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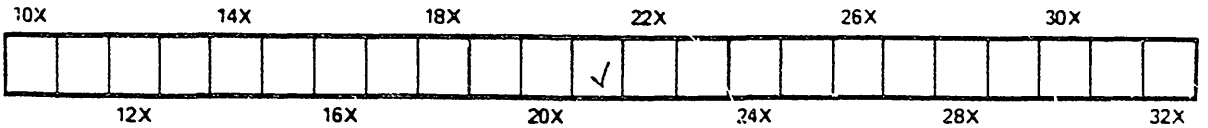

THE CANADA

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THE TRANSITION FROM SCHOOL TO COLLEGE.

L. B. R. Biggs.

COLLEGE life is the supreme privilege of youth. Rich men's sons from private schools may take it carelessly, as something to enjoy unearned, like their own daily bread; yet the true title to it is the title earned in college day by day. The privilege of entering college admits to the privilege of deserving college; college life belongs to the great things, at once joyous and solemn, that are not to be entered into lightly.

Now the things that are not to be entered into lightly (such as marriage and the ministry) are often the things that men enter prepared viciously or not prepared at all; and college life is no exception. "There had always lain a pleasant notion at the back of his head," says Mr. Kipling of Harvey Cheyne's father, who had left the boy to the care of a useless wife, "that some day, when he had rounded off everything and the boy had left college, he would take his son to his heart and lead him into his possessions. Then that boy, he argued, as busy fathers do, would instantly become his companion, partner and ally; and there would follow splendid years of great works carried out together—the old head backing the young fire." Such fatal gaps in calculation, common with preoccupied fathers, are not uncommon with teachers—the very men whose life work is fitting boys for life.

To prepare a boy for examinations that admit to college requires skill, but is easy; to prepare a boy for college is a problem that no teacher and no school has ever solved. In the widest sense, the transition from school to college is almost coincident with the transition from youth to manhood—often a time when the physical being is excitable and ill-controlled, when the mind suffers from the lassitude of rapid bodily growth, and when the youth's whole conception of his relation to other people is distorted by conceit. Sensitive to his own importance, just beginning to know his power for good or evil, he is shot into new and exciting surroundings—out of a discipline that drove and held him with whip and rein into a discipline that trusts him to see the road and to travel in it. If we add to this the new and alluring arguments for vice as an expression of fully developed manhood, we have some notion of the struggle in which a boy—away from home, it may be, for the first time—is expected to conquer. The best school is the school that

best prepares him for this struggle; not the school that guards him most sternly or most tenderly, nor the school that guards him not at all, but the school that steadily increases his responsibility, and as steadily strengthens him to meet it. The best college is the college that makes him a man.

The first feeling of a Freshman is confusion; the next is often a strange elation at the discovery that now at last his elders have given him his head. "I never shall forget," says a noted preacher, "how I felt when I found myself a Fresh man—a feeling that all restraint was gone, and that I might go to the devil just as fast as I pleased." This is the transition from school to college.

In a man's life there must be, as everybody knows, a perilous time of going out into the world: to many it comes at the beginning of a college course; to many—possibly to most who go to college at all—it has already come at school. The larger and less protected boarding-school or academy is constantly threatened with every vice known to a college; the cloistered private school affords, from its lack of opportunity for some vices, peculiar temptation to others; the day school, if in or near a large city, contains boys for whose bad habits, not yet revealed, their parents by-and-bye will hold the college responsible. I remember a group of boys going daily from cultivated homes to an excellent school, each of whom, in college, came to one grief or another, and each of whom, I am convinced, had made straight at home and at school the way to that grief. The transition from school to college was merely the continuation in a larger world of what they had begun in a smaller.

A continuation is what the transition ought to be: the problem is how to make it a continuation of the right sort. "What is the matter with your college?" says a teacher who cares beyond all else for the moral and religious welfare of his pupils. "I keep my boys for years; I send them to you in September, and by Christmas half of them have degenerated. They have lost punctuality; they have lost application; they have no responsibility; and some o them are gone to the bad." "What is the matter with your school," the college retorts, "that in half a dozen years it cannot teach a boy to stand up three months? College is the world; fitting for college is fitting for life; what is the matter with your school?" He who loses his ideals, loses the very bloom of life. To see a young man's ideals rapidly slipping away, while his face grows coarser and coarser, is one of the saddest sights in college or out of it. What is his training good for, if it has not taught him the folly, the misery and the wrong of dabbling in evil? If he must believe that no man is wise till he has come to know the resorts of gamblers and harlots and has indulged himself for experience sake in a little gentlemanly vice, can he not put off the acquaintance four years more, by the end of which time he may have learned some wiser way of getting wisdom? Besides, in the course of those four years (and the chance is better than even) he may meet some girl for whose sake he will be glad that his record has been clean. Cannot a school which closely watches its boys while their characters are moulding teach them to keep their heads level and their hearts true, save them from the wrongs that never can be righted, send them to college and through college, faulty it must be, but at least unstained?

The main object of school and college is the same—to establish character, and to make that character more efficient through knowledge; to make moral character more efficient through mental discipline. In the transition from school to college, continuity of the best influence, mental and moral, is the thing most needful. Oddly enough, the only continuity worthy of the name is often (in its outward aspects) neither mental nor moral, but athletic. An athlete is watched at school as an athlete, enters college as an athlete; and if he is a good athlete, and if he takes decent care of his body, he continues his college course as an athlete—with new experiences, it is true, but always with the thread of continuity fairly visible, and with the relation of training to success clearly in view. Palpably bad as the management of college athletics has been and is, misleading as the predominance of athletics in an institution of learning may be, the fact remains that in athletics lies a saving power, and that for many a boy no better bridge of the gap between school and college has yet been found than the bridge afforded by athletics. The Freshman athlete, left to himself, is likely to fall behind in his studies; but unless he is singularly unreasonable or vicious, he is where an older student of clear head and strong will can keep him straight—can at least save him from those deplorable falls that, to a greater or less degree, bruise and taint a whole life. "The trouble will begin," said a wise man, talking to sub Freshmen, "in the first fortnight. Some evening you will be with a lot of friends in somebody's room, when something is proposed that you know isn't just right. Stop it if you can; if not, go home and go to bed, and in the morning you will be glad you didn't stay." The first danger in the transition from boyhood to manhood is the danger in what is called "knowing life." It is so easy to let mere vulgar curiosity pose as the search for truth. A Senior, who had been in a fight at a public dance, said in defence of himself: "I think I have led a pretty clean life in these four years; but I believe that going among all sorts of people and knowing them is the best thing college life can give us." The old poet knew better:

> "Let no man say there, 'Virtue's flinty wall
> Shall lock vice in me; I'll do none but know all.'
> Men are sponges, which, to pour out, receive;
> Who know false play, rather than lose, deceive:
> For in best understandings sin began,
> Angels sinned first, then devils, and then man."

Here comes in to advantage the ambition of the athlete. Football begins with or before the college year. Training for football means early hours, clean life, constant occupation for body and mind. Breach of training means ostracism. That this game tides many a Freshman over a great danger, by keeping him healthily occupied, I have come firmly to believe. It supplies what President Eliot calls "a new and effective motive for resisting all sins which weaken or corrupt the body;" it appeals to ambition and to self-restraint; it gives to crude youth a task in which crude youth can attain finish and skill, can feel the power that comes of surmounting tremendous obstacles and of recognition for surmounting them; moreover, like war, it affords an outlet for the reckless courage of young manhood—the same reckless courage that in idle days drives young men headlong into vice.

Has not hard study, also, a saving power? Yes, for some boys; but

for a boy full of animal spirits, and not spurred to intellectual effort by poverty, the pressure is often too gentle, the reward too remote. Such a youth may be, in the first place, too well pleased with himself to understand his relation to his fellowmen and the respectability of labor. He may fail to see that college life does not of itself make a man distinguished; in a vague way, he feels that the university is gratefully ornamented by his presence. No human creature can be more complacent than a Freshman, unless it is a Sophomore; yet the Freshman may be simply a being who, with no particular merit of his own, has received a great opportunity; and the Sophomore may be simply a being who has abused that opportunity for a year.

Now the Freshman meets, in a large modern college, a new theory of intellectual discipline. As Professor Peabody has beautifully expressed it, he passes "from the sense of study as an obligation to the sense of study as an opportunity." Too often he regards study as an inferior opportunity; and having an option between study and loafing, he takes loafing. "In the Medical School," said a first-year medical student, "they give you a lot to do; and nobody cares in the least whether you do it." In other words, the Medical School may rely on the combined stimulus of intellectual ambition and bread and butter: its Faculty need not prod or cos. et; it is a place of Devil take the hindmost. Yet the change in the attitude of teacher to pupil is not more sharply marked between college and medical school than between preparatory school and college. "There are only two ways of getting work out of a *boy*," said a young college graduate. "One is through emulation; the other is to stand behind and kick him. Mr. X [a well known schoolmaster] says, 'Jones, will you please do this or that'; Mr. Y stands behind Jones and kicks him into college." I do not accept the young graduate's alternative; but I have to admit that many boys are kicked, or whipped, or cosseted, or otherwise personally conducted into college, and, once there, are as hopelessly lost as a baby turned loose in London. "It took me about two years in college to get my bearings," said an earnest man, now a superintendent of schools. "I didn't loaf; I simply didn't know how to get at things. In those days there was nobody to go to for advice; and I had never *read* anything—had never been inside of a public library. I didn't know where or how to take hold."

This is the story of a man who longed to take hold; and we must remember that many of our college boys do not at first care whether they take hold or not. It is only in football, not in study, that they have learned to tackle, and to tackle low.[1] "A bolstered boy," says a wise mother, "is an unfortunate man." Many of these boys have been bolstered; many are mothers' boys; many have crammed day and night through the hot season to get into college, and, once in, draw a long breath and lie down. The main object of life is attained; and for any secondary object they are too tired to work. The old time-table of morning school gives place to a confusing arrangement which spreads recitations and lectures unevenly over the different days. They walk to a large lecture room, where a man who is not going to question them that day talks for an hour, more or less audibly. He is a long

[1] Both ways are known in football, besides what is called "cursing up."

way off;[1] and though he is talking to somebody, he seems not to be talking to them. It is hard to listen; and if they take notes (a highly educational process) the notes will be poor: besides, if they need notes, they can buy them later. Why not let the lecture go, and sleep, or carve the furniture, or think about something else (girls, for instance)? These boys are in a poor frame of mind for new methods of instruction; yet new methods of instruction they must have. They must learn to depend upon themselves, to become men; and they must learn that hardest lesson of all—that a man's freedom consists in binding himself: still again, they must learn these things at an age when the average boy has an ill-seasoned body, a half-trained mind, jarred nerves, his first large sum of money, all manner of diverting temptations and a profound sense of his own importance. How can they be taken down, and not taken down too much—thrown, and not thrown too hard? How can they be taught the responsibility of freedom? They face, it may be, an elective system which, at first sight, seems to make elective not this or that study, merely, but the habit of studying at all. Already they have been weakened by the failure of the modern parent and the modern educator to see steadily the power that is born of overcoming difficulties. What the mind indolently shrinks from is readily mistaken, by fond mothers, mercenary tutors and some better people, as not suited to the genius of the boy in question. "It is too much for Jamie to learn those stupid rules of syntax, when he has a passion for natural history;" or, "George never could learn geometry—and, after all, we none of us use geometry in later life. He expects to be a lawyer, like his father; and I can't think of any good geometry can do him."

The change "from the sense of study as an obligation to the sense of study as an opportunity" is a noble change for persons mature enough to turn opportunity into obligation; it is not a noble change for those who choose such studies only as they think they can pass with bought notes. Knowledge that does not overcome difficulties, knowledge that merely absorbs what it can without disagreeable effort, is not power; it is not even manly receptivity. Milton, to be sure, patient toiler and conqueror though he was, cried in his pain, "God loves not to plough out the heart of our endeavors with over-hard and sad tasks:" but an over-hard and sad task may be a plain duty; and even Milton, when he said this, was trying to get rid of what some people would call a plain duty—his wife. When we consider the mass and the variety of the Freshman's temptations, and what someone has called the "strain on their higher motives," we wonder more and more at the strength of the temptation to knowledge, whereby so many stand steady and work their way out into clear-headed and trustworthy manhood.

