being so dissimilar; nevertheless, we can hardly fail to find profitable suggestion in the consideration of the status

of salaries and of pensions in other countries.

In France, the public men, who have strained every nerve to give *éclat* and efficiency to their educational system, realize that it is fundamentally a problem of salaries and of honours. They have regulated the matter with an eye to effect, just as the military service is regulated. There is a system of promotions; there are positions in the administrative corps and in the superior and local councils of education to which teachers may aspire, and the salaries as fixed by the law of July 19, 1889, although smaller than Buisson and Ferry and other leaders would have had them, are an advance upon the former rates.

Principal teachers are divided into three groups, viz., elementary, superior primary and normal. Each group is divided into five classes, with annual salaries paid by the State as follows :

	NORMAL SCHOOLS.		SUPERIOR PRIMARY TEACHERS.	PRIMARY SCHOOLS.	
	Men.	Women.		Men.	Women.
Fifth class.....	\$700	\$600	\$360	\$200	
Fourth class....	800	700	400	240	
Third class.....	900	800	450	280	
Second c.a.s.	1000	900	500	300	
First class	1100	1000	560	320	

An additional sum of \$40 is allowed principals in charge of a school of three or four classes, and of \$80 for a school of more than four classes. Assistant teachers in primary schools are paid \$160. Assistant teachers in superior primary schools, from \$220 to \$420. In addition to his salary, every teacher must be provided with a residence or with a money equivalent for the same. The law imposes this provision upon the communes, adjusting the rates of indemnity upon the basis of population. These, beginning at \$20 for communes having less than 3,000 inhabitants, form an ascending series of eight grades, increasing uniformly by \$20. For a population above 100,000 the indemnity reaches \$160. A special rate of \$400 is allowed in Paris.

Individual communes may and often do pay an increase over both the minimum salary and the statutory house-indemnity. These rates give a higher average than American salaries. This is, however, a misleading comparison, because in the case of France we are dealing with a single uniform system, and in that of the United States with forty-four or more distinct and widely varying systems. Moreover, the French salary is paid for the full control of the teacher's time, whose working year is eleven months and who is prohibited from all other occupations. The average school year in the United States, on the contrary, is only 6.7 months, which means of course for many States a much shorter session. The remainder of the time the teacher can do what he pleases. This may be an evil in the system, but it is a fact having an important bearing upon the salary question.

By a law passed seventeen years before the establishment of the present Republic, the French civil pension list was extended to include teachers. The pension is available

for teachers sixty years of age who have given thirty years' service. Under some circumstances, it is available at fifty five years of age after twenty-five years of service. Special provisions are made for those incapacitated from service by accident, severe illness and similar causes. The State retains five per cent. of the salary each month, and also one-twelfth of the first year's salary, and of each subsequent augmentation, toward the pension fund. The amount of the pension is calculated at $\frac{1}{30}$ of the mean salary of the last six years for each year of service, a rating which, it will be seen, gives as a maximum annual pension, one-half of the mean annual salary. Complaint is made of the retention of a twelfth of the salary at the beginning of an engagement, as practically it leaves the novice without any income until the end of the second month. Otherwise the arrangement seems to work satisfactorily.

The status of teachers in Germany is so well understood in this country that little need be said on the subject. They constitute a professional body having a life tenure, and enjoy a prestige similar to that of the clergy. Their salaries are, however, meagre, and at the present time, in many districts of Prussia, complaint is made of a dearth of candidates for teachers' positions owing to the uninviting pecuniary prospect. Nevertheless, statistics show that the average salary, the whole empire included, is 1,032 marks, or \$258. In the cities the average is 1,365 marks (\$341.25), and in the country 874 marks (\$218.50) In addition, house and fuel are provided. The city salaries are below the average in the United States and very much below the average paid here to men. This should be especially noted, since nearly all the German teachers are men. For reasons already mentioned, the averages

for this country cannot well be given, but the report of the Commissioner of Education, just issued, contains some tables that will be found suggestive. From these it appears that the range of teachers' salaries in 447 cities of the United States, having each more than 4,000 inhabitants, is as follows :

RANGE OF SALARIES.	NO. OF PLACES. OF TOTAL.	PER CENT.
Less than \$1 000.....	291.....	65
1,000.....	22.....	5
From 1,000 to 1,500..	94.....	21
From 1,500 to 2,000..	35.....	8
From 2,000 to 2,500..	5.....	1

Of the 291 places in the first category, 248 exceed \$500 in salary. The average salary of assistant teachers for 467 cities is found to be \$508. Some of the highest paying cities are not included in this tabulation, notably Boston, which in 1887-88 reached an average of \$958 on all classes of teachers, principals and assistants, numbering altogether a force of 1,221 persons. San Francisco, which is included in the foregoing table, reaches a still higher average, viz., for principal teachers \$1,741, and for all others \$908. The force is smaller than that of Boston, numbering about 800 persons. New York city, with a force of about 4,200 teachers, shows an average annual salary of \$1,900 for principals and of \$730 for all other teachers.

These rates are considerably above the maximum paid in German cities, but possibly they do not represent relatively larger incomes. The comparative value of money in different countries is a subject of much dispute, but I believe it is generally conceded to be greater in Germany than in America.

I recall that in 1885, an English head-master, Mr. R. Wild, president of the National Teachers' Union, maintained that Continental teachers were better off than their English counterparts on account of their secure

tenure and pensions. At that time the average annual salary for certificated masters in England was \$605, and of certificated mistresses \$365.75. Mr. Mundella challenged the statement, offering to pay part of the expenses of a Continental tour to the delegate who should bring satisfactory evidence of its correctness. Mr. Wild made the tour and as a result submitted a report full of interest and suggestion. He ascertained among other particulars, that in Berlin the average annual salary of 707 assistant mistresses was \$365; that of 1,385 assistant masters, \$558; and that of 137 head-masters, \$885; or a general average of \$515, with the addition in every case of free residence, light and fire.* The Berlin teachers seemed to Mr. Wild better off than the London teachers, although the average salary of head-masters in London had reached \$1,095, and the general average for all teachers \$580. It was generally felt that Mr. Wild had sustained his point.

Pension provisions occupied a prominent place in Mr. Wild's report. The general regulations in Prussia respecting this matter are as follows: 25 per cent. of salary after 20 years' service; 50 per cent. after 30 years';

* For Mr. Wild's full report, see *The Schoolmaster* (London April 11, 1885, pp. 557-58.

75 per cent. after 40 years'; and the full salary after 50 years. The State requires all teachers to pay an annual premium into the pension fund, rated at 1 per cent. of a salary of \$400, at 1½ per cent. of salaries from \$400 to \$1,000, and at 2 per cent. of all higher salaries. It frequently happens that the city or commune pays the premium for the teachers, and also adds to the amount of the legal pension. One head teacher, who calculated his pension with Mr. Wild, indulged the expectation of 2,985 marks from the State, which amount, he said, would be increased by the city to 3,000 marks, or \$750.

In both France and Germany the teacher's pension, or a part of it at least, may be continued after his death to his widow and minor children.

In the other German States and also in Holland, Belgium, Denmark, Austria and Russia the pension is a feature of the educational system. In Belgium Mr. Wild encountered a teacher who was the fortunate recipient of a pension of \$1,000 per annum. This is an extreme case, however, the pension in that country usually ranging between \$200 and \$400. In Switzerland, pension regulations, like all other educational interests, are settled by the individual cantons. Some of these maintain pensions, others do not.

TO TEACH.

THERE are over a quarter of a million persons in this country who engage in the work of teaching. As men rise in civilization they set apart more and more persons to perform a kind of work that is not only seen to be a factor in that civilization, but is a contributing means to happi-

ness, morality, and prosperity. What is teaching? What is the work that teachers perform?

Let us observe one who occupies the place of power in the school-room. He calls a number of children to come before him; they stand in a row; they hold printed books in their

hands; they utter the words in the books, for example; they write numbers on their slates; they add, subtract, or divide these numbers; they take their seats and others succeed them, and similar acts are observed in other classes. Then we note at another time that there is a repetition of facts learned regarding the people and the productions of some part of the earth, or something concerning matters pertaining to health, or to inventions, or to daily work.

Along with this employment of the mind, directed by the one in power, we shall notice more or less done to influence the modes of thought and the moral character of the children. In some schools it is apparent that the heavy burden laid on the teacher is listening to repetitions; in others there seems a direct effort to cause the pupil to come to warrantable conclusions about himself and others. Is all of this labour by the one in power to be called teaching?

All who discuss school-room methods and results agree on one thing—that a child should be taught to employ his judgment. The kingly power in man is his power of judging; by this he puts the roof over his head and by this builds cathedrals. Knowledge is necessary, for on it the judgment is exercised; language, numbers, and constructions are needed to enable one to obtain and retain knowledge. Teaching, then, will be rated high or low according to its effect on the judgment.

