## Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for scanning. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of scanning are checked below.

L'Institut a numérisé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de numérisation sont indiqués ci-dessous.

- ☐ Coloured covers / Couverture de couleur
- ☐ Covers damaged / Couverture endommagée
- ☐ Covers restored and/or laminated / Couverture restaurée et/ou pelliculée
- ☐ Cover title missing / Le titre de couverture manque
- ☐ Coloured maps / Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black) / Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations / Planches et/ou illustrations en couleur
- ☑ Bound with other material / Relié avec d'autres documents
- ☐ Only edition available / Seule édition disponible
- ☑ Tight binding may cause shadows or distortion along interior margin / La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure.

- ☐ Coloured pages / Pages de couleur
- ☐ Pages damaged / Pages endommagées
- ☐ Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached / Pages détachées
- ☑ Showthrough / Transparence
- ☑ Quality of print varies / Qualité inégale de l'impression
- ☐ Includes supplementary materials / Comprend du matériel supplémentaire
- ☐ Blank leaves added during restorations may appear within the text. Whenever possible, these have been omitted from scanning / Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été numérisées.

☑ Additional comments / Commentaires supplémentaires: Continuous pagination.

THE

# JOURNAL OF EDUCATION

Devoted to Education, Literature, Science, and the Arts.

**Volume XXI.** **Quebec, Province of Quebec, February, 1877.** **No. 2.**

**TABLE OF CONTENTS.**



## On Teaching Geography.

Paper- read by W. Lawson, Esq., F.R.S., before the College of Preceptors.

When we seek to estimate the educational value of any particular subject, we are generally guided by two considerations :—(1) What is its value as a means of intellectual training ? (2) What is the practical value of the information which it conveys ? Now, whatever may be said of the importance of Geography as a means of mental training—and very much may be said—few will be disposed to deny the practical value of the knowledge which it imparts.

*Importance of Geography.*

It was Dr. Watts, we believe, who stated that geography was one of the eyes of history; but a great advance has been made since his time; and while geography is still necessary to a complete understanding of its sister study, it now ranks as an independent science. Viewed in its full scope, as including physical geography, it is intimately associated with the phenomena of the natural world. It takes cognizance of the changes and temperature of the atmosphere; the causes of winds and oceanic currents; the origins of storms, earthquakes, and volcanoes; and the distribution over the globe of all forms of organic life. Taken in a more restricted sense, its study is of the first importance to a commercial country like England. It investigates the causes of our manufacturing superiority; it unfolds new fields to our commerce, and makes us acquainted with the character and productions of our vast Colonial empire. Besides all this, it is necessary to the proper understanding of our daily newspaper. The extension of the telegraph system, and the enterprise of the Press, bring to us every morning news from all parts of the world; and the reader who is ignorant of geography can only half realise the accounts which he reads. A striking illustration of the importance of geography in relation to the daily press was recently afforded. Early in the month of November the readers of the *Times* would notice that, day after day, three maps or charts appeared in its columns. There was the usual weather chart, showing the lines of equal barometric pressure and the direction of the prevailing winds; a map of the seat of war; and a map to illustrate the discoveries made by the recent Arctic Expedition. This shows how intimately geography is bound up with the affairs of every-day life and with our every-day reading. It is perhaps unnecessary to dwell further on this part of our subject. Upon its importance I presume we are all agreed. The main question is, How shall it be taught ?

*First Lessons.*

It has sometimes been urged that our first lessons in geography should commence with drawing a plan of the school-room; that we should next proceed with the street in which the school stands; then take the town, and last of all the country: and that in this way we should gradually prepare the minds of our pupils for understanding what is meant by a map. I confess that all this has often struck me as a waste of time. I should commence by telling a child that the world was round, like a ball; that it was so large that the hills and mountains upon its surface bear no greater proportion to its bulk than do grains of sand upon a globe twelve inches in diameter, and the deepest valleys are not so large in proportion as the minute impressions in the skin of an orange. I should next tell him him that a map was a picture of the world, or of some part of it; but that the picture was on so small a scale that the rivers could only be represented by lines,

and the towns by dots. In all my experience, I never met with a child that could not thus be made to understand what was meant by a map, without having to be carried through a course of lessons on topography.