One way to deal with these strange, excited, inexperienced and intensely human things called Freshmen is to let them flounder till they drown or swim; and this way has been advocated by men who have no boys of their own. It is delightfully simple, if we can only shut eye and ear and heart and conscience; and it has a kind of plausibility in the examples of men who through rough usage have achieved strong character. "The objection,"

[1] A student whose name begins with Y told me once that he had never had a good seat in his life.

as the master of a great school said the other day, "is the waste; and," he added, "it is such an awful thing to waste human life!" This method is a cruel method, ignoring all the sensibilities of that delicate, high strung instrument which we call the soul. If none but the fittest survived, the cruelty might be defended; but some, who unhappily cannot drown, become cramped swimmers for all their days. Busy and worn as a college teacher usually is, thirsty for the advancement of learning as he is assumed always to be, he cannot let hundreds of young men pass before him, unheeded and unbefriended. At Harvard College, the Faculty, through its system of advisers for Freshmen, has made a beginning; and though there are hardly enough advisers to go round, the system has proved its usefulness. At Harvard College, also, a large committee of Seniors and Juniors has assumed some responsibility for all the Freshmen. Each undertakes to see at the beginning of the year the Freshmen assigned to him, and to give every one of them, besides kindly greeting and good advice, the feeling that an experienced undergraduate may be counted on as a friend in need.

Whether colleges should guard their students more closely than they do—whether, for example, they should with gates and bars protect their dormitories against the inroads of bad women—is an open question. For the deliberately vicious such safeguards would amount to nothing; but for the weak they might lessen the danger of sudden temptation. Of what schools should do, I can say little; for with schools I have little experience: but this I know, that some system of gradually increased responsibility is best in theory, and has proved good in practice. The scheme of making the older and more influential boys "Prefects" has worked well in at least one large preparatory school, and shows its excellence in the attitude of the Prefects when they come to college. This scheme makes a confident appeal to the maturity of some boys and the reasonableness of all, trusting all to see that the best hopes of teacher and scholar are one and the same.

The system of gradually increased responsibility at school must be met half way by the system of friendly supervision at college—supervision in which the older undergraduates are quite as important as the Faculty. The Sophomore who enjoys hazing (like the Dean who employs spies) is an enemy to civilization. The true state of mind, whether for professor or for student, was expressed by a college teacher long ago. "I hold it," he said, "a part of my business to do what I can for any wight that comes to this place." When all students of all colleges, and all boys of all schools, believe, and have the right to believe, that their teachers are their friends; when the educated public recognizes the truth that school and college should help each other in lifting our youth to the high ground of character—the school never forgetting that boys are to be men, and the college never forgetting that men have been boys—we shall come to the ideal of education Toward this ideal we are moving, slowly but steadily. When we reach it, or even come so near it as to see it always, we shall cease to dread the transition from school to college.—*The Atlantic Monthly.*

A GREAT DISCOVERY.

GEORGE McC. ROBSON, M.A.

The True Scientific Method—First Englishman of Science—The Cartesian Vortices Newton's Early Life.

Of old sat Knowledge on the heights,
The thunders breaking at her feet:
Above her shook the starry lights;
She heard the torrents meet.

There in her place she did rejoice,
Self-gathered in her prophet-mind,
But fragments of her mighty voice
Came rolling on the wind.

Then stept she down through town and field
To mingle with the human race,
And part by part to men reveal'd
The fulness of her face.

Altered from Tennyson.

MANY persons regard the secrets of nature as conundrums to be guessed in some moment of idle speculation, and are firmly persuaded that many of the greatest discoverers owe their discoveries to the inspiration of some trivial accident. The view is strongly supported by the superfical accounts that some popular writers have given of Newton's discovery of the law of universal gravitation; these writers, endeavoring to make an interesting and eventful narrative with a useful moral, have expended much ingenious rhetoric in decorating the tradition that the fall of an apple first suggested to Newton the idea that the force which retains the moon in her orbit is the same as terrestrial gravity, and unlimited amazement is expressed that the simple fall of an apple should have led to the discovery of the laws of the universe. The story of the apple is pleasant and plausible, and this account of the discovery of the law of gravitation is easy both to write and to read; it is defective, however, in that it does not, in the least, help one to understand how Newton made his discovery or what it was that he discovered. The fact is that various writings, well known to Newton, gave more suggestion of gravity extending to the heavenly bodies than all the apples ever harvested in England could have done. A long list of quotations from, and references to, these writings is given in the preface to a treatise on Astronomy, published in 1702, by David Gregory, Savilian Professor of Astronomy in the University of Oxford; this work was very highly commended by Newton, and the quotations from ancient authorities that are given in the preface are abridged from notes supplied to Gregory by Newton in his own handwriting. It appears, then, that the apple, even if it be not altogether apocryphal, was not the most potent factor in the genesis of Newton's great discovery; and it is manifestly impossible to tell the story of his discovery without indicating, however briefly, the steps that led up to it, and referring to a few of the great men who anticipated to some extent the methods Newton employed.

Roger Bacon, the first Englishman of science, was born at Ilchester in 1214 and died at Oxford in 1294. In his *Opus Majus* we find the first clear enunciation of the method that Newton used so successfully. Bacon laid down the fundamental principle that there can be no knowledge of nature without observation and experiment; and he explained in detail how every natural science must be based on math-

ematics, and can make progress only when its fundamental principles are expressed in mathematical form. These views are in close accord with the best modern ideas, and foreshadow very clearly the methods used by Newton; but they were so far in advance of Bacon's age that they were utterly incomprehensible to his contemporaries.

A more successful advocate of the employment of mathematics in scientific research was the brilliant French philosopher, René Descartes, who was born near Tours on March 31st, 1596. He pointed out that geometers, starting with a few self-evident axioms, were able to deduce the most abstruse propositions from those axioms by a vigorous process of reasoning, and maintained that in a similar manner the mysteries of the universe could be solved by mathematical reasoning based on a few fundamental principles. This is but a partial statement of the true method, for Descartes fails to emphasize, as Bacon did, the necessity of frequent appeals to observation and experiment to verify the results of the reasoning; to this contempt for experimental verification is to be ascribed the failure of Descartes' attempt to explain physical phenomena.

Descartes says science is a tree of which metaphysics is the root, physics is the trunk, and the three branches are mechanics, medicine, and morals; these branches being the applications of our knowledge to external affairs, to the human body, and to the conduct of life. In 1644 he published his *Principia Philosophiæ* ("Principles of Philosophy"), which deals chiefly with physical science and in which he treats of the laws of motion and the theory of vortices. Descartes' philosophy was long dominant in Europe; it was taught in all the universities, Newton himself was brought up in this faith, and for a time the vortex theory maintained itself as a rival of the Newtonian theory of universal gravitation; it is, therefore, germane to our purpose to give a slight account of Descartes' vortices. In his *Principia*, Descartes attempts to construct a system of philosophy that is absolutely free from assumptions; accordingly he begins with an attempt to demonstrate his own existence; this he conceives to be proved by his famous aphorism, "I think, therefore, I exist" This is the starting point of his system; he then asserts that it is manifestly impossible that a vacuum can exist anywhere, and maintains that the universe is a *plenum*, "filled with matter." Originally this matter consisted of equal parts with sharp corners; by the motion of the parts, their corners are rubbed off till the parts are reduced to spherical form, and the dust produced by the abrasion constitutes another and subtler form of matter. There is also a third form of matter—the material of which the earth and all opaque bodies are composed. Luminous bodies, like the sun, are composed of the first kind of matter, the transparent interplanetary spaces are filled with the second kind of matter. All this matter is revolving in circular currents, or whirlpools, which are called vortices. The first kind of matter naturally collects together at the centre of each vortex, the second kind of matter forms an all-pervading medium surrounding the center. Thus he accounts for the fact that the sun is the center of the solar system; to explain the motion of the planets, each planet has a special vortex in which it is whirled round like a straw in the eddy of a swift-flowing stream. Gravitation is attributed to the settling down of bodies toward the center of each vortex.

It is easy to show that Descartes'

vortex theory is full of inconsistencies, and that the consequences deduced from it by logical reasoning are incompatible with well-known and indisputable facts. Yet it found ready acceptance among intelligent men and good mathematicians, because it filled the void left in men's minds by the overthrow of the Ptolemaic system. Kepler had established his three laws as facts, but the human mind is never satisfied with the knowledge of a fact but ever seeks to know why the fact is so and not otherwise; Kepler himself sought for the explanation of his laws, and with wonderful prophetic instinct spoke confidently of a physical astronomy that would give a rational explanation of his laws. Descartes' *Principia*, then, appeared at a time when men's minds, shaken from the old faith, were willing to accept any plausible theory that afforded them even a temporary resting place, and most of the adherents of the vortex theory accepted it without much investigation; indeed, it is well known that the number of those who had the courage to read Descartes' *Principia* through was very limited.

Though the Cartesian vortices have long since been discarded, it would be unsafe to regard his theory as altogether absurd. The leaders of thought to-day are agreed that all space is filled with a medium capable of vortex motion, and some physicists are endeavoring to show that rigidity and all the other properties of matter are due to vortices in this medium; but, whereas Descartes' vortices were very large, the modern physicist prefers vortices of infinitesimal dimensions. However, without attributing any inherent absurdity to the Cartesian philosophy, it is necessary to point out that it was not in any sense an anticipation of, or a step toward, Newton's discovery. Newton, it is said, read only about eight pages of Descartes *Principia*, and on those pages he wrote the word "error" several times. This sketch of the vortex theory shows, what can also be shown from the writings of other authors, that inquiring minds were then eager to discover the deeper laws of which those of Kepler were but the outward expression and consequence.

Descartes' greatest service to science, however, was not his physical theories, but his invention of the method of Analytical Geometry. This is a genuine invention of the highest merit, and is a powerful and indispensable instrument in scientific investigations. Newton's discoveries could not have been made without the aid of the Cartesian geometry, and if Descartes had not invented it Newton would have had to spend some of his valuable time in working out some similar system himself. Moreover, the Cartesian geometry led directly to the invention of the Differential Calculus by Newton and by Leibnitz.

But the real foundation on which Newton erected his stately edifice was discovered by Galileo. In the last years of Galileo's life, when he was blind and helpless, he reasoned out the fundamental laws of motion on which the whole modern science of mechanics rests. These laws are sometimes called Newton's laws of motion, because Newton stated them in the following form:

1. *Every body continues in its state of rest or of uniform motion in a straight line, except in so far as it is compelled by forces to change that state.*

2. *The change of the quantity of motion is proportional to the force that causes the change, and takes place in the direction in which the force acts.*

In this law the quantity of motion of a body means the product of its mass and its velocity.

3. *To every action there is always an*

equal and opposite reaction; or the mutual actions of two bodies are always equal and oppositely directed in the same straight line.

The laws of motion are the fundamental principles of mechanics, and when these laws are properly expressed in mathematical language there can be derived from them, by purely mathematical reasoning, a vast and orderly store of knowledge. Descartes unfortunately never understood the laws of motion, therefore the first principles from which he started were wrong, and no amount of correct reasoning from false premises could lead him to correct results. Had he condescended to verify his results by experiment, he might have detected his errors, retraced his steps, and amended his first principles. It may be said that Galileo laid the solid foundation on which Newton built, and Descartes invented some of the tools that Newton used in building.

The discovery of the laws of motion was, perhaps, Galileo's greatest contribution to science, and formed a fitting close to his remarkable life. On January 8th, 1642, the veteran Galileo died, and before the close of that year there was born in England a sickly infant who was destined to carry on gloriously the work so nobly begun by Galileo.