A child reads, "The bee gathers honey and stores it in the hive," and we watch him to see if he exercises his judgment on this statement. It is said to us that, "He may not do so to-day, but it is well to lay up the fact for future use." While this reply may cover a small range of facts, as that a certain dog will bite, or that the liquid in a certain cup is poisonous, it cannot be held any longer to

be an educational maxim; the time for that is past.

Again we listen: a child tells what it has read about Egypt—"It is on both sides of the Nile—crocodiles abound in the waters of the river." We note the satisfaction of the teacher because this is the statement in the book. Some knowledge has been lodged in the memory; and intellectual acquisition is important. But is this statement about Egypt a kind of knowledge that the judgment of the child can operate on? Does it enter into his thought?

But we noted there were evident efforts for government. To govern, there must be employment of both authority and love. Here comes in a denial of a statement sometimes heard, that teaching is for money. The pupil is influenced at first by the authority that is possessed by the teacher, but that must soon be replaced by affection, and that is not obtained for money. We noted that there was a training of the child by which he is induced to choose and to do the right; and to prefer to act in accordance with certain fixed principles, day by day, from choice, clearly understanding these principles. It is not difficult to put such a pressure on elastic steam that it becomes seemingly obedient. The children in a school-room march in and out in such excellent order that the teacher too often flatters himself that his discipline has given them character. But morality without freedom of choice has no permanent value. The pupil must contemplate moral facts, and bring them under his judgment; and distinguish between good and evil, and freely choose the good.

From the above it will be seen that teaching demands the constant meditation upon certain keywords that may by each one be formed into maxims: judgment, self-government, freedom, character.—*The School Journal.*

PEDAGOGY.

AT a recent session of the Academy of Moral and Political Science, Mr. Gréard read a short article on "Pedagogy" which he defined as a science founded on psychology. Mr. Courcelle Seneuil contested that definition. For him, pedagogy, in common with all the so-called moral sciences, is only an art. On that occasion Mr. Ravaisson presented the following observations: In distinguishing art from science, it is not necessary to separate them. The artist whom all agree in considering the greatest of modern times, and who has studied into the nature of art more profoundly than any one else, viz., Leonardo da Vinci, has said, "To paint without a theory, is to sail without a rudder." Pedagogy, the art of education, should also, then, be founded upon a science. Is that science psychology? Perhaps it would be better, in a more general manner, to say philosophy, as to speak of psychology only might lead to the neglect of that which should surpass everything else in the soul, the *nescio quid divinum* which is precisely that which should be the first consideration of true pedagogy. There is something in childhood which surpasses anything in later years, which makes its chief charm, which merits the respect which was claimed for it of old, and which justified the words: "Except ye become as one of these, ye cannot enter into the Kingdom of Heaven." That something is an inward disposition, the origin of sociability, which raises us above that "Me" which Pascal called "odious." That inward disposition attests its presence within us by a principle resembling that which the ancients called the "genius" of

each, and to which they desired each one to render a religious worship because it appeared to be something within us higher than ourselves, *Est Deus in nobis*. It is necessary, says Pascal in an analogous sense, "to love a being which is in us, and which is not yet ourselves." If he had been specially interested in the pedagogical theory, he would doubtless have said that that universal something which is in us is that by which we are capable of charity, that which heads the list of virtues, and which, therefore, education should keep principally in view. Thus we would be lifted above the base idolatry of self. The highest part of philosophy is that which belongs to the treatment of divine things. It should then be philosophy's noblest part to elevate pedagogy. The ancients, from whom we have derived the word pedagogy, had a very concise idea of the aim of education, which was, that it should be a preparation for public life. Among them were two entirely different classes, slaves and freemen, and for these the problem of education was very different. To instruct a slave was to teach him the special trade which he was to use for the general profit, and beyond that nothing was expected of him. To instruct a free man was to prepare him for a free life, that is to say that he should cover with all of his faculties a range vastly wider than that of a personal egotism, or of strictly material interests. There should be long years in which he should not be spared, says Plato. And do we not see, in all nature, that the most important results require longest preparation? Here is then the question of a culture which the human soul should achieve, and which has its duration and its

necessary epochs beyond all other culture. Civilization, according to the Greeks, consists in passing from a state of rudeness to a state of gentleness. The state of rudeness was that of the barbarians, of whom the greater part were slaves, who were always kept in subjection. The state of gentleness was that of the Hellenes, where no one ever thought of himself before others, before the gods, his fellow-citizens, and his equals. In that state people were no longer solely friends to themselves, and, consequently, enemies of others, but rather the

friends of gods and men. That was a state of liberality, of generosity and, through that alone, of friendship. Because this was the dominant thought among the ancients, during the heroic ages, we should, according to Leibnitz, familiarize youth with the monuments of their literature. Though there may be different kinds of instruction, there should be but one kind of education, or, more explicitly, but one education, that which is able to elevate each one above himself.—*Translated for Public Opinion from the Paris Revue Bleue.*

THE FARM HOME.

THE grinding competition which at present characterizes the trades, the business and the professions of the great cities is likely to result in turning a degree of attention, at the present juncture of agricultural prosperity, from the anxieties and responsibilities of city life to the comparatively easy and certain pursuits of the country, and to make the young man of the farm more contented with his lot. Poets have sung, philosophers have spoken and sages have written of the glories of the field and forest, but their united anthem of praise has not been enough to stay the rush of the wood and prairie moths to the far seen lights of the city. The fact is that too few americans have any inherent love of tranquility—they are instinctively drawn toward excitement. They are moreover ambitious and seek the intellectual centres for development. But times are changing rapidly toward a betterment of the farmer's condition. Almost the entire land has been not only "claimed" but improved. A few seasons of favourable crops will put the land tillers, especially those of the West, far in advance of

their fondest hopes. They may easily become the owners of wealth as well the comfortable suppliers of the substantial foodstuffs. This is no time to dream of the soothing influences of rural sequestration. It is a time to estimate the business prospects, the unhampered freedom and the means for personal improvement that are already at hand or can be made to accrue to the lot of the country resident. The advantages afforded by the present public school system, especially under the liberal provisions of some of the Western and South-western States, the building of towns and the establishment of business and manufacturing centres throughout the land, are such as to give the country people many intellectual, commercial and domestic benefits without the anxieties and uncertainties of a great city. The rapidly increasing intercommunication between the country and the city cannot fail to bring about a broadening of ideas, and the adoption of many modern conveniences and improvements calculated to make the home of the prosperous landholder attractive. The

present Farmers' Alliance movement is responsible for some vagaries through the influence of unscrupulous political aspirants and on account of untrained judgment in public affairs, but whether its greatest ends are accomplished or not it has at least given to the farmers a political and social importance they never possessed before and of which they should be proud. The farm home is the one most sacredly bound to the fundamental ideas of liberty. Just as health

is most vigorous and life is most prolonged in rural America, so patriotism is more deeply rooted and more enduring in the homes of several generations than in the ever changing abodes of the metropolis. There never has been a time in the history of the nation when the farmer could be so justly proud of his estates as at present, nor when he could do so much for his sons, his daughters and his country.—*The Kansas City Times.*

THE VALUE OF ACCURACY.

IN a general sense every one knows the value of accuracy, but men have very different ideas of what constitutes accuracy. One mechanic will be satisfied with a fit which another will not pass. Engineering instruments that were prized one hundred years ago for their accuracy would not be tolerated to-day. Even in ordinary machine shops a degree of accuracy is insisted upon to-day in common constructions that was scarcely attainable, in a commercial sense at least, at a period within the memory of living workmen. There has not been as much advance in the arts as in mechanical work; indeed, the ancient sculptors reproduced the human form with such a degree of accuracy that their products are still the wonder and admiration of the world. Fragments of these statues impress one by their truth even more than the finished works of modern sculptors, and every one recognizes that it is because not only of their grace, but of their exactness. It does not require an art education to appreciate the difference between accuracy and a near approach to it either in statuary or in portraiture. Even bad portraits are usually sufficiently like the

original to enable one to recognize the subject; another, more accurate in its representation of form, is a better likeness, but it is only the rare portrait known as a "speaking likeness" that is exact. The difference between such a portrait and one that in the absence of a better might be acceptable is sometimes so slight that it could not be measured, yet that difference in degree of accuracy seems to measure the difference between great talent and genius. Accuracy in speaking or in writing is also a most valuable quality. Ideas are to be represented in words, and only the great masters of the art make a near approach to accuracy. Yet it is most desirable that men should be able to convey to others exactly what they mean. This is most strongly felt in business because mistakes entail losses that are sometimes very heavy, and the limited vocabulary required for the transaction of ordinary business enables men to attain a degree of accuracy in this field that saves them from misunderstandings. And just as the salesman or correspondent attains skill in giving exact expression to his thoughts, desires or orders he is valued in his calling because he is