It is sometimes said that children are very often taught to repeat geographical terms which they do not understand,—that a child brought up in a town, for example, has no conception of what is meant by a mountain or a lake. I do not think many teachers will endorse this statement; theorists very often imagine difficulties which are never met with in practice. However tame the scenery of any neighbourhood may be, there is generally a hill, a stream, and a pond; and it is not difficult for the quick imagination of a child to magnify these into mountains, rivers and lakes, especially if the imagination is aided by a brief description on the part of the teacher.

Having explained to our pupils the nature of a map, we next inform them that a globe is a representation of the distribution of land and water throughout the world. A single illustration will suffice to show them that in whatever position a globe be held, only one half of its surface can be seen at once. I could then be explained that, in a map of the world, the Globe is supposed to be divided into two equal parts, and the halves flattened and placed side by side. We might next draw the attention of the pupils to the great continents, and especially Europe, with the British Islands on the extreme verge of the Western Hemisphere—

Et penitus toto divisos orbe Britannos.

Then, turning to a map of Europe, we could show Britain on a larger scale, and point out the relative positions of other countries, with the names of which the children might be familiar. Lastly, we might turn to a map of England, and point out some of its great features, and, if possible, the position of the town in which the school was situated.

*Arrangement of Lessons.*

It will be seen that the lessons described above are but preliminary; the *systematic* study of geography should begin by our native country. Great care should be taken in arranging the lessons, so that the several parts of the subject come in their natural order. Our pupils would then see the connection between one part and another; their intelligence would be quickened, and their interest kept alive. So far as England is concerned, the following would seem to be a natural order: the boundaries and coast line, thus showing the shape of the country; then, the surface and minerals; next, rivers and lakes; then, climate and productions (vegetable and animal); next the people and their occupations; and lastly, the divisions and towns. The minerals ought to be taken along with the surface, because they depend upon the nature of the surface: mountains and hilly countries are generally rich in minerals, while in flat district these are rare. It is not wise to make too many divisions in a lesson, or in a course of lessons, for the continuity of the subject-matter is thus often lost. The teacher should also be on his guard against using one stereotyped form for all countries alike: for, if this be done, he is very often tempted to insert unimportant facts for the sake of symmetry. Care also should be taken, especially in treating of foreign countries, to make a judicious selection of facts. It seems a waste of time to tell a child very much about the army and navy of foreign countries, or the different houses of legislature, and the number of members in each: on the other hand, it might be interesting to him to learn something about the food, dress, and general condition of the people.

*Physical Geography.*

We have laid stress upon the importance of arranging the lessons on an intelligible principle, so as to show the dependence of one part of the subject-matter upon another. It is the neglect of this principle that has often brought the study into disrepute. Geography is looked upon as a means of acquiring a certain number of useful facts, but seldom as an instrument of intellectual training; and yet few subjects are better adapted to this purpose. When properly taught, it not only strengthens the memory, but it also simulates the imagination and quickens general intelligence. In order, however, that the true relation between one part of general geography and another should be properly understood, the pupils should have some knowledge of physical geography. It would be well, therefore, when they begin the geography of England, that they should also receive some elementary lessons in phpsical geopraphy. In this way, they would become acquainted with certain general principles which would explain the facts they are learning, and would add both of their interest and value.