Isaac Newton was born, to a widowed mother, in the manor house of Woolsthorpe, near Grantham, in Lincolnshire, on Christmas day, 1642. His father, who was a yeoman farmer, died a few months after his marriage with Harriet Ayscough, and very little is known of him. The care of the delicate infant and of the farm both devolved upon Mrs. Newton, who was eminently sensible and practical, and in every way a most excellent woman. Mrs. Newton was afterwards married to the Rev. Barnabas Smith, to whom a parishioner had recommended "the widow Newton as a most extraordinarily good woman." On her second marriage, she went to live at North Witham, and her mother, Mrs. Ayscough, came to Woodsthorpe to take charge of Newton. After attending the village school for some time, Newton was sent to the grammar school at Grantham, which he attended for three years, during which time he boarded at the house of Mr. Clark, an apothecary. At first, Newton was neither a diligent nor a successful student; Latin grammar apparently had no charms for him, and he states himself that he was the last boy in the lowest class but one. The school bully, who held the place immediately above Newton in class, one day gave Newton a severe kick in the stomach; whereupon, Newton straightway fought and beat the bully. This victory aroused his ambition, and from that time he devoted himself with incessant energy to study and quickly reached the head of the school. During this period, though he did not often join his companions in play, he was a recognized leader among them, and supplied them with a variety of toys of his own construction. He was particularly skilful in making kites, waterwheels and windmills. One of his favorite amusements was to frighten the country people by tying a paper lantern to the tail of a kite on a dark night, which the country people took for a comet foreboding war, pestilence and famine.

The one love affair of Newton's life occurred while he was an inmate of Mr. Clark's household. He appears to have fallen in love with Miss Storey, who also boarded with Mr. Clark's family. She was two years younger than Newton, and is

said to have been a young lady of great attractions and considerable talent. Newton delighted in her society, and he presented her with several very ingeniously constructed cabinets. Poverty seems to have been the only bar to the consummation of their happiness. Miss Storey was afterwards married twice, and at the age of 82 she was Mrs. Vincent, living at Grantham. Many stories of Newton's early life were obtained from Mrs. Vincent by Dr. Stukeley. Newton's affection for her never failed; in her old age he frequently visited her and relieved her financial difficulties by generous aid.

About this time Newton constructed a water-clock, which was long used in Mr. Clark's family. In shape it resembled an old-fashioned house-clock; the index on the dial-plate was turned by a piece of wood that was set in motion by dropping water. He constructed, also, a mechanical four-wheeled carriage driven by a handle turned by the person seated in the carriage. Mrs. Vincent is the authority for the statement that Newton early displayed great talent in drawing, and excelled in poetical composition. Some of these boyish verses were remembered and repeated by Mrs. Vincent seventy years afterwards.

When Newton was fifteen years old his mother's second husband died, and she returned, with three children of the second marriage, to Woolsthorpe. Newton was taken from school to assist in the management of the farm. Part of his duty was to accompany an old servant to Grantham to do the weekly marketing. On these occasions he left the marketing to the servant, and retired to the attic of Mr. Clark's house, where he read all the books he could find. During this period he constructed several sun dials; one of these dials was cut on a stone in the wall of his own house; this stone is preserved in the library of the Royal Society, and the letters TON are still visible on it.

Mrs. Smith, observing that her son was likely to be a very unsuccessful farmer, consulted her brother, who was rector of a neighbouring parish. Her brother very wisely recommended that Newton be sent back to the school at Grantham, to prepare for entrance at Trinity College, Cambridge. At school, Newton acquired a fair knowledge of Latin, which was practically the only subject then taught in English schools; he also picked up, without any assistance, some knowledge of mathematics and science, and he read some logic, which was regarded as a necessary preparation for the study of mathematics.

In 1661, Newton entered Trinity College, Cambridge, as a subsizar. During his first year of residence at the university he attempted to read a book on astrology, but could not understand it on account of the geometry and trigonometry. He, therefore, read in order Euclid's "Elements of Geometry," Oughtred's "Clavis" (*i.e.*, Oughtred's key to the mathematics) and Descartes' "Geometrie." Euclid he found surprisingly easy. The Cartesian geometry he mastered by himself, though with considerable difficulty, and it fascinated him so much that he resolved to devote himself to mathematics, rather than to chemistry, as his serious study.

During his undergraduate career, Newton made two splendid discoveries in mathematics. His first great discovery was the binomial theorem, with which every student of algebra is familiar. His second great discovery was the method of fluxions, now known as differential calculus. The oldest professorship

of mathematics in Cambridge University—the Lucasion—was then recently founded, and Dr. Isaac Barrow, an eminent mathematician and a very genial old man, was the first Lucasian professor. Newton rendered great assistance to Dr. Barrow in the preparation of his treatise on optics. In the preface, Dr. Barrow acknowledges Newton's help, and says that Newton corrected many errors and made several valuable additions of his own. The discoveries that Newton had already made in pure mathematics and in optics, if he had never done anything more, would have been sufficient to rank him among the greatest scientific men that ever lived. He took his B. A. degree in 1665, and shortly afterwards he was driven from Cambridge by the great plague. He retired to Woolsthorpe, and the period of his residence in the home of his boyhood is crowded with brilliant discoveries.—*Science and Industry.*

THE GREATNESS OF ENGLAND.

PROF. WILLIAM DALE, M.A.

THE interest in the development of English history and in the growth of the English character lies in the fact that England has so far best solved the problem of just government. That she has in fact done so appears to be proved by the almost universal consent of nations. This consent is shown by the practical adoption of forms of government and methods of administration, first wrought out on English soils, by all nations which for the past century have taken their place in the line of human progress.

The problem presented by Roman history, is so far the simpler, because we can trace its historical development, until the work of human progress for which Rome toiled is taken up by other hands. The English character and English history present harder problems, because English history has not yet run its course. The future is still veiled from our view.

National character is a very complex product. Racial elements, the influence of external events, the growth of internal institutions, all combine in determining the final result. The aim of statesmen in ancient times was the establishment of order, the formation, therefore, of a strong central executive. Rome ultimately accomplished this, but in the process exhausted the forces of the State. But the lesson was not forgotten. The idea of a strong central power was the aim of all European nations during the middle ages. How to preserve that power, what is the source of it, how to limit it, on what does it ultimately depend for its continued existence and efficient working, are the questions which English history tries to answer. The final resultant of the diverse lines of struggle, political and social (the two factors are never wholly identical) is at any given epoch, the national character.

The growth and the security of the liberty of the individual, the possession by all of an equality of rights are the special contribution of the Teutonic people. The struggle of ideas here implied, the idea of power and the idea of liberty, has had a fair field and no favor in England alone of European countries. This is the distinct note of her nationality. Upon the feebly-united elements of Saxon power was im

posed the strong Norman executive. From the Norman conquest the struggle for freedom began. The Church was the first leader against feudal brutality. And it seems as though the preservation of liberty was owing to the Church. For although after the compromise on the Hildebrandic claims, the Church was generally to be found on the side of authority and absolutism, yet in the three great crises of 1215, 1297 and 1688, it found itself on the side of the national party. To accomplish its ends, the Church has by degrees found that its proper sphere of influence is, not to give sanction to despotism, but to influence conduct, to form character, to mould the conscience. From the hands of the Church, the leadership passed to the baronage. Like the aristocracies of birth in the ancient city state, they form in the modern nation the connecting link between monarchy and democracy. In England the leaders in the struggle for the constitution and for the limitation of the royal power were the great feudal land-owners. The Church through its possession of land and because its privileges were open to all, formed a connecting link between baronage and common alty. And by what almost seemed a series of accidents class distinctions were prevented from developing into legally separate estates. This fact has contributed most ma terially to national growth, to the blend ng of the various elements of political moment into one national body. Class distinctions were a marked feature of mediæval life and gave to that life much of its picturesqueness. The baron, the knight of the shire, the yeoman, the tenant. the villein, the merchant, the trader, the artisan, were distinct figures in the picture. But of all the attempts made to perpetuate legally the distinctions of society, the personal summons by writ to the House of Lords is the only one that remains. The growth of the commons as the preponderating element in the constitution, and the final recognition of their claim to ultimate sovereignty, are perhaps traceable to three circumstances: the union in one house of the representatives of the counties and the representatives of the towns; the holding of the balance of power between the contending factions of the baronage; the gradual acceptance of the fundamental principle that what concerns all should be treated of by all. The general utility of the commons, as a means of raising money, kept them in existence until, by 1399, they had claimed and exercised, but by no means secured, all the powers which we understand by the liberties of the nation. But the kings were always restive, and had devised means by which laws could be evaded and money raised without applying to their faithful commons. At this juncture, too, the leadership of the nation passed away from the baronage. The power of the barons was destroyed by the War of the Roses. At the same time the force of the mediæval Church was exhausted. The elements of a new national life were as yet in the germ. The only force left, around which the national consciousness could find a rallying point, was the power of the crown. Fortunately for the steady growth of the nation, the Tudor despots preserved the forms of liberty, and preferred to throw the form of legality over their arbitrary proceedings. But the union of temporal and spiritual supremacy in one hand was a critical moment: a moment which was prolonged by threatened danger from without. With the overthrow of Spanish power by the defeat of

the Armada and the rise of Holland, England awoke as it were from a dreadful nightmare, and found that her sleep, disturbed though it had been, had given her a giant's strength. The Stuarts atoned for the sins of the Tudors.

The leadership of the nation passed into the hands of the com mons. The Reformation had made of England a new nation. The nobility, the natural leaders of the nation, from whose feeble grasp the sceptre was falling, was attached to the cause of Reform by the gift of Church lands. Henceforth the struggle for political freedom was combined with that for religious freedom. Puritanism led the forces in the strife: was for a time victorious, and then failed—necessarily failed, just as the Hildebrandine theory had failed—as a political force. But henceforward Puritanism formed the basis of all that is best in the British character: a living influence moulding social and political life.

Justice and humanity are the marks of the modern democracy, at least of the Anglo-Saxon type. It has other more questionable marks, lest we should boast ourselves of perfection, lest we should forget. Even jealous France speaks of Anglo-Saxon superiority and of British greatness. Is it then pos sible to give any answer as to the cause of that greatness? We can see the germs of freedom in the Saxon invaders planted in homesteads all over the land. We may in fancy trace their slow growth during the ages of Norman despotism and Plantagenet power. We can follow definitely the long struggle of five centuries, which gave to Englishmen a political character and a political training which are unique. We can watch the blending of the principles of the Reformation with the national character. We may mourn over the rash attempt made to stop the national development, and lament the consequent rending in twain of the Anglo-Saxon people. We may boast that the blessings of freedom and justice have been conferred upon millions, who otherwise would never have enjoyed them. But who can find out the reasons for these things? The first English freeholders had no title deeds to their lands. The British Constitution is unwritten. The British character is the result of British history. British history is a long struggle for what is just and right. And the British people, like the Roman people, in this respect, believe that the struggle has been guided by the hand of Providence, and maintained by tenacity of purpose and an historic consciousness which refuses to break with the past.—*The McMaster Monthly.*

LIQUID HYDROGEN.

WHAT may be called the sister discovery to that of liquefying air is the reduction of hydrogen to the state of a liquid. This has at last been successfully performed by Prefessor Dewar, of the Royal Institute, London. The amount produced was about two fluid ounces. This rare liquid was found to boil at 432° F. below zero, which is the nearest approach ever made to the absolute zero of the thermometer scale.

SOME DIFFICULTIES IN DISCIPLINE.

IN these days of large classes one of the most pressing problems of discipline is: How to keep a class together as an organic whole, at the same time that each individual is kept busy. Even in large schools where there is careful classification the difficulty is felt by experienced teachers. In smaller schools and less happy conditions (where the novice usually has to begin his career) the inexperienced teacher often feels he is a hopelessly poor disciplinarian; whereas it is often a mere matter of solving this single problem. After all, good discipline is of a slow and gradual growth, and very often the results of the so called "born disciplinarian" are by no means so good or so permanent as those of a teacher who has built up rationally his own powers. A great writer on education has said that the fountain of discipline is the will of the pupil, and that obedience and attention must be *active*; if mechanical, they become a sort of disobedience and inattention, finally degenerating into servility, the very opposite pole to true discipline. This is probably the reason of our dissatisfaction with the result of Board-school education; it is not so much a question of this or that subject that has been taught or neglected, but it is the discontented, sulky, even idle habits engendered by the military government of huge classes.