an economical servant or agent. Less esteemed and more difficult to attain is accuracy in social communication. Yet it is most important to the peaceful relations of men and their agreeable intercourse that there should be no such misunderstandings between them as arise from inaccuracy of expression. When one undertakes to report what has been said by another there is great danger of error. The exact words may be repeated, but with the wrong inflection or in the wrong connection, or a departure from the exact words may convey the wrong idea, and thus give rise to a misunderstanding or a quarrel difficult to settle. Language should be considered as a very useful instrument or weapon, whose misuse may wound or bring trouble upon one's self or others. It is, therefore, man's bounden duty, if he would use language at all, to learn how to use it with discretion and accuracy. He must be especially careful when he undertakes to convey to a third party what has been said by a mutual friend, for a little distortion here and a little there may render his report so inaccurate as to be valueless, if not altogether mischievous. All men do

not attempt to draw or to use tools, but all men seek to talk or to convey their ideas in some way from one to another, and they should seek to do so with the accuracy the artist or the mechanic studies to attain. Just as an artist cannot produce upon canvas that which he is unable to see, and, therefore, must train his eye as well as his hand, so the conversationalist must learn to understand as well as express; he must be a good listener as well as a good talker. Many of the bickerings which constitute the petty annoyances of life would disappear if the study of accuracy in thought and expression should become more general. Every one admits its value, but many give it only lip service, and go on from day to day offending against it by their carelessness or their extravagance of statement. It is a subject worth considering, for even the common slip of stating as a fact what has only been heard, instead of reporting it on a given authority, sometimes causes trouble and in the literature of the world is a prolific source of error and a great factor in the perpetuation of falsehood.—*Baltimore Sun.*

PRACTICE TEACHING IN NORMAL SCHOOLS — APPRENTICESHIP IN TEACHING.

WILLIAM H. PAYNE.

FOR reasons which will presently appear, I have given to my topic a title somewhat different from the one that was proposed to me by the editors. I am not orthodox in my opinions with respect to practice teaching in normal schools; and this paper will embody marked dissent from the received standards of belief and practice.

Universally throughout the West, so far as I know, and quite generally

throughout the North and East, there is attached to normal schools what is called a practice or experimental school; that is, a school in which the students in training serve a sort of apprenticeship in teaching children in the various elementary branches for a specified number of hours a term or year. These schools sometimes represent the twelve grades of the common school course, and sometimes a smaller number. Each distinct de-

partment of the practice school has its regular or responsible teacher who presides while the apprentice work is in progress; and over all is the critic teacher whose function is to witness the giving of the lesson by the tyro, and at an appointed hour to call together these pupil teachers and make a critical estimate of their performances. Each trial lesson is observed by a certain number of the student's classmates, who note the weak and the strong points in the exercise; and during the inquest they are summoned to express their opinions on the work they have witnessed. The judge or arbiter is the critic teacher, who gives a final estimate and summing up of each case. This is the usual *modus operandi*, as I have witnessed it in representative schools, and is my text for a few observations.

The general allegation that may be brought against this practice teaching is that the conditions under which it takes place are so artificial and unnatural that it is more likely to be harmful than helpful to those who take part in it. The student teacher knows that the pupils whom he is attempting to instruct are not his own and that he is only remotely responsible for results, seeing that they depend on so many others beside himself. His pupils are conscious of the same fact and owe no special allegiance to their temporary teacher.

It would be an abuse of language to call this real teaching. And what stuff must a youth be made of, who can teach in the presence of five or six official critics, who with pencil and note-book in hand, are spying out the slightest departure from the established code of methods? Each question, each response, even each inflection and gesture must square with the code or the penalty will be paid when the hour of inquest comes. The artificial is at a premium; the student teacher is inevitably and strongly

drawn away from the spontaneous and the natural toward routine and mechanism, which are the vices engendered and cultivated by this process of "training."

And what shall be said of the formal inquest, when, in the presence of the principal, heads of departments, teachers of methods, critic teacher and pupil critics, the student teachers are called up for trial? These official critics must criticize, for this is their function. Not to note a fault or find one would be neglect of duty; and the proof of critical penetration is to discover latent faults that lie too deep for common observation. And so the stock criticism is hypercritical. As there is an established code of methods, so there soon comes to be an established code of criticisms, and these speedily degenerate into cant. I have witnessed more than one of these sad spectacles, but I have no recollection of having heard a word of approval for anything done by one of these unfortunate students during his trial lesson. Under the conditions it is hardly supposable that any really good teaching could be done; but I have occasionally seen bright young people give a lesson which had some decided merits, which the official critics passed over in silence.

Teaching of high quality, that into which a gifted man or woman throws his whole personality, will escape all set rules and stereotyped methods, and, while obedient to the requirements of a general principle, will admit of countless variations and adapt itself to the special lesson, class, and occasion. One of the teacher's highest endowments is versatility, and to create this power ought to be one aim of professional instruction. Now it must be apparent that the general and almost inevitable result of the processes I have described is to mechanize instruction and to substitute "devices" and "methods" for

living power. I think it must be admitted by all impartial observers that normal-school training has not been favourable to the development of personal talent and power in teaching; and I believe this fault is traceable to the system of practice teaching which is in vogue in our professional schools.

An invaluable adjunct to a normal school is a primary school, in which students in training may observe the finest results of the teaching art, in the way of organization, discipline and instruction. It is needless to say that a practice or experimental school can never be a school of this type; for so many crude hands and heads can never produce a piece of high art. A school of observation should not be a pedagogical clinic for the exhibition

and cure of abnormal processes, but a model of what is best in the art of teaching, and one which can safely be reproduced by the students who observe its organization and working. If students have been properly instructed in the general principles of education and teaching, and have made a study of their application in a school of normal type, they are, in my judgment, serving the only apprenticeship that is necessary, and the only one that is not subject to grave dangers. Teaching is an almost wholly spiritual act or art; and the best preparation for it is a clearly defined idea of what a good school is, a knowledge of general principles, and the untarnished enthusiasm of an amateur. —*Educational Review.*

THE BIRDS' MOVING TIME.

THIS is the season of the year when hundreds of thousands of birds migrate, by night and by day, in large battalions from the frost bound north down to the sunny south. These migrations form one of the most interesting studies of ornithologists, who tell us that the little voyagers make their long journey with the precision and discipline of an army on the march. They have their advance and rear guards, while the main body is kept compact. Of course there are stragglers who are unable to keep up with their companions, but these fall out of the ranks, and unless they perish make their way as best they can to their destination.

Of so much interest are these annual migrations that the Department of Agriculture at Washington spends large sums of money making investigations, during both of the migratory seasons, which are the spring and fall. The object is to determine every

movement of interest in the passage of the birds and to distinguish what classes are harmful to farmers.

The latter question is serious. It is now under consideration whether the United States Government would not be wise to follow the advice of two or three of the Australian Legislatures in offering a bounty for the eggs of birds that destroy grain and fruits, or a certain sum per capita for the birds themselves. A man may make a good living in some of the Australian colonies by taking his gun or a snare and devoting himself to the destruction of the English sparrow.

The Agricultural Department sends out a printed blank to every lighthouse keeper along the coast, with a request to him to describe the kinds of birds that pass by the lanterns at night or that are found dead in the morning around the base of the towers. The keepers are further requested to note the number that

they see or find, and, if they cannot determine the species, they are asked to send a head and wing to the Department.

The head and wings of the birds unidentified, on arriving at Washington, are sent to the Smithsonian Institute, or the natural museum, for the professors to describe their kind. Just now large bales and boxes containing these sections of birds are being received at these institutions where they are handed over to the ornithologists.

Now that cold weather has set in in the north, millions of birds of almost every species are on the wing for the south. They are travelling along the same high roads over which they have passed from time immemorial. Some of them go in vast congregations down the valley of the Mississippi, and will not on any account depart from that route until they reach their winter abiding place. Others skirt along the fringe of the Rocky Mountains, thousands and thousands in a flock, halting at any stopping place, so long as the weather is mild, and, when it is cold again, rising high into the air with a tumult of noises and continuing their southward march.

Every night millions and millions of birds pass along the eastern and western coasts of the continent, and will continue to do so for the next two or, perhaps, three weeks. It is these birds that the lighthouse keepers and other coast officers in the employ of the Government are instructed to study and report upon. The reports sent in latterly by the lighthouse keepers are said to be very interesting. They show, among other things, that for the period following the cold snap which reigned over the northern part of the continent from Maine to Hudson Bay, unusually large congregations of birds moved southward.

On nights when there are no stars

to be seen, and there is no light anywhere in the sky, the birds become bewildered and fly toward any light they see. One lighthouse keeper, on Long Island, in his report, just handed to the Department, says: "On one dark night I think I must have seen, from about 11 o'clock to dawn, more than 100,000 birds pass my tower. There must have been quite that number, judging from the size of the flocks which swept by on the wind like great dark clouds. The stragglers from the main flocks made straight for the light, and many dashed themselves to pieces."