Another reason why the study of physical geography should be introduced as early as possible is, that it is only in this branch of the subject that we can take that wide view of the question which raises geography to the dignity of science. In descriptive geography we are necessarily confined to a limited area; but when we view the earth as a whole, we discern the intimate relation between one part of of its structure and onother. Taught by such men as Ritter and Guyot, we see that the apparently fortuitous distribution of land and water, the irregularities of the earth's surface, and the disposition of the mountain chains, have stamped a certain diversity of climate upon different parts of the globe; and this has again resulted in certain fertile regions lying side by side with deserts and other tracts more or less sterile. The regions favoured by nature have been inhabited by luxurious and effeminate races, while the more sterile countries have given birth to hardy and independent tribes; and the conflict between the North and South forms a large portion of the past history of mankind. Or again, it has been pointed out that the fertile river valleys of Egypt and Western Asia were the centres of early civilization, and that the position of the great mountain chains of Asia and Europe facilitated the spread of mankind over the earth, by enabling him to wander far away from his original abode without suffering any great change of climate. We see, also, how Europe, broken up by its coast line and mountains into separate nationalities, was, by its "varied contrasts," enabled to carry on to greater perfection a civilization which in Asia had become stationary; and how America, with its broad and fertile plains, offers a home to the surplus population of the Old Continent.

Of course, the portions of physical geography selected in the first instance should be adapted to the age of our pupils. The general distribution of land and water, the causes of winds and oceanic currents, and the agencies which influence climate, might first be taught. Volcanoes and earthquakes, the formation of glaciers and icebergs, the laws which regulate the distinction of plants and animals, and the influence which man and nature have mutually exerted upon each other, would follow in due course. In our upper classes it might be advisable to advance still further, and to impart to our pupils some knowledge of the principles of geology.

*Geology.*

This science is well worth studying for its own sake; but it is in relation to physical geography that I wish to

speak of it, and in doing so I can hardly do better than use words of my own, which I have used in another place.

"Geology is not merely interesting on account of the revelation which it affords of the past; it is also intimately associated with the history of the present. The great charm of physical geography lies in the fact, that it enables us, in some mesure, to understand the operations of Nature, which are daily going on all around us, and to discover the laws by which these operations are governed. We see the intimate connection which exists between the soil and the climate of the globe, and the distribution of organic life. The climate, again, depends not only on latitude, but also upon winds, oceanic currents, the distributiou of land and water, and the nature of the surface. Now, geology enables us to go back still further in the chain of causation. It teaches us that the nature of the soil depends upon the character of the rocks which lie beneath. It explains why some districts are rugged and mountainous, while others are level and undulating. It shows the great chances that have taken place in the distribution of land in the past ages, and the causes of those changes. It explains why some countries are rich in minerals, while other are comparatively destitute; and it explains also the formation of the rocks themselves, and of the minerals inbedded in them. It even throws light upon the present distribution of vegetable and animal life. In short, it is scarcely too much to say that physical geography is only half complete if it be not explained and supplemented by the sister science."

*Astronomy.*

And just as we deem some knowledge of geology essential to a complete knowledge of physical geography, so also we think it ought to embrace the outlines, at least, of astronomy. The daily and annual motions of the earth, the tides and the seasons, are of course closely connected with geography; but our pupils ought to learn something also of the earth's position in space. They should be taught to realize that it is but one of many planets that revolve round the sun; that some are nearer to the central luminary while others are more remote; that other planets have moons and atmospheres, and the regular recurrence of day and night, summer and winter, just as the earth has; and that the sun itself is but one of myriads of stars, each of which has in all probability, a systems of planets revolving round it. We should also point out how the sun is the great centre of the heat, light, and magnetism; and that, just as any great changes on the surface of the sun are at once felt upon the surface of our planet, so it is most probable that changes daily taking place on the earth's surface react upon the sun; and that thus we are led to realize the truth which Carlyde impresses upon us. "Not a leaf rotting on the highway but is an indissoluble portion of solar and stellar systems."