I. The most important point to bear in mind is the *distinction between amusing a class and interesting it.* An old teacher will often say: "Interest can be over-done; I don't believe in too much of it." Reason and experience both show that this is false. Interest can never be over-done. But amusement can be, and very often is; and it must be admitted that training colleges are responsible for a great deal of evil in this respect. One of the leading teachers in England overlooked this point in an "Essay on Stimulus" written some years ago. He advocated the use of bright and entertaining sentences for analysis or translation, in preference to the dull old exercises once in vogue. This is well; but it must be continually emphasized that an interest in the subject of an exercise is not an interest in translating it from one language to another. So subtle is this distinction at times that many brilliant teachers, who can always command the attention of their class, are surprised at the poor progress in the subject. The boys' minds have been busy and cheerful indeed, and never bored, but they have not been busy over the essential things For this reason brilliant teachers are in some cases more harmful than the incompetent who cannot hold the class together at all; for the mischief done by the former is not so easily apparent. As a test, then, of one's work, it is always better to ask, not only: "Have my pupils been thoroughly interested and hard at work all the lesson?" but also: "In what have they been interested"? And let us measure our progress more by the quality than the quantity; and the quality is to be measured by the resultant activity of the pupils. Another point is to be noted in this connection; although the interest awakened in a subject can never be too great, it can be given too lavishly and too soon. Interest should rather be a gradual acquisition of the pupil than the gift of the teacher, and Arnold's rule, never to give a piece of information till the class had earned it, although often impracticable, is

very sound in principle. Some teachers have a feverish desire to pick out all the most interesting parts of a subject, and in so doing they are in danger of producing a kind of mental dissipation in their class, as if one should spend his time in reading only the *Review of Reviews*. The self-restrained patient teacher will get a far more permanent interest aroused, although it may not bear full fruit until his pupils are removed from his influence. How far more permanently interesting, for instance, is it to feel the difficulty of the character of Hamlet after reading and re reading the play than to have the opinions of many commen tators served up in a bright discourse! In order to illustrate the distinction between interesting and merely amusing a class, no subject in the curriculum is more appropriate than reading—that *bête noire* of the weak disciplinarian. Teachers are always trying to discover good reading-books, and publishers trying to meet the demand by fresh departurers, many of them entirely mistaken from an educational point of view. The numbers of historical and geographical readers are a striking instance of the futile attempt to do two things at once. The old idea of combining penmanship and morality only raises a smile now; but the confusion of aim in a geographical reader is no less ludicrous. It must be admitted, however, that the choice of a reader is a difficulty. If too heavy and abstruse, there is little opportunity for the pupils' exercise in intelligent expression; on the other hand, if too easy and in teresting, there is a hurry to get on to see what comes next. Considering the enormous output of story-books for children in the present day, there seems no need whatever to foster the taste for mere tales during school hours. The very short time that can be devoted to the reading lesson ought to be spent in an endeavour to render as well as possible pieces of distinct literary merit. Interest in the subject of the piece will doubtless be aroused, but only the interest in the actual rendering of it should be counted unto the teacher for righteousness. The old-fashioned book of extracts had many points to recommend it; the fault lay in the sense of unreality that always attends an extract, divorced from its context and often meaningless in consequence. On the other hand, again, the whole of a standard work would not afford sufficient variety. This difficulty could be easily solved if the fetish notion that every pupil must be provided with a copy were broken down.

The following experiment was once tried in a class of girls, and by its means an hour of boredom to the pupils and misery to the teacher was rendered one of the pleasantest in the week. Each girl was told to come to the next lesson with a book of her own choosing (from the home or the school library) prepared to read a passage of it to her fellows. The choice was to be kept a secret till the appointed hour, when one by one the girls stood up and read their pieces, while the others listened critically in order to vote on the best at the end. Pathos and fun followed one another quaintly, and all were eager to hear, so that any inaudibility or indistinctness was quickly pulled up *by the class*. The teacher, indeed, had little to do but to look on, limit the time and jot down critical notes. It need hardly be said that the competition became so keen that the pieces were thoroughly practised beforehand in private, to the immense advantage of the pupil. The voting was managed by each pupil

assigning marks to each reader in turn. These were quickly added at the end, and the order of merit was announced. After this, the teacher gave a short criticism of each reader, and a general criticism on the votes of the class, pointing out her reasons for agreement or disagreement. Thus each member of the class was busy during the whole lesson, and busy on the right points. One incidental advantage may be mentioned, that the pupils saw the real book from which the extract was read, very often in a far more attractive edition than would be possible in a school book.

II. Another general principle to bear in mind is that the *various enthusiasms lying dormant in a class of children may be utilized.* After a little observation it will be noticed that one pupil revels in excessive neatness, another in getting through a large amount of work in a given time, another in showing somebody else how to do it, another in shortening his labor by various devices. Each of these virtues is usually allied to a complementary vice—the neat one is slow, the quick one inaccurate, and so on. Instead of fighting the vices, it is often more profitable to call attention to the virtues, as opportunity arises, in order that the whole class may be leavened by them. For instance, in the up-hill work of giving a class a thorough mastery of a rule in arithmetic, certain definite ideals should be put before them, and no one should consider that he knew the rule till each ideal was fulfilled. To be quick, to use the best methods, to be neat in work, to be so clear as to the why and wherefore that you could explain it to the first man in the street, to be absolutely accurate—these are the points for a class to aim at. Certain lessons are appropriate for emphasizing certain ideals, *e.g.*, simplification of fractions is a good opportunity for the neat pupil to shine forth as an example. The quick, inaccurate worker should be made to do his example by two, or even three, different methods. Impatient at first, he will gradually become interested in making his answers correspond, and this will prove a greater spur to accuracy than being merely told that the answer is wrong and the example must be redone. It may be objected that a second method is often clumsy, as, for instance, when an addition of decimals is to be checked by adding the vulgar fractions; but the apparent waste of time is fully compensated by the training in accuracy, for it is assumed that the boy is already quick enough, and the boy is of far more importance than the example; though, to judge by many a teacher's procedure, one would hardly suppose so.

III. *The function of competition* as an aid to discipline is another leading point to be considered. Roughly speaking, competition does no harm if used only for sheer routine work, in which it is almost impossible to awaken a rational interest. An enormous amount of *memoriter* work in language-teaching comes under this head, where it is certainly true that "repetition is the teacher's sheet-anchor." But no subject is quite exempt from this burdensome duty, so distasteful to the brilliant teacher. Marks are by no means necessary for competition; but where they are not employed the teacher's utmost ingenuity is required to keep the work alive. The Jesuits were specially clever in this direction, and their methods are well worth attention. Their class-matches, for instance, where the pupils were divided into sides and challenged one another, are not so difficult to manage as they sound

by the description; for the class thoroughly enjoys it, and enters heartily into the orderly arrangement of details, and a pupil will learn his lesson to save his side from defeat much more readily than to save himself from detention. The choice of leaders and sides need not take place every lesson, but may hold for half a term, and even then need not be arranged in actual schcol hours; so that very little loss of time is occasioned.

When the pupils are widely varied in capacity, or at widely different stages in a subject, the common refuge is a subdivision. But sub divisions are always the mark of a young teacher who is anxious to suit everyone: a case has been known of a class of five pupils in French, in three divisions. An experienced teacher never makes a division in a class if he can possibly avoid it; for he knows that it means direct loss of time, loss of the "sympathy of numbers," confusion in setting preparation work, and distraction to everyone in the room owing to the varied work going on. With very rare exceptions, the class can be made to work together some how; there will be a loss, no doubt, to a few pupils, but not the loss equal to that caused by a sub division. In language-teaching, the old fetish order of noun, adjective, pronoun, etc., can be entirely discarded. If one pupil has never done his adjectives, let him, nevertheless, plunge into the pronouns with the rest. The boy who is far ahead of the others is harder to deal with than the one who is behind. If he is obliged to work by himself for the greater part of the lesson, a pleasant change for everyone can be made by putting him up to be questioned in turn by all the others; they will be glad to humble him, and he will endeavor to stand the fire with easy nonchalance. Work at a map in geography affords a good opportunity for this device. As for the inevitable group of backward pupils, repetition of verbs, etc., should often be done together by the whole class for their benefit, the mere volume of sound being very helpful to the weak memories. A point often overlooked with regard to the backward is that they should frequently be allowed to join in the chorus, or answer single questions with their books open before them. It is far better that they should do this than give wrong or muddled answers; of course the rest of the class will see the reason of this and tolerate it easily.—*The Educational Times.*

Every boy born into the world should be put in the way of maintaining himself in honest independence. There are but three ways of living—by working, by begging, or by stealing. Every productive occupation which adds anything to the capital of mankind, if followed assiduously, with a desire to understand everything connected with it, is an ascending stair whose summit is nowhere, and from the ascending steps of which the horizon of knowledge perpetually enlarges.—*J. A. Froude.*

Their speech was noble because they lunched with Plutarch and supped with Plato.—*Lowell.*

Teach the children how to read, and what to read, and give them a love for reading.

TEACHING MANUAL TRAINING.

"TECHNICAL ELEMENTS VS. USEFUL OBJECTS," a DISCUSSION by R. M. SMITH, SUPERVISOR of MANUAL TRAINING, CHICAGO PUBLIC SCHOOLS.

GENERAL education consists in the rational culture of the whole human being—that is to say, of the moral, intellectual and physical inclinations of the child. In the majority of cases the general education of the elementary school will be the only guide for the future; in our circumstances it ought to serve as the base upon which to build the special education. It is, then, important that the teacher give the necessary care simultaneously to all the inclinations of the child. All the education given at the elementary school having in view the general education of the child, it follows that all instruction which does not propose this result, and which tends to specialize, becomes prejudicial to the general development. It is, then, evident that the method which ought to be employed for the teaching of manual training ought to favor the general education, and not look to preparation for any special trade.

Two very distinct methods are employed for the manipulation in wood. The first, which we may call the method of technical elements, consists, as its name implies, of detached elements of nearly uniform size, each one designed to initiate the child into one particular operation. This is an analytic system which prepares the different parts of an object, but without immediately contributing to the object we have in view. The children apply to each element a special operation of sawing, planing, fitting, etc. This method belongs to the workshop, and its authors are mechanics or particular individuals who propose only technical instruction. These have no other end in view than the trade apprenticeship and the study of the secrets of a profession. Ignoring the needs of the elementary school, they neglect the educative side of the work, and likewise the service which it can render to general instruction.

The second is called the method of useful objects, in which the child completes some objects. The system, instead of having pupils make some elements without an immediate end, has them prepare the different parts of an object so that they may be joined together and from an object which can be utilized. This series of objects ought to be graded in such a way that the pupils may familiarize themselves easily with the handling of different tools, accustom themselves to the different operations and may be sufficiently initiated into the secrets of the different combinations.

This is an analytic and synthetic method. The object is first decomposed, then the different parts of which it is formed are made and united to form the synthesis of the object. This method has originated, not in the workshop, but in the family and the school. Its end is not to make workmen for any determined trade, but to prepare the pupils for study of any trade, to render easier the apprenticeship of the manual occupation chosen later, to develope a general dexterity and to contribute to the work of education and instruction which is the double object of the school.

A school method possesses a value more or less great according as it

conforms more or less to the principles of education. Of two processes employed for the same branch of study, it is necessary to choose that which satisfies the greater number of the principles of education. It is, then, useful to examine which of the two methods answers best the requirements of a sound education.

Instruction ought to be varied. All the processes of modern education are based on this proposition, the truth of which may be demonstrated by an attentive observation of human nature. The mind of the child not being capable of prolonged application to the same object, the teacher sees himself under an obligation to vary his lessons as much as possible. The younger the pupils are, the more does he vary them.

But the succession of the lessons ought not to be left to hazard. For as change of exercise becomes really profitable and can serve for relaxation after the accomplished efforts, it is important to arrange the employment of the time in such a manner that an easy exercise succeeds a difficult one, that a lesson demanding an intense application of the mind may be followed by a lesson less absorbing. To establish the distribution, the teacher has only to remember the following educational maxim: "The more two exercises differ from each other, the more will they serve to relieve each other." To avoid weariness, variety is necessary not only in the succession of the different lessons, but it is essential to avoid monotony in the teaching of the same lesson. This remark, true of education in general, is applicable to the lessons in manual training. The method which admits of the greatest variety in its exercises ought necessarily to be preferred. The technical elements are almost all of the same form, and differ only in being differently made. This uniformity gives rise to weariness. The method of useful objects presents, on the other hand, a great variety.

Instruction ought to present some interest in its result. Variety of occupation renews the efforts but the interest which the results present can alone sustain an interest in the work.