The plate glass of these lanterns is from a quarter to half an inch thick, and the birds came against it with such a force and in such numbers that they make the lantern fairly quiver with their impact. But some of the birds are very cautious and do not hit the glass, but hover around with wide open, bright and frightened eyes, glaring at the light. The birds that strike the glass generally break their bills or fracture their skulls, and the ground around the base of the tower on the following morning is covered with their dead bodies.

Among the birds that are now migrating are loon, the tiniest warbler, the little humming birds, and the great wild goose, which breeds in millions all across the continent and from the shores of Hudson Bay down to the northern New England States. Moreover, they come from Labrador, Newfoundland, and even from Greenland.

The goose has greater wing power than any other bird that is known. It will fly 700 miles without resting. This is proved by the fact that they cross the points in the Gulf of St. Lawrence measuring that distance, and they do not seem at all exhausted on alighting. They remain, of course, at the first stopping place for a few days feeding. Then if the wind is

fair, that is to say, blowing in the direction of their march, they take wing again and fly probably another 700 miles without stopping.

The brant or barnacle geese are nearly as good flyers as the Canada geese, but they keep to themselves and seem to be in a greater hurry to get south. Then come along vast streams of duck, including the mergansers—the red breasted ones of this variety being the most numerous—mallard, teal, black and wood ducks and the great northern loon drive past on the storm with their goblin cry. Following these are the robins, thrushes, meadowlarks, bobolinks, kingfishers, woodpeckers (the golden-wing nearly always leading), nut hatches and the cawing crows, which are the noisiest of all. They seem to forget all discipline, and fill the night air with their scolding.

Only a few nights ago a party of scientists went down after sunset to Bedloe's Island to witness the passage of the birds, and to note whatever might occur to them as being worthy of subsequent enquiry. A report of their observations will soon be completed and ready for publication in the official records.

The night selected was one immediately following the cold snap, and the scientists, well wrapped in their winter coats, made their way to the upper gallery of the Statue of Liberty, and took their places under the flaming torch of the goddess. They waited two or three hours, but not a bird came in sight. Presently, however, masses resembling dark clouds appeared to windward, and the party soon recognized that the advance guard and main body of a great army of birds were approaching. There were many stragglers, and some of these flew against the granite base of the statue; others fairly pelted the goddess, while others peered around the light and brushed the faces of the

observers with their wings. The main body of the birds kept high up in the heavens and flew right along. The scientists secured about a score of birds in their nets and kept them until daylight, when, after determining their species, they let them go. The stream of birds kept up until dawn, when they all sheered away from the light.

A curious and interesting fact is that in 1886, soon after the statue was first lighted, over 1,000 birds were picked up about the base of the tower on a morning following a dark night. Each year following this number has gradually decreased until it is unusual for more than from 200 to 300 to be found after a stormy dark night. This would seem to show that the danger of being allured by the brilliancy of the goddess torch is becoming known to all the Atlantic coast birds of passage.

One of the most interesting things in connection with these night flying birds is the apparently perfect system of signalling that they maintain when sometimes they are half a mile high in the air. They seemed to have arranged a code of signals by whistling. The note is, of course, peculiar to the bird, and is used among other notes when singing, but for the purpose of signalling this note is only used. The bobolink, for instance, who has a wide range of song when on the passage, has but one cry, and he advises the main body of any threatened danger by whistling "spink, spink."

The birds that lead the main body are veterans who have made the march north and south for half a dozen years. The signal of a wild goose is a loud "honk." The kingfisher, who chatters in his summer creek and scolds so that you might almost imagine that he was a human being, simply gives a scream or a single resonant note, which keeps his forces

together. The thrush and the robin each give a single shrill whistle which can be heard across a storm at night for a distance of nearly a mile. These birds are all great travellers. Some of them travel every spring and fall from the shores of Hudson Bay, from Labrador and even Greenland, to the tropic of Capricorn, a distance of 6,000 miles.

The massing of these forces in the early fall is very curious and highly interesting. Not a single bird starts southward until the cutting northern winds begin to pipe. Then all the families or broods for miles around begin to collect until hundreds and sometimes thousands get together and form into a body on the edge of a wood. Here the younger birds wheel, and scream and frolic, chasing each other through the air; but the elders appear sedate and seem to be waiting to collect together every bird that should join in the march.

It has long been a matter of conjecture as to how these birds can make their way at night, but it has been held latterly by the best ornithologists that they are guided by the stars. This is proved from the fact that on clear nights they fly often to a height of three miles, and at that distance it would be utterly impossible for them to be guided by the topo-

graphy of the route. Moreover, when the stars are covered the birds become bewildered and have at once to seek the ground.

The captain of a schooner trading between Prince Edward Island and Newfoundland told the writer how, on one occasion, he had left the Newfoundland coast with a steady northeaster which blew straight across the gulf, but, after being out a short time, the wind veered and blew from the south and it became very foggy. On the morning of the second day the crew were surprised to find about fifty wild geese on the deck of the vessel, some of them clinging to the hatches, deck or wherever they could get a hold.

Now, a wild goose never starts out for a journey across the sea unless the wind is fair, and it will then start in the day, but not in the night. These birds must fly by the stars, because they would have no other guide for 600 or 700 miles of water. Sometimes, however, the wind veers, and as a wild goose will not alight in the sea, it takes refuge on the first object that comes in sight.

Hundreds of thousands of little woodbirds every year, in flying across the gulf, get out of their course in the dark and storm, become exhausted and are drowned.—*Recorder, N.Y.*

NOTES FOR TEACHERS.

THINGS, NOT BOOKS.—If a true idea is to be formed of them, the brain must have help through the eye. The late Mr. Thring, of Uppingham, has told us that all history was shadowy ghostland to him till he saw the mark of Richard Lionheart, at Rouen, when he was twenty—that is, when he had long been in possession of a much larger amount of such knowledge as books, unaided, can give, than most people ever gain.

INFLUENCE OF THE LIVE TEACHER.—Three conditions must be fulfilled if children are to gain as much knowledge of nature, and of wholesomely interesting human nature, as they need for healthy life. No one, as a rule, ever learns to care for anything that he is the better for caring for, except by help of the influence of some one who already cares for the thing in question, or something like it; and for the majority of children

the first of the three conditions is that their teachers shall possess such knowledge of and interest in nature and the best human life and work.—*The Journal of Education.*

LUNDY'S LANE.—At this place of historic fame, near Niagara Falls, there was a scene of unusual interest and solemnity on the 17th inst. It was a re-interment of remains of eleven soldiers of H. M. 89th and 103rd regiments, who fell in the famous battle of the 25th of July, 1814. Buried on the day following the battle at a spot about 140 yards north of the Lane, they had rested there for 77 years or more, until disturbed on the 3rd September last by diggers in a large sand-yard. The Lundy's Lane Historical Society became possessed of the mortal remains of those noble dead, and made suitable arrangements, through the ready permission of the Commander of the Forces, for a military re-interment among their comrades who fell at the same time and were buried in trenches on the hill. The occasion attracted a concourse of more than 3,000 interested spectators from all parts of the Niagara peninsula. About 400 infantry and (dismounted) cavalry, under Lieut.-Col. Moran, with an excellent band preceded in procession at short distance between, and then were borne by six officers the coffined remains covered with a British flag. About 300 school children next fol-

lowed, and then about 200 men of all ages wearing the badge of the Lundy's Lane Society, and of other societies. Already the hill was crowded with people; house-tops, and every large tree, and the public road were occupied. The procession arriving at the grave, and order established, the President of the L. L. H. S. then mounted a large cannon and delivered a suitable address, which was followed by another from the Rev. E. J. Fessenden of Chippewa. The President next proceeded with the Church's service. . . . The service ended, the firing party discharged their farewell shots in three volleys, the band playing between them soft strains of "Nearer, my God, to Thee," and at the last "The National Anthem." The scene was most impressive. The crowds preserved a solemn attention, the village shops were closed, flags were half-mast; bouquets were placed on the old graves, and several wreaths on the two cannon close by were reverently taken and dropped within the grave. The pious and blessed hope of the great final Resurrection must have occurred to many persons standing on Lundy's Lane Hill on October 17th last. It is not much, some are apt to think, that can be laid in the grave, but God is able to restore, and to give life to the dead. This corruptible must put on incorruption, and this mortal must put on immortality.—*The Canadian Churchman.*

PUBLIC OPINION.

WHY I WENT TO COLLEGE.—"The nobility and power of the lives of two college graduates who lived in the town where I taught, contrasted with the mediocrity of the lives of most of my other associates.—this, I think, really sent me to college." Look out how you, after graduation, advertise a college education.—*George A. Gates.*

SUNDAY SCHOOL TEACHING.—Why is it that Sunday school teaching is so disappointing? The answer to this question is not to be put in a few words. The teachers are often, comparatively speaking, ill-informed themselves and unskilled in the art of education; the lessons are often lacking in definite instruction on important

points of faith and duty : the time devoted to religious teaching is very short. To be thoroughly effective, religious instruction should be given day by day ; it should be closely connected with a child's life, and, above all, should be directed to the formation of habits rather than to the acquisition of knowledge.—*The School Guardian*.