*Oral Teaching.*

A question sometimes arises as to the comparative merits of oral teaching, and the use of text-books. My own opinion is, that both methods should be adopted; but that in teaching physical geography, oral instruction should precede the use of books; while, in general geography, text-books should first be used. Physical geography deals mainly with principles which need explanation and illustration, and these can best be given orally. But after any branch of the subject has been fairly grasped by the pupils, it would be well to place in their hands a text-book in which they could find the information they have already learned, put in a concise and systematic form. On the other hand, descriptive geography deals largely with facts, and these might, in the first instance, be "got up" by the children, and would serve as a basis on which the teacher could enlarge from his greater store of knowledge. And here I would lay stress upon the importance of comparison; every fact learned should be referred, whenever possible to some object with which the pupil is acquainted. The explanation of the unknown by reference to the known is a valuable principle; and comparison has the further advantage of associating ideas, and thus aiding the memory. England will, in many respects, form a good standard of comparison; for apart from its being the country with which we are best acquainted, it has some special advantages. The number 50 plays a striking part in its geography. Its area, exclusive of Wales, is 50,000 square miles, and this will be found a convenient unit in estimating the size of other countries; the parallel of 50° north just touches the south coast of Cornwall; the isotherm of a 50° passes through Dublin and London, and may be taken as the average temperature of the British Islands.

It will be found useful, also, occasionally to give special oral lessons on passing events, such as the discoveries of Cameron, the voyage of the *Challenger*, and the recent Arctic Expedition. Such lessons give a reality to the work done in school, and link it with the affairs of practical life; beside they arouse the interest of children and cause them to enter into their ordinary geographical studies with greater zest. And, if you once get your class to feel an interest in their work, it is wonderful how rapid is the progress.

*Text Books.*

It is generally admitted that there has been a great improvement in text-books of all kinds during the last twenty years. Still they are far from being perfect; and, in geographical text-books especially, I am afraid we crowd in too many facts, and do not always make a judicious selection of them. It is true, that with school children, as a rule, memory is the strongest faculty, and there is no great harm in giving it plenty of exercice. But we should take care that the facts which we ask them to learn are suitable, and not such as they will be sure to forget as soon as they leave school. We should impart to them such knowledge as they can assimilate. Their mental appetite is, indeed, vigorous, but we should not, when they look to us for bread, give them a stone.

Next to memory, perhaps the imagination is the most strongly developed faculty in a child; but this fact is generally overlooked. Our text-books are too often crowded with dry, uninteresting lists of facts and names, and seldom with any attempt at description. Of course, a text-book cannot admit of description to any considerable extent, but something may be done. In treating of the surface of a country, for example, instead of giving a number of isolated facts respecting the heights of the mountains, and extent of the plains, we might *describe* the surface, and so endeavour to place before the mind of the reader the appearance which the country actually presents. Again, with respect to towns and other places, we can seldom give a long description, but we may very often link the name with some striking event or celebrated person. Mr. Quick, in his valuable work on *Educational Reformers*, remarks how popular with boys are books of travel; "but," he goes on to say, "as boys are engrossed with the adventures, and never trouble themselves about the map, they often remember the incidents without knowing where they happened." Now it is important to remember this, and it is one reason why we should seek to associate the names of places

with incidents of travel, or events in history. The allusion, however brief, may bring a flood of recollection to the boy's mind, and his desultory reading becomes definite and useful. Or again, sometimes the situation of a place may be described very briefly, and yet quite definite enough to satisfy the imagination. Thus Barmouth, on the Welsh coast, has been described as "a mimic Gibraltar on a mimic Mediterranean;" and it has been said that "Milan stands amidst a sea of green trees, as Venice does amidst a sea of green waters."

*Use of the Black Board.*

A teacher ought never to give a lesson in geography without making use of the black board. Where you are dealing with names and places with which your pupils are but imperfectly acquainted, its use is obvious; you can write down the names, and can draw a sketch-map, rough though it be, of the locality you are describing. But even in ordinary lessons it will be found most useful. If you are examining a class on work which they have prepared, you may sketch a rude outline of the country on the board, and ask your pupils to name the different parts of the coast upon which you lay your finger. You may draw a straight line for the mountains, a wavy line for the rivers, and put a dot or a cross for a town; and in this way may fill in the map as rapidly as you put your questions, and the interest of the class is thus kept alive. In lessons on physical geography, the black board is indispensable. The formation of glaciers, the direction of winds and currents, the courses of rivers, the development of a coral island, the cone of a volcano, all these may be roughly illustrated on the black board, and you will thus make a deeper impression upon the minds of your pupils than by any mere description, however clear.