The branches of study which by themselves present some attraction are very rare. The studies of drawing and singing, as well as the lesson in history, are of this number. The child likes drawing, which makes it easy for him to copy objects within his reach, permits him to give his sketches a less awkward shape and enables him to obtain some result destined often to afford some satisfaction to his parents. He devotes himself with pleasure to singing, because the modulation of his voice and the words which he sings awaken his sensibility and, likewise, enable him to afford pleasure to the persons whom he loves. He hears and reads with delight a story from history because his curiosity is satisfied, and because it pleases him to recount the facts which have awakened his imagination. As to the other branches taught in school—arithmetic, grammar, writing, etc.—the child finds less pleasure in them, and the teacher, in order to obtain sufficient application to those lessons, finds himself obliged to add to them an artificial interest, consisting in the allurement of good marks, of flattering reports sent to his parents. The satisfaction which the child meets with in school rewards replaces only to a limited extent the intrinsic attraction which the exercises lack, sustains his efforts and imposes a restraint on his habitual petulancy.

Manual training may present a certain interest by itself, or be entirely devoid of interest according

to the method employed. In the method of technical elements, the results destined to be destroyed, to be placed in some case or hung against a wall, render necessary the means of artificial emulation. In some schools, good marks are given in order to sustain the application; in others, after several exercises well done, the pupils are permitted to make an object of common use and to dispose of it as they think best. They thus do justice to the method of useful objects.

We must proceed in the same way with instruction in manual training, by limiting the preparatory exercises to the needful limits, and by allowing the children to put to profit, as soon as possible, the notions already acquired, by applying this elementary knowledge to the making of small, simple objects as soon as they know the handling of the necessary tools.

To keep the pupils too long a time at the preparatory exercises is to expose them to inevitable discouragement. The method of technical elements prescribes only simple exercises. The child never has the opportunity of applying them to a complete whole. The same does not apply to the method of useful objects.

The child feels the desire to seek for an immediate result. When we look at children who give themselves up to play during recess, we see they act with a vivacity, an ardor, which they do not bring to the lessons of the classroom, because of the need of refreshing themselves after the fatigues of a sedentary study; from the necessity of moving the body, from the instinct to favor the work of nutrition, and of the molecular changes so active at that age. But when, in addition, we analyze the nature of the games which they organize spontaneously, we perceive very quickly that they always propose a result. Their movements are not thoughtless, like the unruly capers of a colt just escaped from the stall. If, after a confining lesson, they appear to run and leap without end or aim, these gambols are quite momentary, and are quickly replaced by some combinations more or less ingenious. There is not a single game commenced that has not in view an immediate result. It is the quickness of execution that gives to children activity, courage and the perseverance necessary to endure fatigue, often out of all proportion to their frail natures and the mobility of their minds. The hope of this immediate result forms a powerful motive; it produces that psychological strength which is capable of surmounting all difficulties.

These remarks furnish us with the proof of the enthusiasm which a child brings to his work when he foresees that an agreeable result will follow close upon his efforts. It is necessary also that the work should present to him the allurement of a pleasure. To have him execute in the workshop some work which does not present an immediate result, is to put the child to do something which is not interesting to him. It does not seem to me that the possession of a bare board, the tracing of some lines with pencil, or the changing of its form with the saw, the plane, the gouge or the chisel, presents an interesting result. To allow the pupil, by way of reward, to show to his parents the little board, transformed in this way, is often to render him liable to see his work appreciated in a thoughtless and superficial manner, sometimes with indifference and an injurious irony—circumstances which are produced but rarely with the method of useful objects.

I would add that hanging the transformed elements on the walls of the classroom or preserving them with care in a cupboard or case does not appear to me a measure capable of exciting a very lively joy in the little workman; he would always prefer to benefit by the fruit of his labor. The method of technical elements does not lead to any immediate result. The exercises will only find a practical application when the pupil is an apprentice; but will he ever be that? In the method of useful objects, on the other hand, the enthusiasm of the child always finds itself sustained by the prospect of a real and tangible result obtained in a short time.

The child experiences great satisfaction when he meets with the reward of his work in the work itself. It is recognized that the child is greatly encouraged in working at an object which, after completion, may serve for a particular use. The choice of these objects must not be made indifferently. It is essential that the results present a practical utility, either for the pupil himself or for his parents, or for some persons who are dear to him. The importance of this proposition does not require proof. When the pupil can say during his work, "The object which I am making will be my property, can render me service under such and such circumstances, or will be a pleasure to my parents," he finds in this thought a new emulation, and brings to his work all the attention, all the care, all the precision of which he is capable. Let us place beside this child a fellow pupil occupied with a piece of work destined, after its completion, to be destroyed, or to find a place on the walls of the classroom, it is evident that there will be a very great difference between the stimulants of the two. We should see, on the one hand, an enthusiasm without the least falling off; on the other, a carelessness which it would be necessary to shake off from time to time by the allurement of good marks, or the promise of rewards in the future. Is it not very much more logical to give as a reward the result of the work, that is to say, the object which has been made in a satisfactory manner? Why should we look for artificial means of emulation when we can find them in the work itself?

The method of technical elements does not produce any finished object; the teacher finds that the same results do not act as stimulants to the child. In the method of useful objects, each model, well executed, will be a reward.

The instruction in manual training ought to develop the moral sentiments of the pupils. The teacher can use the instruction in manual training to develop in his pupils, in a practical manner, the sentiment of filial love. The objects made at the school can serve for the personal use of the child or of his parents. Who among those who have lived in the midst of children does not know that their first attempts—the first efforts—have for their principal motive the desire of pleasing their father, of obtaining a smile from their mother, of receiving praise from their teacher? Who has not seen these children blush when the teacher addressed to them a word more affectionate than ordinary, or depart radiant from the classroom when they had the happiness to carry to their homes an evidence of having given general satisfaction? Without doubt, they had a little pride in their joy—as much, perhaps, as the hope of a reward of an order less exalted; but they had this

thought, particularly — that their father and mother were going to be pleased. This is what may be called emulation by means of affection. And very fortunate or very blamable will be the teacher who does not exert all his pains to entertain this sentiment, so delicate, so pure, and to take as his first assistant in his task these sentiments of filial tenderness.

The good marks and the inscriptions on the honor roll draw their principal value from the importance which the parents attach to them. It is easy to understand the satisfaction that the mother shows in using a little bench made by her son, in cultivating some flowers in a box made by him; it is easy to imagine with what care she will arrange her toilet articles in a box with compartments which has been presented to her by one of her children. By means of the method of useful objects the child can give evidence of his thankfulness to his parents, and also toward persons toward whom he has contracted any obligations. He thus puts in practice an important principle of moral instruction. The child finds a real happiness in the success of his personal efforts. This principle has given birth to the Froebel method, justly appreciated in all countries. To encourage the child by the success of spontaneous combinations, or which appear such to him; to aid his personal efforts; to give him at the same time the power to say, "This is my work"; to develop his individuality, his personality, his initiative—such ought to be the thought, the motive of the educator; because he must know that too limited a share among us is left for the free expansion of the individual character, of the genial spirit of the child. We cast our pupils much in the same mould. We do not allow them to use their own means often enough. We do not allow them to fly enough with their own wings.

The work, wisely prepared by the teacher, and based on spontaneity, invention and creation, will contract in the child the habit of personal endeavor, will give him an understanding of the combinations and of the means of investigation necessary to arrive at a result. The teacher, by interesting the child in his work, will give him the power of surmounting obstacles, will give to him the desire of enduring fatigue. By wisely directing the natural bent of the mind, he will inspire in his pupil an intimate pleasure, a sincere joy in vanquishing the difficulties and arriving by himself at the end which he proposes.

The task of the teacher charged with the teaching of manual training is the same; it is necessary that he suit the operations to the capacity of his pupils; that he give some advice; that he make them find out, by means of the ideas already acquired, the secret of overcoming difficulties; that he avoid going at hazard, of presenting models badly graded or including too difficult exercises; that he proceed, in a word, in a logical manner to help the pupil in his desire to give satisfaction by his personal efforts. The child has no encouragement when working on some detached elements which do not lead to any combination. Having nothing to take to pieces and build up again, he cannot find the delusion of personal action.

In conclusion, let me say that if the foundation on which manual training is based be not solid and secure; if it be not established on the fundamental principles of edution, its day of prominence must be short-lived.

Since, then, so much is expected from its introduction, or, rather, re-

introduction (for the subject is not so new as at the first blush we are so apt to suppose), it behooves us, as educators, to give the matter our most serious consideration.—*The Intelligence.*

COMMERCIAL EDUCATION IN THE UNITED STATES.

A VALUABLE memorandum prepared by the United States Commissioner of Education for the British Embassy at Washington, and appended to the recent report* to the Foreign Office on Commercial Education in the United States, deals in an interesting manner with the progress, during the last half century, of the methods adopted in the various States for providing an education suitable for those who intend to make commerce their life's work

Commercial or business colleges, so-called, had their beginning in the United States more than fifty years ago. At least one institution of this class now in existence was established in 1840. For many years the branches taught in these business schools were substantially limited to book-keeping, arithmetic in which prominence was given to percentage and commercial calculations, penmanship, and business forms. Later, stenography and type-writing were added. For twenty years or more these private schools made but slow progress, partly because the training offered in these branches was not superior to that which could be obtained by their study in many of the colleges and private academies

In 1870 the Commissioner of Education at Washington received reports from twenty-six business colleges, although there must have been a larger number then in existence. These twenty-six schools had 5,824 students. In 1880 the number of schools reporting had increased to 162, and the number of students to 27,146.

The demand for stenographers and type-writers caused the rapid growth attendance upon these schools. Amanuensis courses were offered in nearly all of them, and students obtained diplomas or certificates of graduation in from two to six months in some of them. Very few of these schools had courses of study extending over more than one year.

In 1890 the number of business schools was 263, with 78,920 students. The high-water mark was reached in 1894, when 518 of these schools reported, with an enrolment of 115,748 students. Since that time there has been a steady decline in the number of schools, and a rapid decrease in the number of students. For the year 1898 there were only 337 commercial or busines schools reporting to the Bureau of Education, and the number of students was only 70,950. This decrease is attributed partly to the business depression of the past few years, and partly to the fact that so many public high schools, as well as many private colleges and academies, have established commercial courses in many respects superior to those offered by a majority of the business colleges.

HIGHER COMMERCIAL EDUCATION.

It has been long admitted among leading business men that those preparing for business careers should have the opportunity of a commer-

* No. 504. Miscellaneous Series, 1899.

cial education higher and broader than that given by even the best of the so-called business colleges. About ten years ago the American Bankers' Association began to direct the attention of educators and the public to the need of a more adequate professional training for young men preparing for business life. A committee was appointed to find out what was being done in this direction in the institutions for higher education in the United States. It was found that the Wharton School of Finance and Economy of the University of Pennsylvania was the only institution offering a course of study of a grade comparable with the regular collegiate course, and specialising those subjects most important to thorough training for business and citizenship. At the request of this committee, Dr. Edmund J. James, then professor in the Wharton school, was invited to visit the leading educational centres of Europe, examine their best commercial schools, and present a report upon the subject. Prof. James presented his report to the American Bankers' Association in 1893.

The agitation begun by the American Bankers' Association has resulted in the establishment of commercial departments in at least two universities, those of California and Chicago, the improvement of business courses in a number of colleges, and the organization of such courses in other colleges, and in many public and private high schools and academies.

THE WHARTON SCHOOL.

The Wharton School, founded in 1881, was the first institution in the United States to offer a thorough professional education to young men contemplating business careers. The course in finance and economy constructed upon the plan suggested by the founder extends over four years, and is one of the regular college courses leading to the degree of Bachelor of Science and Economics. In 1897-98 there were eighty-seven students in this school. Besides many subjects usually included in higher education, particularly certain branches dealing with political and social problems, the course includes the following topics which relate to commerce: Accounting, physical and economic geography, practical economic problems, algebra, German, business law, money and banking, business practice, theory and geography of commerce, political economy, economic history, history of law and legal concepts, local and municipal institutions, public finance and transport.

UNIVERSITY OF CALIFORNIA.