FROM THE ANTIPODES.—Professor Morris, Chairman of the committee that was formed in Melbourne to assist in raising in some degree the loss occasioned by the burning of the library of the University of Toronto some time ago, has received from the librarian of that institution a number of acknowledgments of donations sent by various donors in Melbourne. The librarian adds :—" I believe Sir Daniel Wilson, the president, has already communicated to you the satisfaction with which this gift from the Antipodes has been received in Toronto. The newspapers here have appreciated the gift in the spirit in which it is offered, as well as

the special reference made by yourself to this an evidence of kindly feeling between two colonies of the British Empire, which are separated by so great an interval of space from each other."—*Australasian Schoolmaster*.

ACADEMIC TRAINING.—" Do not be led away by the delusion that everything has been thought upon such subjects that can be thought, and all we have got to do now is to abandon them as barren fields of intellectual exertion, to devote ourselves to the more practical studies. I am perfectly certain that any great centre of academic education which ignored philosophy as an essential branch of its studies would thereby condemn and stultify itself. Industrial work, unbalanced by literary work, literary and industrial work, unbalanced by speculative work, depend upon it, ought never to form the mental sustenance and subsistence of academic training."—*Hon. A. F. Balfour*.

GEOGRAPHY.

THE RECESSION OF NIAGARA FALLS.—Since 1842 there has been an average yearly recession of the American Fall of seven 68-100 inches, and at the Canadian or Horse Shoe Fall an average yearly recession of two feet 16-100 inches. In other words, in forty-eight years the American Fall has receded thirty 75-100 feet, and the Canadian Fall in the same time has receded 104 51-100 feet.—*From Goldthwaite's Geographical Magazine*.

CORK.—The cork tree belongs to the class of oaks, and there are two trees,—*quercus suber* and *quercus occidentalis*, that from time to time shed their bark or outer coating. This coating is the cork which is sold to the trade ;

but its bark, shed by nature, is not remarkable, because it does not contain any sap, which is necessary to retain the elasticity. Cork is obtained by peeling. After a tree is three years old the peeling may commence, but cork of that age is poor in quality, and besides the peeling would kill the tree. Trees twenty years old give cork of a fair quality ; but the older the tree the better the cork until the tree has gained the respectable age of 100 or 150 years, when it is no longer good, the bark having become hard and unyielding. The price in the market varies from four to seventy cents per pound according to the quality and thickness. The full grown cork tree is seventy feet high and has

a diameter of five feet. It is found in thick forests of Spain, the south-eastern part of France, and in Algeria and Senegambia in Africa. The quality of the cork depends very much upon the situation of the land, that exposed to the greatest heat being the best. Each tree yields cork of two different thicknesses, the bark growing on the northern side of the tree being the thinner. —*It.*

A LAND OF WHEAT.—Over the plains of Manitoba once rolled the waters of an inland sea. The southern edge of the great ice sheet in the glacial epoch prevented the escape of north flowing streams, and they formed a mighty lake. Boulders from the Rocky Mountains, or from the eastern Laurentian hills are now seen here and there, where they were dropped by floating ice cakes many hundreds of miles from their place of origin. Then came the recession of the ice, the disappearance of the lake rich in cretaceous and nitrogenous elements, and, in course of time, rose a mighty forest, as great and as dense, it is believed, as those which now cover the Pacific slopes of the coast mountains. It is certain also that great forests covered these plains before the glacial epoch. The lake deposits, the forest growths, were among the elements that helped to produce the almost inexhaustible wheat-bearing soil of Manitoba; and to-day her farmers are happy in the prospect of the greatest harvest they ever reaped. It is believed that the wheat of Manitoba will average forty bushels to the acre. Many farmers say it will average forty-five bushels. Men who have seen many seasons of Minnesota wheat raising said in Manitoba last month that they had never looked upon such

wheat fields before. Those great fields stretching for scores of miles around Brandon, Portage la Prairie, and Deloraine are worth crossing the continent to see.—*It.*

FOSSILS COLLECTED ON THE CANADIAN PLAINS—Just now Swift Current is interesting because on the banks of the little river have been found a large number of mammalian and fish remains, in the tertiary rocks [rocks formed in the first period of the age of mammals] that crop above the stream. Among the specimens is the largest species of hoofed animals analogous to the rhinoceros that has ever yet been discovered. Even in early tertiary times these great beasts, it is evident, were roaming through the forests that then existed on the now treeless prairie of Canada; for these plains, which take some days of speedy railroad travel to cross, were once covered by lofty forests, and it is probable that great fires, such as to-day are killing an enormous quantity of the timber in the northwestern states and in British Columbia, were partly responsible for the disappearance of these ancient forests. The best portion of the skull of one specimen of these rhinoceroses described by Prof. Cope is about three feet long and eighteen inches across, with the frontal bones and snout preserved. The teeth are beautifully preserved, and some of them are nearly four inches across, three inches thick and nearly four inches in length, with zigzag and sharply cut crowns. Many other bones of various portions of the skeleton were also found, making in all a beautiful display of fossil bones belonging to as huge and ferocious a beast as prowls to day in the jungles of an African or [Indian forest.—*It.*

ASTRONOMICAL NOTES—DECEMBER.

BY MR. THOS. LINDSAY, TORONTO.

THE giant Jupiter is still the leader among the planets, his beauty out-rivalling all the stars of Aquarius, in which constellation he is placed. He is, however, waning in his splendour, drawing nearer and nearer to the sun, and gradually giving way, as an object of interest for observers, to Saturn and Venus.

Jupiter sets at 10 h. 22 m. local mean time on December 21st. He culminates with the bright star Fomahaut in the Southern Fish on December 14th.

Saturn is slowly asserting his right to the proud title of the "most beautiful telescopic object in the heavens." The rings which re appeared October 30th are now seen as a slender thread of light extending on each side of the disc. In October he was seen as a clear round ball devoid of rings, but will not be so seen again until 1906. He rises at midnight on December 19th, and reaches a meridian altitude of 48° at 6 hrs. A. M.

Venus is evening star in December, reaches her greatest declination south on the 6th, after which she becomes more and more favourably situated for observation. She sets on December 1st at 5 h. 30 m., and on the 21st at 6 h. 5 m.

Mercury is also evening star in December, and reaches her greatest elongation on the 11th, being then $20\frac{1}{2}$

degrees east of the sun. Although very far south in declination the careful observer may obtain a glimpse of Mercury, so seldom seen by amateurs, on that day. He will set in the horizon of Toronto at 5 h. 37 m., his true compass bearing being west $35^\circ 44'$ south. On the evening of December 6th Mercury will be seen in the same field of the telescope with the 3rd magnitude star λ Sagittarii.

Mars and Manus are morning stars in December. The Planet of War and the "Star of the Georges" will appear in the same field of the telescope on the morning of the 15th, rising at 3 h. 20 m. A. M. and culminating at 8 h. 35 m. at an altitude of 34° .

Neptune is well placed for observation. He culminates on December 3rd at 11 h. 34 m. P. M. at an altitude of $66^\circ 19'$; preceding Aldebaran the bright red star in Taurus, by 3 m. 33 s. and being $3^\circ 41'$ north of that star. In the path of the moon for December there lie many bright stars. The most noticeable occultation is that of Mars on the morning of December 26th. The true conjunction in Right Ascension occurs at 9 h. 38 m. 3s. local mean time. As the contact occurs in broad daylight a good telescope will be required to observe it.

We shall be pleased to hear from any of our correspondents who may observe this phenomenon.

EDITORIAL NOTES.

THIS number completes the thirteenth volume of this Magazine. We have to thank all the friends of THE MONTHLY, and they are many, who have helped us in any way to make the Magazine what it is and has been. Many, both in our own country and in the United States and Britain, have

spoken words of praise and of encouragement in regard to our efforts, to have a Magazine worthy of Canada. We hope the friends of THE MONTHLY will, with promptitude and vigour, see to it that we are sustained with more energy and good will than ever. Let us have a Magazine worthy of Canada.

THE problem with which educators are wrestling at the present time most vigorously is pedagogics. One part of this general question is what part in the training of teachers practice-teaching should have, and where and how should it be conducted? Educationists seem to be of one mind as to the necessity of having all those who aim to be teachers in the public or elementary schools so trained. In European countries this opinion seems to be equally strong as to its necessity for all teachers, whatever may be the grade of school in which they are being trained, before they are entrusted with the responsibility of having full charge of classes. The same opinion is undoubtedly gaining ground in Britain, the United States and Canada. The opinions of eminent and experienced men are being gathered from all countries on this important plan of the proper preparation of teachers for their high calling. We gave the opinion of one expert last month, another is given in this number.