Carl Ritter, whom we may style the prince of geographical lecturers, was constant in his use of the black board, and he also sought to link the subject of his lectures with passing events. "With almost womanly tact," we are told, "he seized upon those features which present circumstances made especially interesting; and out of the immense stores of his erudition he culled just what he could use with the greatest profit. He illustrated his theme with occasional maps and diagrams; but much more through the medium of the black board, in the use of which he was a master."

*Maps and Map-drawing.*

Atlases are now so cheap, that they are within the reach of children attending even our elementary schools, and they have superseded, in great measure, the use of wall maps. These serve to adorn the walls of the school-room, and perhaps, through constantly seeing them, the eye becomes familiarised with the forms of countries and continents; but they are now of little use in class teaching. On the other hand, atlases are indispensable. In getting up their work, children should be taught to make constant reference to the map; and in oral lessons, the pupils should find out in their atlases, if possible, every place which the teacher mentions. This gives them something to do, keeps up their attention, and familiarises them with the positions of places.

Map-drawing should form an essential part of all instruction in geography. Children find it an interesting exercise, and nothing is better adapted for fixing on the memory the names and situations of places. A map drawn from a copy should be required every week, and marks night be given for neatness and accuracy. It will be found necessary to caution the beginner against crowding in too many names, and he should be taught to make a selection of the more important ones. Filling up blank maps is a good exercise, but it is better to let the pupils draw the whole map themselves. Occasionally, after some little time has been given for preparation, they should be asked to draw from memory; and it should never be considered that they know the geography of any particular country until they can draw from memory a tolerable map of it.

*Conclusion.*

In drawing my remarks to a conclusion, I cannot help fearing that you may have found my observations trite and wearisome. I lay no claim to originality in my views, and have sought to make my remarks practical, rather than sensational. I have endeavoured to point out the importance of the subject, and its practical bearing upon the affairs of every-day life. I have tried to show also how geography may be made interesting to children, and be, at the same time, an instrument of intellectual training; that it need not be merely an exercise of the memory, but that, when properly taught, it will stimulate the imagination, and improve the reasoning powers.—*The Educational Times.*

---

## The True Value of a College Education.

By E. O. HAVEN, LL. D., Chancellor of Syracuse University, New York.

A college education seems to be intrinsically valuable. Only about one man in three hundred in America obtains it; but this small proportion embraces at least a full half of the men high in office and influence. Is this an accident? Is reasoning based on this premise, an illustration of *non causa pro causa?* Herbertt Spencer thinks it sophistry to assume that marriage has any effect on longevity, simply because statistics would indicate such a fact, for men who have the elements of longevity are the more likely to marry. Is it in this way true that the larger portion of men who will command success, will also find their way to college? Are both effects of one cause, and not one in any degree the cause of the other?

We cannot resist the induction, based on careful observation, that a thorough course of study and discipline, such as is best represented in all civilized nations by a university course of study, is of invaluable advantage to all who rightly improve it. A certain percentage of students do indeed sacrifice themselves to tobacco and strong drink and indolence, but no equal number of young men, selected on any other common basis, presents so large a proportion of successful men.

From what does this advantage proceed? Is it from the Latin and Greek, which consume from three to four years of study? Or from the mathematics, which consume a year more? Or from the mixture of natural science, history, philology, mental and moral philosophy, political economy, essay writing, and declamation of selected and original composition, which consume the rest of the seven years devoted to study? Or is it in the college politics, the sports, the friction of college life, that this potency lies?