The Board of Regents of the University of California on January 15th, 1898, decided to establish a college of commerce in that institution. The college was formally opened at the beginning of the last term of the same year. The four years' course is parallel with the curricula of the college of general culture, about one-half of the subjects studied being prescribed in these colleges. The subjects making up the other half of the fundamental course are selected from a broad field covering philosophical, legal political, historical, economic, geographical, technological, and mathematical studies. It is stated that "this college is intended to afford an opportunity for the scientific study of commerce in all of its relations and for the higher education of business men, and of the higher officers of the civil service." Besides the fundamental courses the new college offers a large number of special courses, and the student may

arrange his studies with special reference to the future work, the different subjects being more or less closely related to commerce.

UNIVERSITY OF CHICAGO.

The next great institution in this country to recognize the importance of the higher business training and to make liberal provision for it is the University of Chicago. The College of Commerce and Politics opened its doors at the beginning of the last summer quarter. President Harper, in his twenty-fifth quarterly statement, presented on October 1st, 1898, says: "It is with feeling of great satisfaction that I may announce the inauguration during the past quarter of the College of Commerce and Politics. It will be remembered that the undergraduate work of the University was organized in three colleges, the College of Arts, the College of Literature, and the College of Science, each college taking its name from the groups of subjects upon which special emphasis was laid. When it was first proposed by Head Professor Laughlin that the University should organize work in a line of subjects dealing more closely with the great fields of commerce and politics, it was still a question whether that work should take the form of a professional school or be organized as regular college work. After long debate in the faculties and senate of the University it was decided that the work should be organized as a college and administered as such Herein lies the great difference between the work as thus presented in the University of Chicago and certain work of perhaps a similar character undertaken elsewhere."

The required course in commerce includes, besides the general branches usually taught in higher education, the following topics specially relating to commerce: Railway transport, comparative railway legislation, financial history of the United States, money and practical economics, banking, processes of leading industries, tariff history of the United States, insurance.

COMMERCIAL EDUCATION IN PUBLIC COLLEGES.

Of the 172 colleges providing commercial or business courses all are private institutions except eleven. Of the eleven, two are supported wholly by the States in which they are located, the nine being agricultural and mechanical colleges, supported by funds from the general Government, supplemented in some instances by State funds. The eleven public institutions offering commercial courses or providing for certain commercial studies are the University of the State of Missouri, West Virginia University, Colorado State Agricultural College, University of South Dakota, South Dakota Agricultural College, Florida Agricultural College, Nevada State University, Montana State College, University of Arizona, New Mexico College, and North Georgia Agricultural College.

COMMERCIAL EDUCATION IN PRIVATE SECONDARY SCHOOLS.

Of the nearly 2,000 private high schools and academies reporting to the Commissioner for 1897 98, there were 742, with 14,180 students in commercial and business courses. In the 742 schools there were only forty reporting as many as thirty students each in commercial courses. References to the courses of study in a few of these schools will give a general idea of the work being done in the direction of commercial education by the private secondary schools of the United States.

The Thornton Academy at Saco,

Maine, offers a business course extending over four years parallel with the regular courses. It includes, besides the usual secondary studies, business arithmetic, penmanship, bookkeeping, business forms, physics, physical geography.

The commercial course in Calvert Hall, Baltimore, Maryland, may extend over one or two years. It includes commercial correspondence, commercial arithmetic, bookkeeping, banking, phonography, typewriting, modern languages and drawing.

The business course in the Wentworth Military Academy extends over five years parallel to the classical course. It omits Latin and modern foreign languages, substituting for them commercial arithmetic, drawing, bookkeeping, business forms and correspondence, commercial law, civil government, stenography, etc.

The commercial course in the Pawnee City Academy includes most of the studies usually taught in the first and second years of the course of secondary studies, together with bookkeeping, commercial arithmetic and commercial law.

COMMERCIAL EDUCATION IN PUBLIC HIGH SCHOOLS

There were 5,260 public high schools reporting to the Bureau of Education for the year 1897 98. There were 1,037 of these schools, having a total of 32,314 students, in the commercial or business course of study The business course in the greater number of these schools does not differ widely from the business course in the private secondary schools already mentioned. In many of these schools the last year of the course is devoted largely to commercial studies, while in many others such studies are distributed through the whole course of four years. Of the 10,37 public high schools mentioned, there are only 139 having fifty or more commercial students each.

BUSINESS HIGH SCHOOL, WASHINGTON.

For years, Washington has enjoyed the distinction of having the only business high school in the United States connected with a city system of schools, and wholly supported by public funds. The Business High School was established in 1890, although the Central High School had had a business department since 1882. The report of the Business High School for 1890-91 shows that 310 students (160 males and 150 females) were enrolled the first year, and that the school had nine teachers. The school has had a steady growth to the present time. The report for 1897-98 shows an enrolment of 601. There were eighty-nine graduates, the largest number for any year since the school was established. The number of teachers employed is twenty. The average age of the student entering is 16.7 years. The requirements for admission are the same as for the other high schools of the city, and pre-suppose the completion of the eighth year course of the elementary schools The course of study for the Business High Schools is as follows:

First year: English grammar and literature, business arithmetic, bookkeeping, penmanship, shorthand, typewriting or mechanical drawing.

Second year: English grammar and literature, bookkeeping and business practice, commercial law and commercial geography, shorthand, typewriting, advanced mechanical drawing (op ional).

FURTHER EXAMPLES.

The commercial course of study

for the high schools of Boston adopted by the School Committee, September 24th, 1897, extends through two years, and in addition to the secondary branches usually taught, includes the following, specially relating to commerce: Penmanship and commercial forms, commercial arithmetic, bookkeeping, phonography and typewriting, elements of mercantile law, commercial geography.

The course of study for the Department of Commerce in the Central High School of Philadelphia covers four years, and in addition to the secondary branches usually taught, includes the following, specially relating to commerce: Penmanship and business forms, physical geography, commercial arithmetic, commercial geography, bookkeeping, stenography, typewriting, office practice, observation of business methods, industrial and commercial history, industrial chemistry, transport, banking and finance, ethics of business, commercial law and Philadelphia interests.

The commercial departments of the high schools in other important American cities are organized upon the same general lines as those given, and no particular advantage is gained by multiplying examples.

THE COST OF COMMERCIAL EDUCATION.

It is difficult to obtain an accurate estimate of the cost of commercial education in the public high schools, the separate cost of the schools themselves not being reported except in a few instances. Where these schools belong to city systems of public schools the cost is included in the general financial statement of the system. It may be stated, in general, that the cost per pupil is from 50 to 100 per cent. greater in the high schools than in the elementary schools. In the city of Washington the cost per pupil in the first four grades of the elementary schools, estimated on average enrolment, was $12 42 for 1897-98; in the next four grades the estimated cost per pupil upon the same basis was $20.56, while the cost of each high school pupil, estimated on average enrolment, was $42.89. This figure may be taken as the cost per pupil in the Washington Business High School. — *Indiana Journal of Education. Dec., '99.*

GERMAN EDUCATION.

IN the German conception of public school and higher education, and in the efforts to bring the concrete facts more closely in harmony with this conception, there has recently been remarkable progress, or at least change. And if one accepts the theory held by many educators the world over, *i.e.*, that the needed and thorough reform of the modern system of tuition must come in Germany and through German pedagogues, it may be truthfully said that the present time is rife with big things. After the truce, in fact, which came on the heels of the present Kaiser's short and unsuccessful effort to effect a radical reform of the German "gymnasium" curriculum, and of the methods employed by the teachers there, the battle is now on once more, and the arena is already filled with the noise of the belligerents, the advocates of both "technical" and "classical" education spilling an ocean of ink in behalf of their contentions.

One of the matters which the young Kaiser, on ascending the

throne, first tried to arrange and re shape in his impulsive way was this one of the old-fashioned, orthodox German gymnasium education. That this was a step in the right direction was admitted then by the majority of educated men here, but that the young monarch's manner in making the attempt was faulty and over-hasty also admits of small doubt, and the Kaiser, burning with ambition, and with a great many tasks before him that seemed to him even more urgent, dropped the matter again, having succeeded in only muddling things worse than before, in "easing up" the school task of the "gymnasiast," especially in Latin and Greek, to such an extent as to seriously interfere with the young student's proficiency in both classical languages, in introducing a spirit of unrest into the minds of both teachers and pupils, and in setting an agitation going which has never since stopped. This last achievement was, perhaps, good in itself, and one other thing accomplished, and also to be commended, was the taking up of manly sports by the "gymnasiasts" and university students as a body, of rowing, football, lawn tennis, etc. The great reform, however, the Kaiser had dreamed of had not been brought about.

Since then ten years have elapsed. During that time technical and applied science has achieved triumph after triumph, and one important new invention after the other has been introduced here and elsewhere. It is also well known what a strong interest the Emperor has taken in some of these—how, for instance, he received men like Roentgen, Marconi, Slaby, etc., and witnessed their demonstrations, and how he did everything in his power to further the standing and the interests of technologists. All this, of course, with the hearty disapprobation of the men of the old school in Germany, who continued to look upon chemists, engineers, electricians, etc., as a higher sort of mechanics, but not as men of science, certainly not as belonging to the "Ritter von Geist," not as their fellows in the aristocracy of intellect. That the average German "Gelehrter" has gone a good deal too far in this respect can hardly be doubted. Even such a prince of applied science as the late Siemens was, though he had attained wealth and recognition, suffered all his life from the thinly veiled disdain of the German university-bred savant, and it must be remembered that in Germany the university bred man thus far is the only one for whom the sugar plums ripen in the public service of the country, that he is the paramount power in German literature, journalism, almost every form of public opinion, and that, therefore, non-recognition from that quarter has meant all along the shutting up of all the avenues through which men attain to glory, emoluments, popular esteem, orders, decorations, preferment, influence.

The battle cry was "technical against classical education" throughout Germany for years, and the practical men with the technical education had generally the worst of it, as they do not belong, as a rule, to the writers, and were too busy to reply to much that was said. One of the main objects the men of technics fought for all along was the title of "doctor," as conferred by the universities on their highest and ablest graduates. In a country like Germany, where "titelsucht," the mania for titles and visible decorations, is rampant, and where not to bear a title of some kind or other seems to the average man one of the most

serious misfortunes, and where peo ple in their judgment of others are very largely governed by such titles, it meant, of course, a great deal more than in other countries that the young engineer, analytical chemist, architect, etc., no matter how thoroughly educated and how efficient and well-deserving, was under all circumstances debarred from the enjoyment of a title denoting academic degree and conferring social distinction as well.

It was here the Kaiser again interfered in behalf of the technical men. To the intense disgust of the whole Prussian bureaucracy, and of the vast and influential body of university-bred men outside of it, he conferred on the three Prussian high schools of technology in Berlin (or rather in the suburb of Charlotten berg.) Aix-la-Chapelle, and Dort mund the right of conferring academic degrees, the only difference being that the "Doctor Ingenieur" must be written and printed in Ger man letters, instead of Roman ones, so as to avoid misleading the public. The Emperor did this, too, in a way to make this gift doubly valu able, and a large part of the German press has since been bemoaning the fact and expressing the direst fears for the future of the country. Nearly every university-bred editor or writer has flung Goethe's bitter sarcasm about the uses to which science is put, viz.,

Dem Einen ist sie die hohe, die himmlische Gottin; dem Andern Eine tüchtige Kuh, die ihn mit But ter versorgt.

into the faces of these men of applied science, now his actual com petitors in the race for honors, and the abuse heaped on the heads of the latter is still flowing undiminishedly.

It added new fuel to the flame when Prof. Riedel, the rector of the Technical High School here, delivered an address wherein he used the substance of a talk the Emperor had had with him and the other two rectors, and in which the present educational system of Germany, so far as it prepares for the universities, was severely taken to task, and the opinion expressed that a large share of what the pupil of the German middle schools as well as of the higher ones learns is, as a rule, useless, and that not enough regard is paid by the teachers to the practical needs of life. The address went, of course, into details and furnished illustrations which it would not do to repeat here; but it was so powerful and well reasoned as to produce a strong and lasting effect, all the more so when, in answer to the unceasing abuse showered on him, Prof. Riedel publicly stated, probably with the Emperor's permission, that the phrases most found fault with had been used by the Emperor himself in the course of the conversation referred to.