UNIVERSITY MATRICULATION SCHOLARSHIPS.

IT is with pleasure we refer to the founding by the Hon. Edward Blake, Chancellor of the University of Toronto of a generous number of scholarships to be competed for at Junior Matriculation into that University. We regretted, with many others, the withdrawal of the scholarships which were open for competition in former years in the University of Toronto, knowing as we did the beneficial effect the competition for Scholarships had upon students and undergraduates. A commendable feature of these scholarships provided by the wise liberality of the learned Chancellor is that the payment of the tuition fees for the whole University course

is included in the scholarship. Knowing the important effect the establishment of these scholarships will have on the education of the country, we make room for an article on the subject from the *Mail* of this city, with which we heartily concur:

"Ten years ago a sum of no less than \$3,805 was distributed annually for scholarships in various stages of the Arts course, in the University of Toronto, \$700 of that amount being open for competition at the Junior Matriculation Examination. Owing to pressing financial circumstances the University saw itself forced to withdraw first of all the scholarships in the upper years, and finally those offered at matriculation, with the exception of the Prince of Wales Scholarship and the Mary Mulock Classical Scholarship, for which latter the University was indebted to the liberality of the late Mrs. Mulock. The withdrawal of the scholarships was very generally regretted. Objections have, it is true, been sometimes urged against the theory of money prizes as educational rewards, and with more force perhaps against the propriety of devoting public funds to this purpose. Among practical educators, however, few will be found to undervalue the advantages which, at least in the earlier stages of study, arise from that healthful competition which is stimulated by judicious rewards, while all will admit that to give by this means assistance to the poor but gifted and diligent student, as Carlyle puts it 'to furnish the timely aid from which may spring a little trace of help to the young heroic soul struggling for what is highest,' is, on the part of a private donor, not only in itself a meritorious act, but in the highest sense of the word a public benefaction. Friends of higher education will be rejoiced to learn that the matriculation scholarships are to be not only

restored but largely increased, and this, too, entirely free of cost to the revenues of the University. An endowment fund of \$20,000 has been placed at the disposal of the University for this purpose through the noble generosity of the Chancellor, the Hon. Edward Blake, who thus adds but another proof of his devotion to an institution which already owes so much to his wise direction and indefatigable labours.

"A scheme for the allotment of the annual income of this fund in scholarships, to be given at junior matriculation only, has been drawn up and approved by the Chancellor and Senate. The number of scholarships proposed in the scheme is twenty-nine, inclusive of those already offered from private benefaction. The cash value of the scholarships is not large, ranging from \$60 down to \$30, but in every case the money given is to be supplemented by free tuition during two, three, and even four years of the undergraduate course, which at the present scale of fees represents a money value of \$20, \$40, \$60 or \$80, as the case may be. Thus the actual value of the prizes offered ranges from \$140 down to \$90, sums which will afford very substantial aid to the successful scholars. The free tuition in any given year is made conditional on the winning of first-class honours in at least one department in the preceding year. In other words, the student must not only make good his claim at matriculation, but he must maintain it by continued effort throughout the course. A very generally recognized defect in the University system of honour courses is the tendency to specialization at too early an age which it encourages. It is now quite possible and only too common for a student to study but little else than one special department, say Classics, Mathematics or the Modern Languages, from the very

beginning of his High School course. One of the main features of the scheme is the marked encouragement given to the broader courses of study. Of the twenty nine scholarships eight only, and these the smallest, are given for proficiency in a single department; twelve are given for proficiency in two departments—by no means a narrow course of study; and eight, the most valuable of all, are given for proficiency in the whole matriculation work. In allotting the scholarships for proficiency in two departments, a wise grouping of subjects has been made, by which incongruous combinations are avoided, and by which the departments taken up will in most cases be complementary to each other. The plan proposed will also do much to discourage the claims of superiority which are too often put forward by one or other branch of learning. The practical equality of the four departments of Classics, Mathematics, Modern Languages and Science is recognized in the fact that the special scholarships given for each are of equal value, and that in estimating the general proficiency standing the marks allotted to each of these departments are also equal. The recognition of the claims of Science is particularly noticeable in this connection, as it is now for the first time made a scholarship department at matriculation, and not only so, but it is at once put upon a footing of equality with the older branches of learning. History and geography, since they do not properly form a part of any of the four departments mentioned, are considered only in the marks for general proficiency. As the endowment fund is not as yet complete, it is proposed that for the present a part only of the cash value shall be paid on each scholarship, the amount to be increased by ten per cent. of the whole sum each year till the completion of the



fund, but free tuition under the plan will be given from the outset. The plan is now being submitted to the headmasters of High Schools and Collegiate Institutes for their criticism and suggestions, which cannot fail to be useful in a project which so nearly concerns the secondary schools. After receiving and considering the opinions of the masters, the Senate will finally decide upon all details, and will in all probability offer the scholarships for competition at the approaching matriculation examination."

WORDSWORTH'S GRAVE.

Poet, who sleepest by this wandering wave !
 When thou wast born, what birth gift hadst thou then ;
 To thee what wealth was that the Immortals gave,
 The wealth thou gavest in thy turn to men ?
 Not Milton's keen translunar music thine,
 Not Shakespeare's cloudless, boundless human view ;

Not Shelley's flush of rose on peaks divine ;
 Nor yet the wizard twilight Coleridge knew.

What hadst thou that could make so large amends
 For all thou hadst not and thy peers possessed,
 Motion and fire, swift means to radiant ends ?
 Thou hadst, for weary feet, the gift of rest.

Not peace that grows by Lethe, scentless flower
 There in white languors to decline and cease ;
 But peace whose names are also rapture, power,
 Clear sight and love ; for these are parts of peace.

The half-heard bleat of sheep comes from the hill.
 Faint sounds of childish play are in the air.
 The river murmurs past. All else is still.
 The very graves seem stiller than they were.

A'ar though nation be on nation hurled,
 And life with toil and ancient pain depressed,
 Here one may scarce believe the whole wide world
 Is not at peace, and all men's hearts at rest.

—William Watson.

SCHOOL WORK.

CLASS-ROOM.

ANNUAL EXAMINATIONS, 1891.

LATIN GRAMMAR AND COMPOSITION.

Senior Leaving and Honour Matriculation.

Examiners :—A. J. Bell, M.A., Ph.D. ;
 William Dale, M.A. ; John Fletcher, M.A.

NOTE.—An option is allowed between questions 4 and 5.

A.

1. Explain what is meant by (a) objective genitive ; (b) genitive of quality ; (c) genitive of definition ; and give in Latin an example of each.

2. Show by examples the various ways in which the present participle in English may be expressed in Latin.

3. Give examples in Latin to illustrate the different meanings of *dum* and *ut*.

4. Translate into Latin :

(a) We are fighting with an enemy who ought in no wise to be spared.

(b) How few there are who have been, or will be, like him.

(c) Their answer showed more daring than caution, considering the perilous ground on which they stood.

(d) Whenever he heard anything of this kind, he would instantly say that the story was invented by some neighbour.

5. Translate into Latin :

(a) If he does this, I shall be glad ; if not, I shall take it quietly.

(b) These favours are greater than I can requite.

(c) I received the thanks of Parliament and the nation for having been alone in not despairing of the Common Wealth.

(d) Whatever his guilt, whatever his

criminality, no one has a right to indict him in his absence and to condemn him unheard.

6. When is *si* followed by the indicative, and when by the subjunctive mood? Give examples.

B.

Translate into Latin:

The names of Catilina's associates show how noble were the families, how exalted the stations of the men who now prepared to plunge into a revolution. Among them were two nephews of the dictator Sulla. Antonius and Cassius had been candidates for the consulship. Bestia was a tribune elect; even the Consul Antonius was suspected of a knowledge of their designs. They counted upon the support of the men who had been impoverished by Sulla, and hoped to inflame the turbulence which animated the dregs of the populace. They expected moreover the armed assistance of the veterans who have already squandered the possessions they had so suddenly acquired. They proposed to excite against their conquerors the hostile feelings of the Italian races. Finally they resolved to seize the gladiators' schools at Capua: and some of them would not have scrupled to arm even the slaves and criminals.

LATIN AUTHORS.

NOTE.—Candidates are allowed an option between questions 3 and 4, and also between questions 9 and 10.

A.

Translate: O diva, gratum . . . abest liquidumque plumbum.—Horace, Odes, B. I.

1. Write notes on Antium, praesens, triumphos, sollicita, Bithyna, lacessit, Carpathium, Dacus, Scythae, Latium.

2. Scan the first stanza, marking the quantity of each syllable.

3. Give in detail the meaning of the above passage, showing the connection of thought.

4. Define the special characteristics of the Odes of Horace, illustrating from your book where you can.

B.

Translate: Exponam enim vobis, Quirites, . . . et melioribus civibus uteremur.—Cicero, *In Catilinam*.