There is a question here well worth the trouble of a careful answer. Our conviction is that the value of university life consists chiefly in the happy opportunity which college students, almost alone in our country, enjoy, of spending about seven years after the brain has become strong, and the *exuviæ* of childhood are outgrown in any kind of preparative and meditative discipline.

A normal human life may be divided into ten heptades of years, rather than into Shakespeare's seven ages of man. Of course, in practice, the boundaries between these heptades are somewhat elastic. The first heptade is infancy, during which education should look principally at the maintenance of physical health, and the correct germination of mental and moral energies. The second seven years is mostly of the same character, requiring a training of the muscles, that they may be flexible and controlable, also of the senses and of the faculties of perception. The doctrine thot more is learned in these years than in the same time thereafter is often repeated parrot-like, without thought, but is not true. But now comes the third heptade, from fourteen to twenty-one, the most potent of all in its permanent effect on the development and destiny of the man, especially when the appropriate work of the preceding years has to some good extent been accomplished. This is the age of the human being when his theory of life, consciously or unconsciously, is formed. The courage of thousands is here broken by submission to the bondage of excessive toil, relieved only by fits of animal indulgence, and the use of intoxicants or narcotics, instead of voluntarily and joyously, with good hope of success, betaking themselves to the task of life. During this heptade, the great mass of criminals enlist in that numerous and terrible army, so largely quartered in our prisons, but which, nevertheless, always has its greater numbers "in the field." A ribald song has it:

"The drunkards will never be gone,
I'll tell you the reason why:
The new ones, they will come on
As fast as the old ones die."

This is the heptade which, if a political or economical millenium, such as our social science theorists dream of, could come, would not be devoted to exhaustive toil, but to an apprenticeship to semi-labor and semi-study, to periods of heroic effort, intermitted by repose, and all under the tutorship of the more experienced. In other words, were society perfect, all young people would have something to take the place of a university education.

Now, by the law of development, what all need has come to pass for the most highly favored. There is really no magical potency in Latin and Greek. Sanscrit and Hebrew, or German, and the dialects of the North American Indians, would produce the same results,—not altogether, but in some respects better, in others inferior. Mathematics must, to a certain extent, be understood, and nothing can take their place, and the intrinsic value of all the rest of the American college courses of study will be universally conceded.

Still, the greatest value of all education, up to the fourth heptade, in the normal man, is subjective. It is the influence on the student, not in the information acquired. Neither men nor nations can lay up an indefinite stock of capital. What both want is power to create capital. Let Chicago or Boston burn, but let them be rebuilt better in a single year! Let France be mulcted enough to exhaust all the uncivilized portions of the earth, and let her pay the amount, and in a twelvemonth be more prosperous than ever! This is civilization.

Prof. Michel Chevalier, in the opening address of a course in Political Economy in the College of France, delivered Dec. 5, 1875, says that "nineteen out of twenty who have learned Latin, (*) and even taken a college degree, have completely forgotten that tongue a few years after having quit the study of it." He afterwards adds: "And what must we conclude from all this? That the youth of our day only learn Latin by absolute constraint; that they bring nothing but lukewarmness, and even indifference to the study of it, and entering into manhood, lose without regret an acquisition which cost them seven or eight years of labor to attain. And this, in itself, plainly demonstrates that those years could have been better employed."

Now the French professor is guilty of the prevalent fault of hyperbole, which scientific men, above all others, should avoid. First, neither in France, nor in America, nor anywhere else, do students spend seven or eight years in studying Latin, or even Latin and Greek together. Other studies are pursued at the same time, and there are vacations, and it would be more truthful to say "three or four years," though that is often beyond the fact. Second, it is not correct to say "nineteen out of twenty who, without a blow on the head, or something equivalent, had *completely forgotten* all their Latin, if they ever really studied it, would be an exceptional phenomenon demanding careful examination. The students do not completely forget their past acquisitions, but simply lose available and immediate control of them. The seemingly forgotton information can be revived with far less labor than it took originally to acquire it. Besides, the power gained by the act of acquiring, remains. Third, if college graduates do, to some extent, forget their Latin, so they would to the same extent forget anything and everything they might study at the period of life referred to.