In one of the leading G man periodicals, the *Deutsche Revue*, Prof. Kaibel makes a strong argument from purely the point of view of the university man against the Emperor's attempt to put the graduates of the universities on a par with those of the technical high schools, argu ing that this will aid greatly in destroying the last fragment of that idealism in the German character which has made the German people great in science, poetry, the arts, and which has already been sadly curtailed by a growing desire for merely material goods. He, too, furnishes illustrations and examples, and there is undoubtedly a kernel of truth in what he says. But Kaibel commits the mistake of simply ignoring the undeniable shortcomings of the present German educational system, and of joining in the vulgar

abuse of his opponents. All the same his article has caused a sensation, and all the Conservative papers of Germany are reprinting it, many of them because in doing so they can take issue with the Emperor who, to their thinking, is a dangerous innovator, without personally engaging themselves.

Even such a strong government paper as the *Kreuzzeitung* takes delight in thus intimating to the Emperor that he had better retrace his steps again, as he once did before. But there does not seem to be any prospect of his doing so this time, for in court circles it is reported that the Emperor has his programme of school reform now ready, after much wearisome work of preparation in the Departments of Education and Interior, and that after the naval bill has been disposed of in the Reichstag, and the canal bill in the Prussian Diet, the Kaiser will go in earnest at the task of carrying through this reform. He will meet with strong and determined opposition, the strength of which can be measured by the virulence of the present press campaign against the technical high schools, and what his programme is in the matter of school reform is thus far a well kept secret. It is quite possible that the programme, when it sees daylight, will not meet expectations. Meanwhile, the sovereigns of Saxony, Wurtemburg and Baden have imitated the Kaiser, as King of Prussia, in conferring similar rights on the technical high schools of Carlsruhe, Dresden, Stuttgart, etc.

That, however, the movement within the nation itself for a thorough modification of Germany's middle and higher school system is gathering strong momentum, despite the enormous opposition on the part of the old-fashioned and conservative leaders of public opinion here, there are many proofs. One is, that among the German pedagogues themselves the number of those insisting on a change is rapidly growing. The idea among them finds more and more favor that it would strengthen German educational school methods materially if some of the English and American educational features were to be adopted, with a view particularly of arousing in the German boy and youth more of that indomitable energy, that self-reliance, and that practical sense in meeting and overcoming difficulties which have ever distinguished those two nations, and which are in a large measure due to early inculcation at school, where the "try, try again" is taught even to the youngest, and where the schoolmaster is at the same time also an educator as well as teacher. No less a paper than the Cologne *Volkszeitung*, the leading Catholic organ in Germany, published a well-reasoned article by a German bishop wherein this was set forth at length, and with irresistible logic. It is certainly strange to see such an article appear in the main mouthpiece of the Ultramontane party, but the fact does not detract from its significance. It is quite certain that the Emperor's programme will also make towards this same end, and there is, whether one may regret it or rejoice at it, a strong current within the German people of to-day trying to rid it of the national failings that have told against political and financial success in the past, such failings as indecision, procrastination, lack of practical sense and ruthless energy in the battle of life, and there is a growing conviction that these old failings are due in large measure to the dreamy, impractical German schoolmaster of yore.—*W. v. S.*

EDITORIAL NOTES.

Deliver not the tasks of might
To weakness, neither hide the ray
From those, not blind, who wait for day,
Though sitting girt with doubtful light.

"That from Discussion's lips may fall
With Life, that working strongly, binds—
Set in all lights by many minds,
So close the interests of all."

WE draw the attention of our readers to the article on Manual Training by R. M. Smith, Esq, Supervisor of Manual Training in the Public schools of Chicago. Canada has some claims upon Mr. Smith, since he was formerly Principal of St. Francis College in the Province of Quebec. In moving, many years ago, to the great centre of population he now labours in, he has taken advantage of the elements of success that are to be met with there, and the rumor is, in view of the newspaper reports that have reached us from the West, that there are other successes in store for him as an organizer of manual training schools in the United States. In Mr. Smith are to be found the practical engineer as well as the successful teacher, and the two elements have come to be fully recognized by those in authority in Chicago. The manual training idea has not yet taken a firm hold of our communities, though we have something to show with admirable pride in some of our larger centres. The movement which Sir William Macdonald is at present encouraging with his usual liberality will no doubt bear fruit in the near future under the guidance of that indefatigable organizer of the Agricultural Department, Mr. Robertson, of Ottawa.

During the past few months there has been little heard above the din over the war in South Africa, unless it has been the din over the political situation in the Dominion. This war has been a magnificent loyalty lesson to the whole of Canada and to none more so than to the children attending our schools. Incidents can be spoken of as illustrating the patriotic spirit that has come to be a settled spirit in our schools over our connection with the British Empire The other day when the announcement was made in one of our Public schools that General Cronje had surrendered there was a spontaneous burst of applause, followed by the spontaneous singing of a verse of God Save the Queen. There have been poems and essays prepared spontaneously by pupils everywhere, morsels of indifferent literature hardly fit to enter the public eye, but which none the less gave evidence that love of country which is cultivating itself into an instinct is beginning to be something in the rising generation of Canada.

But while patriotism is a lesson that our young people are learning in a natural way from the upholding of righteousness we can hardly recommend the political ethics of the Ottawa atmosphere, as a promoter either of loyalty or rectitude of conduct. When the students of a certain Normal school were allowed their recreation in the quadrangle enclosed by the various Model or practising schools and overlooked from their windows, the old principal's invariable advice when any "high jinks" were likely to be indulged in, was, "Gentlemen, remember that the eyes of a thousand children are upon you." It is not for us to preach to the

high dignitaries of the Canadian House of Commons, and yet we cannot well refrain from repeating in their hearing the words of advice the old principal had to give to his students whenever they failed to regulate their conduct in the quadrangle.

We are glad to learn that there is no letting-up in the anxiety of the committee who has in hand the furthering of a Canadian Educational Bureau, and from what we have heard there will undoubtedly be progress to report at the next Convention of the Dominion Educational Association, of which Dr. J A. MacCabe, of Ottawa, is President. The Premier of Ontario, the Hon. G.W. Ross; the Attorney-General of Nova Scotia, the Hon. Dr. Langley, and the Archbishop of Ottawa are deeply interested in the scheme, while the press of the various provinces continue to counsel its formation with unusual zeal and perseverance.

"There are a few persons over there," pointing towards the Queen's Park, "forget that we, (Victoria University) are there by right."

The above words were uttered by an active and influential member of the Methodist Church, while discussing the University question and University ideals. Evidently one of the points of irritation is the University idea. Will University College be nearer in any way to the University than Victoria? for instance. The answer to this question involves most of the points at issue.

Evidently there are matters requiring attention in the University other than money; though money is always needed and will be needed to the end of the chapter.

The Convention of Teachers this month promises well. We are told Queen's University, Kingston, will be well to the fore. This is as it should be.

CURRENT EVENTS.

A NEW BEGINNING.

Most interests of late have had to bow to the interest of war, compared with which nothing has had much chance of arresting and holding the public attention. The subject of education has suffered with the rest, yet not so much as the rest, because it has been borne in upon the mind of the country that war and education have a great deal to do with each other, and that physical strength and physical courage will not go very far without the applications of science and the guidance of a trained intelligence. War in itself is an "ugly and venomous" thing; but it carries in its head the 'precious jewel" of self revelation, stimulus, national union and effort. We do not wonder that statesmen and politicians, writers and speakers, have on many recent occasions agreed in declaring that we need nothing so much for the future as the trained intelligence and the scientific mind. Every new stimulating influence is welcome, no matter whence it flows. All is grist for our mills to grind. The people want to be better educated, not only to be drilled on their feet and made cunning with their hands, but to be trained in mind and character as well. If war has served to bring them to this point, let us be thankful for the fact.

The Board of Education will help

us to make our new departure. It is now virtually constituted; we have the outlines of its new organization at the same moment with the statutes of the remodelled University of London, and the two will work together in shaping our public education according to our needs. One month from to-day the Act of last Session will come into operation, and the Government seem to be fully bent on completing the machinery by which it is to do its work. A day or two ago, the Duke of Devonshire said in the House of Lords that the Departmental Committee appointed to consider the consequent changes of staff and of organization had made two reports, which had been to a certain extent acted upon, and were being carried into effect. The Committee, he said, was now engaged in considering its third and probably final report, and it would be presented in a short time. Being asked when he hoped to introduce the Bill for constituting the Local Authorities to carry out the new system, the Lord President thought that he would probably not be in a position to bring it in until the Board of Education Act had come into operation. Well, that is not long to wait. A Bill introduced in April might certainly be passed in July, even at our leisurely British rate of Parliamentary procedure.

Yet, as our readers are well aware, the Act, as it stands, will cover a large area of educational activity, and will become operative at once. The Permanent Secretary, a *grata persona* with all branches of the teaching profession, will know how to direct the new energy in o the old channels, and he will have at his side three principal Assistant Secretaries, specially concerned with technical, elementary and secondary education. It is understood that Sir William Abney and Mr. Tucker have been appointed to two of these positions, but that the third is not (when these words are written) finally selected. It is very seriously to be hoped that the Assistant Secretary for Secondary Education will be an official thoroughly in touch with the ideas on which secondary schoolmasters and the Universities have definitely expressed their opinions during the past five or six years. There was an article in last week's *Guardian*, written with much insight into the situation, which reminded the Government that they have been provided by schoolmasters themselves with a rare opportunity.

"The opportunity is indeed unique. For once, all the living forces representative of secondary and higher education—the Universities, the public schools, and the other secondary schools—are united, and speak with unanimous voice in favor of reform. They ask for the training and certifying of teachers, the appointing of inspectors, for the establishing of a representative consultative body by which the Board of Education and schools of all kinds may be brought into organic and constant relationship. The new Act provides for all this; but, since its provisions leave registration, training and inspection all optional, and indicate no principles on which the constitution of the Consultative Committee is to be framed, it rests absolutely with the new Minister of Education and his advisers to determine whether the promises of the Act become realities or not."

It cannot be too often pointed out that the main educational energy, zeal and enthusiasm of the past few years, of which the Board of Education Act is in large measure the outcome, have been manifested by the universities, by the secondary

teachers, and by people concerned in secondary education. The elementary zeal came to a head in 1870; the technical zeal had it fruition twenty years later. All the friends of education are concerned in the new reforms; but, if the secondary schoolmasters had not spoken out and insisted, if there had been no Oxford and Cambridge Conferences, no Royal Commission, and no continuous activity of the secondary associations, there would at this moment have been either no bill at all or a bill treating national education in the secondary stage as a mere question of higher-grade Board schools. The Board of Education Act is comprehensive, conciliatory and impartial as regards the different branches of education, but it is stamped in particular with the secondary hall mark. If the new organization and the new administration correspond with the ideas on which the Act is evidently framed, we may be hopeful as to the future of secondary schools. There is no reason why a great deal of useful work should not be undertaken at once—there is every reason why it should be undertaken. Inspection, registration, the definition of efficiency, the statement of conditions for grants in the case of non technical schools—all these things require immediate attention. The fact is well brought out by Dr. R. P. Scott, in his thoughtful and vigorous article in the *Fortnightly Review* for February. For the improvement of secondary education, he says:

"Four things are necessary to be done. First, to find out exactly what is going on inside our existing uninspected schools. That means, as the first step, an intelligent survey by competent and experienced inspectors. And they must be men and women in sympathy with various types of educational endeavor, not pedants or mere partisans of literature or of science, or of State monopoly, but anxious to stimulate and to make use of every bit of good private effort. The next thing to be done is to rescue many of our day secondary schools from financial embarrassments, and to place the salaries and prospects of assistant masters and mistresses on a satisfactory level. The third step would follow at once—the raising of the intellectual standard of many of the schools, improvements in the professional preparation of the teachers, and the diffusion throughout the nation of a clear and inspiring idea of what a good secondary school could and should do for its pupils. But, concurrently with this, the fourth need should be grappled with—namely, the spread of the public school spirit as far as possible throughout secondary education."

This is well and judiciously said. The new Act, rightly administered, should help us to advance in all these directions.

"The structure of every sentence is a lesson in logic."—*J. S. Mill.*

"The average boy does more for his education by observation and reading than the schoolmaster is able to do for him."—*W. D. Howells.*

"Rules must always for the most part be negatives."—*Minto.*

"Every language must be learned by *use* rather than by rules."