5. Give rules for the mood of comparentur, sis, uteremur.

6. Write notes on istae, aere alieno, tabulae novae.

7. "Consilii atque orationis. Hendiadys." Explain.

8. "Locupletioribus. Predicative." Explain.

9. Unum genus. Describe in your own words, the first class of Catiline's supporters. What is Cicero's advice to them?

10. State the object of each of the four orations against Catiline respectively.

C.

Translate at sight:

Audite, audite consulem. . . atque in cervicibus nostris restiterunt.—Cicero, *Pro Murena*.

Late patere, be wide-spread; specula, watch-tower; resto, remain behind.

ARITHMETIC, MENSURATION AND COMMON TRANSACTIONS.

Primary — (Solutions.)

Leo. B. Davidson, Collegiate Institute, Toronto.

A.

1. (a) and (b) Book work.

(c) Carry all the addends to the same number of decimal places as there are in that addend which already contains the greatest number of decimal places. Then find the L. C. M. of the numbers representing the number of figures that repeat in each addend, then add, etc. *Ans.* 9.989079.

2. *Ans.* \$90. 3. *Ans.* \$1.05.

4. Purchaser pays $\frac{3}{8}$ of $\frac{1}{5}$ of $\frac{1}{2}$ or $\frac{1}{200}$ of list price, etc. *Ans.* 31.57 + per cent.

5. He gets \$16,000 stock yielding income of \$480. He resells for \$12,800, etc. *Ans.* \$102 $\frac{3}{4}$.

6. Allowing compound interest, the amount of the annuity is $\left(\frac{1.04^5 - 1}{1.04 - 1}\right) \times \$350 = \$1895.71 + .$

7. P. W. of \$400 = $\frac{2}{3}$ of \$400 + P. W. of \$300 = $\frac{2}{3}$ of $\frac{2}{3}$ of \$300 + P. W. of \$200 = $\frac{2}{3}$ of $\frac{2}{3}$ of $\frac{2}{3}$ of \$200 = \$825.82+, which is about 77 cts. more than the amount found by the ordinary method of equating the time, etc.

B.

8. Area = 84 sq. ft. Length of perpendicular on 14 ft. side is 12 ft.

9. To find the cub. contents take 2 in. from each of the external dimensions. Cub. contents = 472.82 cub. ft. Quantity of lumber = $374\frac{1}{8}$ ft.

10. Area of lining, that is, of its plane surface = $(84+77)(84-77) \times \frac{22}{7}$ or $\frac{1127 \times 22}{7}$ sq. in., etc. *Ans.* $22\frac{1}{2}$ tons.

C.

11. Cost of sheep = \$4,500; feed and yard = \$71.77 $\frac{1}{2}$; freight = \$175; total cost = \$4,746.77 $\frac{1}{2}$. Bsold sheep \$5,562.50, etc.

12. A should get C's \$10 and \$4 from B.

ALGEBRA AND EUCLID.

A.

1. (a) In order that it may be exactly divisible $2x+3y=0$; $\therefore 2x = -3y$. Substitute, and dividend vanishes, that is, there is no remainder.

(b) $b = x^2 - 2xy - y^2$.

2. (a) $(x+2b)(x-b+5a)$. (b) $(x^2+a^2)(x+a)(x-a)(x-1)(x^2+x-1)$.

3. (a) $\frac{a-b}{a+b}$. (b) o. (c) This expression

becomes $\frac{x^3}{(x-y)(x-z)} - \frac{y^3}{(x-y)(y-z)}$

+ $\frac{z^3}{(x-z)(y-z)}$, etc. *Ans.* = $x+y+z$.

5. (a) $x = \frac{c-a-b}{b-a-c}$.

(b) $x = \frac{a c (n+q) - n q (c+a)}{n q - a c}$.

(c) $x = \frac{a c}{b}$.

B.

6. Let x = number of gals. first pipe puts in per min., etc.; 1st = 22 gals.; 2nd = 7 ga's.; 3rd = 12 gals.

(7) \$280. (8) A = \$204; B = \$84.

9. Each horse cost $\frac{\$p}{m}$. Sells n horses for $\frac{\$21 P n}{20 m}$; $\therefore (m-n)$ horses = $\frac{\$11 P}{10}$

$\frac{21 P n}{20 m}$; \therefore each = $\frac{22 p m - 21 p n}{20 m (m-n)}$ \$.

10. 90 miles.

C.

Book work.

D.

15 Euclid's Line is length without breadth, etc.

16. Consider carefully I. 4, and I. 8; I. 18, and I. 19; I. 24, and I. 25, etc.

17. Draw a figure, in which the circle is supposed to cut the straight line in three points, and proceed similarly to Euclid's construction, etc.

18. (a) Take the lines as given, and proceed according to Euclid's construction in I. 22, and you will at once detect the difficulty; similarly in case (b).

19. Two intersecting straight lines make two different angles with one another, unless they intersect at right angles. See I. 13 in Euclid.

HAMILTON PUBLIC SCHOOLS.

PROMOTION EXAMINATIONS, JUNE, 1891.

ARITHMETIC—GRADE 5.

1. Divide $\frac{19}{21}$ by $\frac{7}{21}$, $\frac{46}{51}$ by $\frac{29}{51}$,

$\frac{1}{9}$ by $\frac{8}{9}$, $\frac{13}{15}$ by $\frac{14}{15}$. [14]

2. If a man walks at the rate of $3\frac{3}{8}$ miles an hour, how long will it take him to walk $40\frac{1}{2}$ miles? [14]

3. How many quart boxes will be required to hold 9 bush. 3 pks. 1 gal. 1 qt. of strawberries? [14]

4. A newsboy buys 7 dozen newspapers at 20 cents a dozen and sells them at 3 cents a paper; how much does he gain? [14]

5. If \$116,323 be divided among 89 men, how much of it will 49 of them receive? [14]

6. John agreed to sell $37\frac{1}{2}$ cords of wood to Henry. He delivered $9\frac{1}{2}$ cords one week, $3\frac{3}{8}$ cords the next week and $10\frac{5}{8}$ the next. How many cords has he still to deliver? [14]

COMPOSITION.

1. Write the following correctly: have you a long sharp slender pencil tom hot corn hot corn who will buy hot corn? please many bring me some forget me nots? [19]

2. Write statements using correctly these words: seen, done, lay, sat, lain. [15]

3. Use each of the following action-words to state what but one does: fly, guess, go, employ, stay, fix. [12]

4. Fill the blanks in the following with action-words, and tell how each is used: _____ is dangerous. They are _____ The giraffe _____ Watch the _____ stars. [16]

5. Give the correct spelling when *er* is added to the following quality-words: dry, true, wet, funny, sly, busy. [12]

6. Write correctly the address of a letter to be sent to John Smith, who lives at number 13 Maria street in the city of Ottawa. [6]

GEOGRAPHY.

1. Name the countries of North America with their capitals, and tell where the capitals are situated. [15]

2. Name a large gulf or bay on North, East, South, and West, and one inland bay. [5]

3. What passage of water connects Hudson Bay with the Atlantic Ocean? Lake Erie with Lake Ontario? Gulf of Georgia with the Pacific Ocean? Arctic Ocean with the Pacific Ocean? [8]

4. Where are James Bay, Georgian Bay, Bay of Fundy, Gulf of Georgia, and Baffin Bay? [10]

5. Trace the following rivers: McKenzie, Saskatchewan, Mississippi, Missouri and Albany. [15]

6. What and where are: Yucatan, Belle Isle, Cuba, Sable, Campeachy, Panama, Chidley, San Lucas, Newfoundland? [9]

GRAMMAR.

1. Give as many rules as you can for the use of the period. [13]

2. Write a statement in which you use a series of words. Write a command in which you use an action-word. Write an inquiry in which you use a relation-word. [15]

3. How may an action-word be used? Give an example of each way. [18]

4. Write the following words so that each shall mean more than one: ox, lady, cloth, chimney, loaf, sheep, church, goose. [12]

5. Does the water flow above continually? Is the carving-knife on the table? The rolling-waves came on. Skating is a winter sport. When will the birds come again, Mother? We are writing with ink.

- (a) Write down the names;
- (b) Write down the action-words;
- (c) Write down the relation-words;
- (d) Write down the words that show how, when, or where an action is performed. [21]

LITERATURE.

1. Describe the beaver. [16]

2. How does the beaver know that the tree is ready to fall? Tell what use he makes of the tree. [12]

3 Explain "Social animals," "dam," "store-room," "beaver-town," "sentinel." [12]

4. Describe a "Jack in the Pulpit." Who composed the choir? Name the different flowers that composed the congregation. [12]

5. What did King Bruce say before he saw the spider? What did he say after he had watched the spider? What lesson do we learn from this story? [16]

6. Tell in your own words the story of "The Little Match Girl." [5]

TEMPERANCE—GRADE 8.

1. What quantity of water exists in the blood; in the muscles; in the brain of man? [8]

2. Name some of the colloidal parts of the body. What does water do to the colloidal parts of the living body? [8]

3. What general evidences is there that water is an all-sufficient drink? [8]

4. What is the best example of a natural standard food? What is the proportion of solid and fluid matter in this standard food? [8]

5. What other fluids are found, naturally, in the bodies of man or other living animals? Why do other fluids of the body seem to differ from water? [8]

6. What process has the juice of fruit to go through in order to pass into wine? Give two proverbs to show the bad effects of wine. [8]

LITERATURE.

1. Explain the meaning of "Burns first came upon this world as a prodigy;" "sober judgments;" "glitters with no lustre but his own." [12]

2. What does Muller think of Shakespeare as a man (not as a poet)? How do "Great nations make great poets"? [12]

3. Explain the meaning of "silent influence;" "Superhuman power;" "classic." Name some classical writers. [12]

4. Give meanings for the following: "beacons;" "battered harness;" "armed heel;" "burghers;" "corselet;" "dinted helm;" "couched a spear;" "knightly fame." [16]

5. Explain the lines "The sword of heaven is not in haste to smite, Nor yet doth linger."

Explain the following: "The nation in every country dwells in the cottage;" "profane historians;" "sacrifices to the old scimitar." [14]

6. Write the last stanza of "Ring Out, Wild Bells;" the last stanza of "To Mary in Heaven;" and the stanza of "The Bells of Shandon," beginning "I've heard bells chiming." [14]

CONTEMPORARY LITERATURE.

"HAPPY Hours for Poor Children" is the opening article in the November *Quiver*. "Rough Riding in China," by a missionary's wife, is of more than usual interest. The serial and short stories are given.

THE September *Academy* contains an excellent article on the "Division of High Schools." Other articles are "Notes on Technical Education" and "In the Classic Halls of Louvain."

THE Christmas number of the *Saturday Night* promises to be even better than last year. A Competition is again offered to encourage native talent, the result of which will be made known in the number. The illustrations will be especially fine.

THE *Overland Monthly* is now an illustrated magazine, its cost is reduced from four to three dollars. Articles worthy of note are on "Libraries and Librarians of the Pacific Coast," "California Horse Farms." "Our Poppy" is a poem by John Vance Cheney.

THE Greek style comes third in the series of Historic Styles by Paul Rouaix in the *Decorator and Furnisher* for October. "Furishing the Kitchen" is a valuable article on a novel subject by Agnes B. Ormsbee. The decorative forms of electric light fixtures are of remarkable beauty but perhaps the dining-room mantel given is the most beautiful of the illustrations.

A PORTRAIT of the Rt. Hon. A. J. Balfour appears in the *Illustrated News of the World* for November 7th. "Come with me and be my love," by Robert Buchanan, is coming out in weekly parts at present. The largest illustration is Canadian North-West Farming. "Reaping the Harvest in Manitoba," "Across Mangolia," "Recollections of Parnell," and "Arts and Crafts of Childhood" are specially interesting in the reading matter.

HAPPY Children who begin with November another new volume of the *St. Nicholas*. The opening poem "Romance" is by Mildred Howells, a daughter of the novelist.

"Tom P. ulding," a serial by Brander Matthews, promises well. Mary E. Wilkins contributes one of her short stories, "The Dickey Boy," and E. T. Corbett a delightful piece of verse, wonderfully illustrated, entitled "The New Story of the Apple Pie."

ANDREW LANG'S second paper "Among Books" appears in the November *Scribner's*. "Authors he met while at College" add interest to the books mentioned. "The Wrecker" increases in interest and nears the southern seas where Mr. Stevenson is now at home. "The Federation of Australia" by the Hon. Alfred Deakin, M.P., of Victoria is a question of moment to Canadians. The poetry is by Duncan Campbell Scott, Octave Thanet and Julian Hawthorne. "Mr Lowell as a Teacher," by one of his pupils, is a contribution of value to Lowelliana.

Catalogue of the Michigan Mining School. (Houghton; Published by the Mining School.)

College Series of Greek Authors. Edited under the supervision of John Williams White and Thomas D. Seymour.

PART II. of Messrs. Macmillan's illustrated edition of *A Short History of the English People* has just been issued and contains Sections III. to V., of Chapter first.

A number of the illustrations are taken from ancient copies of the Scriptures; the subjects of others are coins, necklaces, a Viking ship found at Tune, Alfred the Great's jewel found at Athelney, etc.

A Handbook of British Commerce. By P. L. Simmonds, F.L.S. (London: Moffatt and Paige.) This manual of commercial geography is arranged as a kind of dictionary, a list being given of all the principal articles of commerce, etc., and brief accounts being appended to each. These are models in their way, and the amount of information included is surprising. A few omissions might be noted—the name of Prof. Bell might well be given under the telephone, for instance—and the note on aluminium is too brief, but these matters will doubtless be

remedied in later editions. The book was needed and will be of much service.

ONE has a feeling, in reading books on morality, that it is a pity we cannot use the best of all text-books on Morals. Still it shows at least that some persons know the need for teaching this subject when such books as *Ethics for Young People* by Prof. Everett of Harvard (published by Messrs. Ginn & Co., of Boston) are issued from the press. Prof. Everett's book has many good points, and deals with duties which we owe to ourselves and others in a clear and fair manner. But there is *nothing* in the book from first to last which deals with the one relation in which we all stand to each other and to a Heavenly Father. How can a book on Ethics which ignores that be satisfactory?

English Men of Action:

Rodney. By David Hannay. 2s. 6d., (London: Macmillan & Co., and New York.) Mr. Hannay writes *con amore* and what is so written is apt to be so read. It would be well if his book secured for its subject that recognition, though tardy, which Admiral Rodney's great services to his country deserve. He saved the West Indies when the American Colonies were lost, and was thus one of the very few men who made the British Empire so far as victories can make it. For him who would inform himself of historical or naval affairs, or who can appreciate a great sailor and a true man, this is a book to read and enjoy.

The High School French Grammar. By W. H. Fraser, B.A., Lecturer on Italian and Spanish, University of Toronto, and J. Squair, B.A., Lecturer on French, University College Toronto. (Toronto: Rose Pub. Co.) This is a book that deserves recognition for many reasons, though indeed, perhaps, it does not need it, having received pre-natal authorization from the Education Department. It is intended to be used both in elementary and advanced classes, and is both well-written and well arranged. Much attention is given to pronunciation, and the exercises are practical and carefully graded. The Vocabularies and Index add greatly to the value of the book.

Studies in American History. By Mary S. Barnes, formerly Professor of History at Wellesley College, and Prof. Earl Barnes, of the Leland Stanford University. (Boston, New York and Chicago: D. C. Heath & Co.)

It is inspiring to read, much more to use, such a history as this, which makes good use of real historic material, shows historic development, and makes the past speak in the words of men who lived then. The words of Homer, Columbus, Pitt, Longfellow, Lincoln and others, brighten the pages of this real history. It is, at last, a history with an impartial account of the Civil War, because it lets both sides speak for themselves, and, on the whole, approaches as nearly as any book we have seen to the ideal school-book.

The Prometheus Bound of Æschylus and the fragments of the *Prometheus Unbound*, with introduction and notes by N. Wecklein. Translated by Prof. Allen, of Harvard University. (Boston and London: Ginn & Co.)

The foregoing announcement speaks for itself. The College Series of Greek Authors consists of classical works which for scholarship and general excellence would be difficult indeed to surpass.

The translator has adhered closely to the text and commentary of the original edition, and has had the advice and assistance of Dr. Wecklein (Rector of the Maximilian Gymnasium in Munich) in his work.

Cambridge Mathematical Series:

Elementary Trigonometry. By J. M. Dyer, M.A., and Rev. R. H. Whitcombe, M.A. (Cambridge: Deighton, Bell & Co.; London: George Bell & Sons.) 4s. 6d. To prepare a school text-book for beginners in Trigonometry which should render the path of the learner as smooth as possible, and yet enable him to gain an adequate knowledge of the subject is not an easy work to accomplish, but the authors of this latest issue of the Cambridge Mathematical Series have produced a text-book which will bear comparison with the best. The treatment of the subject varies somewhat from the ordinary method: there are four parts, the last, on logarithms, etc., being especially good. A great many examples are given.

Mechanics for Beginners. Part I. Dynamics and Statics. By the Rev. J. B. Lock, M.A., 3s. 5d., (London: Macmillan & Co., and New York.) The author has given in this book the more elementary parts of the Dynamics of a particle and of the statics of Parallel Forces which have already appeared in his work on elementary dynamics, with some additions, such as a chapter on simple harmonic motion and the Pendulum and some articles on Units. The book is especially intended to meet the requirements of Students of the Science and Art Department at South Kensington, but we need hardly say that any student will find it a most satisfactory book. The method followed in the portion of the book on dynamics is new and will probably be found an improvement on the ordinary method.