"The vernacular first, then Latin."—*Comenius.*

CORRESPONDENCE.

UNIVERSITY IDEALS.

The following letter on the University of Toronto and its federated colleges is reproduced; with the writer's consent, from the *Mail and Empire*, of February 24th.

SIR,—As a graduate of the University of Toronto, anxious to see his Alma Mater a great (not merely a big) university, and longing to see education lifted to a higher, broader, more imperialistic level, if one may so speak, I wish to thank you for calling the attention of your readers to this question in the admirable way in which you have done. Three main points seem noteworthy—finances, administration, and ideals; and the last is the most important. Money can do a great deal, administration perhaps more, but without lofty, generous ideals neither money nor administration counts for much.

"What Jowett did for Oxford" is exactly what we need, not one man, but four, five, or even more men, to do for Toronto. If I mistake not, Jowett never occupied any administrative office of influence in his university, but did his work mainly in connection with Balliol College, beginning as fellow and ending as master. His scholarship and literary work made him known to the outside world, but it was his interest in, and labours for, his students which made his college famous. As a participator in the inter-collegiate lectures, which are one of the chief features of Oxford and Cambridge, he conferred upon the university generally the benefits which would have been confined, but for the inter-collegiate lectures, to his own students. By all means, then, let us have Jowetts as many as we can find, but, that they may do Jewett's work, they must have like conditions. In other words, we must have, not one large, unwieldy college, but a number of comparatively small ones, all working for a common end, but every one holding fast its own traditions and contributing to the common good out of its own strength of character.

It has been said in one of your interviews that Oxford cannot be reproduced here. I do not say that it is desirable that it should be, but I do say that whatever is good in British models we should adapt to our own different circumstances. In Winnipeg, where the university and the colleges are all younger than ours in Ontario, they have denominational colleges, all teaching the subjects of the arts course, working together by a system of inter-collegiate lectures, forming a real federation (all on an equal footing), and persistently refusing to adopt the plan advocated by some men here — that denominational colleges should confine themselves solely to theology. In this, as in many things, Manitoba is ahead of us, although we boast that ours is the premier province of the Dominion.

I am glad to hear, though, that in Latin a beginning has already been made in the direction of co-operation between University College and Victoria. My hope is that, as the theologians seem to be coming to the point where they can combine their forces to their own and their students' advantage, this beginning in Latin may lead to greater things—perhaps even to co-operation with Queen's and Ottawa. We have a large province, and we cannot afford to hold any but large views on educational questions above all others. Has any one thought yet what may be required in the way of universities for the

country north of Saut Ste. Marie and Lake Nipissing? Besides that great district our little fringe of settlements along the lakes and rivers may look very small some day, and its universities may in the time to come outshine all of ours unless we can rise to a more generous and helpful rivalry than we have had in the past.

Whatever is determined upon in regard to Victoria will probably decide the fate of federation itself. To my mind, it would be unfortunate if she either withdrew from her present partnership in the University of Toronto, or, if continuing as a partner, she should have less at stake in the concern, for she undoubtedly would have less if she were a mere theological hall. The traditions of fifty or sixty years are in our country what centuries are in Oxford and Cambridge, and cannot be broken lightly or waved aside with a sweep of the hand. Sentiment does count, as we all are realizing in these days of sacrifice for the idea, the sentiment, of Empire. Those who harp on this theological string surely cannot stop to think how vexatious their tune is to Victoria men, past and present, and how productive of discord in the common life it is. Let them try to imagine what their own feelings would be if, by any mischance, the unhappy movement of the sixties against University College should be revived.

So far as I can see, the difficulty comes chiefly from the difference in ideas between the two colleges; but a university, to be worthy of the name, must be able to tolerate all forms of thought and all varieties of aspirations. We cannot all think alike, nor can we all feel alike. Hence it seems to me to be wise to have, not one college, but as many as various groups of men (and women) require for that perfect development which we call education. Who can tell? Perhaps some day we shall have Knox, Wycliffe and St. Michael's all teaching art classes. Such a state of things appears visionary now, possibly, but, if occasion should ever require it, I am sure that nothing but good would result to the whole university from it.

If the denominational universities, (for they are not mere theological colleges), stand for one idea more than another, it is for that of religious instruction being, equally with literary culture, scientific training and physical exercise, necessary for the full development of a man. Counting Ottawa, Regiopolis, Queen's, McMaster, Trinity, and the Western University the chancellor of Victoria must be well within the truth when he says that only about half of the educational work of the higher sort is being done by the University of Toronto. This means that half of the population of this large and wealthy province is shut out, by reason of its views on education and by reason of the University Federation Act, from sharing in the benefits which it was supposed that Act was framed to secure to it. Secularists, whether Christian or anti Christian, have their rights, but so have anti-secularists. If, as I believe, and as I have tried to show, any number, large or small, of citizens (i.e., owners of the University of Toronto), is excluded from that institution by the secularist clauses of the Act, it is high time that the defect were remedied. This question ought to be settled on the basis of equal rights for all before further grants of money are voted. We boast of our religious freedom and of our toleration, but such boasts are vain in the present state of affairs. This remnant of religious

persecution ought to be swept away without delay, merely as a matter of common justice.

In saying what I have said, I wish it to be distinctly understood that I am not casting any reflections upon University College. I know its Y. M. C. A., and something of its Greek letter societies, and for the moral influence which they all exert I have nothing but praise. But I felt as an under graduate, and I feel now, that they were, and are, not enough. It has always seemed to me that, even if the statute is left unchanged as regards University College, the clauses which seem to make religious instruction possible in the college might be, and ought to be, utilized. At the Normal School religious instruction is given to the students. Why is it not given also at University College, where it could be more easily done without denominational jealousy than it could be anywhere else, if the theological colleges would co-operate, and would take charge of the members of their respective communions? For those who have conscientious scruples good courses in ethics are provided, and can be made compulsory. I do not think I am going too far in saying that our new Imperialism is generating a vast deal of moral—not to say religious—enthusiasm. Where else ought it to be fostered and guided if not in the universities and colleges? But whatever views may prevail as regards University College, there can be no doubt that other institutions ought to be allowed to pursue their ideas of religious instruction combined with all the advantages that the university, the whole people's property, has to offer in connection with the library, the laboratories and intercollegiate lectures.

Speaking of toleration and justice brings me to the mention of those clauses in the Act which, as in the case of the two musical schools in our town, for instance, give privileges to the one while they withhold them from the other, because the latter has what is called "double affiliation." The provincial university should be free to all, without distinction of any sort whatsoever. The more numerous these alliances are, the better for the university, but all should be of exactly the same kind, all affiliated or federated institutions standing upon an equal footing in in their own class.

The Agricultural College and the School of Science ought to be made together with all other technical or professional schools, federated colleges on a level in all respects with Victoria, Knox, Wycliffe and St. Michael's. Nor should any of these be placed below University College in any respect. It was by perfect equality of colleges that the people of Manitoba worked out their problem, leaving the university supreme in its own realm. It is by perfect equality of the provinces that Confederation has been made to work out so well as it has worked out in the Dominion. And it is only by perfect equality that Imperial Federation will work out. Similarly, it is only by perfect equality for all, combined with generous ideals, that the University of Toronto can become a great university, and one which shall truly represent the people that own it, for as I have often said, it is the people who own it, and not merely the graduates, or even those who work hardest for it and in it—frequently with too little thanks.

To take up the other headings, I may perhaps ask to be allowed to trespass upon your space at some future time.

Yours, etc.,

A. H. YOUNG.

Toronto, Feb. 24th.

BOOKS AND MAGAZINES.

THE first article in *Scribner's Magazine* for March is on The Fighting with Methuen's Division, by H. J Whigham. The account ends with the crossing of the Modder River, the management of the expedition being somewhat severely criticized. The instalment in the April number ought to be particularly interesting. Mrs. Wharton, who has recently published a book of short stories, contributes the first part of a short novel, The Touchstone, in which some of the characters of one of her most striking short stories appear. The Eye of the Harem is an amusing short story, by Arthur Cosslett Smith. The Renaissance of Landscape Architecture is a picturesque article by George F. Pentecost, jr. Tommy and Grizel are still in difficulties about Tommy's sprained ankle, which turns out to be dislocated after all.

The Shadow of a Man is the name of the complete novel in the March *Lippincott*. It is written by E. W. Hornung, and is an agreeable contrast to that author's earlier work, The Amateur Cracksman. The Shadow of a Man is an interesting and well told Australian story. The Canadian Tommy Atkins is an article by Percie U. Hart on the North-West Mounted Police, who receive much well-merited praise from Mr. Hart. Mr. Stephen Crane begins his series, Great Battles of the World, by a paper on The Brief Campaign Against New Orleans. Why New Orleans should be considered one of the great battles of the world does not precisely appear.

The March number of *St. Nicholas* contains more than the usual number of contributions above the average in merit. Charles G. D. Roberts has a Canadian story called In the Rapids of the Ashberish. There are no less than six historical sketches. One of the most interesting of these to Canadian children would be The Royal Champion of England, by Jennie Day Haines. In the department Books and Reading a list of the best one hundred books for a young people's library is given. The new departments on nature, science, drawing, writing and photographing are developing into a most interesting experiment.

Heroes in the Nursery is the title of an article which is reprinted in *The Living Age* from *The Speaker* that would be read with interest and profit by many of the teachers of primary classes.

The Need of Stopping to Think is one of these excellent articles, so characteristic of the *Sunday School Times*, which may be found on the first page of the issue for the tenth of March. Mr. Harris, the author of a biography of Robert Raikes, which was published last year, contributes to this number of the *Sunday School Times* an article on "The Respectable Mr. Raikes." The departments for assisting the work of a Sunday-school are conducted as usual.

"Cupid, the Freshman Manager," a short story that appears in the *Youth's Companion* for March 15th, is concerned with the purity of college athletics, and should be read with much interest by the many subscribers to the *Youth's Companion* who are interested in this question. The Yielding of a Blinn is a story for girls of quite as excellent a character. More than the usual allowance of verse appears in this number, one of the most attractive con-

tributions being The Wise Frogs, by Miss Ethelwyn Wetherald, whose father was an early and honored member of the teaching profession in Ontario.

Preliminary Stages of the Peace of Amiens, by H. M. Bowman, is the latest contribution to the University of Toronto studies in the historical series. Mr. Bowman seeks to establish the sincerity of Napoleon's peace overtures at this time against his later denials of sincerity at St. Helena. The author's contribution is an interesting one and is written with clearness and not a little grace.

THE RATIONAL SPELLING BOOK.—The American Book Company, has published, in two parts, a spelling-book, by Dr. J. M. Rice, arranged on a definite psychological plan, and designed to make the learning of spelling—that bugbear of school work—both interesting and easy. The words have been selected, primarily, with reference to their use in ordinary affairs. The book is recommended to the notice of teachers, and the Educational Department. Part I., 15 cents; Part II., 20 cents.

Special map of South Africa, 1s War map of the Transvaal, Natal, etc., 1s. Pictorial Bird's Eye Map of the Transvaal, Natal, etc., 6d. Edinburgh and London: W. & A. K. Johnston.

Three excellent colored maps of the seat of war have been issued by the well-known geographical publishers, Messrs. W. & A. K Johnston. We have no hesitation in pronouncing them the best maps of the kind that we have seen. A box of 50 coloured flags (18 British, 16 Transvaal and 16 O.F.S) for marking movements of troops is also supplied, price 1s.

The following publications have been received:—

D. C. Heath & Company, Boston.

Keller's Kleider Machen Lente, edited by M. B. Lambert.

A Brief Course in Physiology, by Buel P. Colton.

School Sanitation and Decoration, by Severance Burrage and H. J. Bailey.

Houghton, Mifflin & Company, Boston.

Michael Angelo, a collection of 15 pictures, with introduction and interpretation by Estelle M. Hurll.

Potter & Putnam Co., New York.

The Inductive Geography, by Chas. W. Deane and Mary R. Davis.

Philosophy is the child of religion.

"Poetry is one of the most efficient means of education of the moral sentiment as well as of the intelligence. It is the source of the best culture."—*Prof. Norton.*

"The power to understand rightly and to use critically the mother tongue is the consummate flower of all education."—*C. W. Eliot.*

"Language lies at the root of all mental cultivation."—*Dr. Mommsen.*