I have seen the experiment tried on a large scale, and am thoroughly convinced from facts, that if twenty young men, beginning at the age of ten, should devote themselves to the study of natural science, history, and what is called useful and practical knowledge, and continue the study till the age of twenty, and twenty more young men should begin at the same age to prepare for college and pursue the regular course of study, this latter twenty would actually be the better scholars in natural science, history, and general knowledge after ten years' work, besides all their extra knowledge of Latin and Greek. This seems at first unreasonable; but the fact is that the preliminary study of abstract languages is but getting the tools ready for efficient work.

The life of every strong and active man is a constant getting and forgetting. It would be an intolerable burden to carry in the active memory the defunct hypotheses of natural science which seemed to be true a few years ago, or any other material that has answered its purpose and been dismissed. Twenty years hence we shall need to have cast off some skins and shells that now seem bright and beautiful. Themistocles was right in his response to one who offered by some art of mnemonics, to teach him how to remember everything:—"O that some one would teach me the art of forgetting!" The knowledge and thought last acquired are the most valuable to every vigorous man. Colleges are training schools, not savings banks. And this is preëminently true of all our public schools.

We do not deny that private tutorship will often be a good substitute for school training. This is seen in such men as Buckle, John Stuart Mill, and Herbert Spencer. Still, in almost all instances, we can detect in such a man a narrowness, often not easily defined, but unquestionable. Had Buckle and Mill been subjected to school discipline, and enjoyed college study and excitement, the former would probably have lost his sentimentality and egotism, and the latter might have reached the deeper fountains of passion earlier in life, and also a profounder faith and philosophy than are usually accorded to men who never have a childhood, and whose power of analysis always keeps ahead of their experience. John Stuart

(*) Greek is not a prerequisite to a degree in France.

Mill, so far ar we can judge from his autobiography, seems never to have had a mother, and his education during the whole of the first heptades, was unnoticed.

The world will never outgrow universities. America has not too many colleges. It is not indicative of breadth, or of originality, to be harping on the one note, that American colleges ought to be concentrated into a few universities. This would greatly diminish the number of students. Few who proclaim that doctrine give any evidence of having thoroughly studied the subject. On the law of supply and demand, some of them will improve, some modify their character, some disappear. Not coercive or restraining, but encouraging efforts are needed, and rapidly; whatever be the demand, it will be supplied.

If the principle which we have laid down is correct, all can see the bond of connection between colleges and our public schools of every grade. They are all engaged largely in one work,—to make the most of manhood. Not simply to pile up an objective mass of information, but to give to their pupils power to create and power to employ.—(*New-England Journal of Education.*)

---

### Terrestrial Magnetism

If a magnetized steel needle is suspended by its centre of gravity, or placed upon a point, it will take a determinate direction towards a point of the horizon which is very nearly north and south. The force which produces this direction is called terrestrial magnetism. It is one of the modes of manifestation of the natural sources of electricity, since magnetism itself is only a particular form of electricity. The magnetic force of our globe is manifested at its surface by three classes of phenomena, namely, the declination of the magnetized needle, its inclination, and the intensity with which the force acts. The declination is the angle that is formed with the direction of the meridian of the place by the direction of the magnetized needle placed upon a vertical pivot. The inclination is the angle that is formed with the horizon in the magnetic meridian by the direction of a magnetized needle sustained by its centre of gravity, around which it is able to turn freely in a vertical plane. These three elements, declination, inclination, and intensity, not only vary from one place to another, but in the same place with time. They also manifest irregular and accidental variations, designated under the name of disturbances, the existence of which is connected with the presence of some natural phenomena, such, in particular, as that of the aurora borealis. It is well established that the forces which act upon the magnetized needle emanate directly from the terrestrial globe, and we are naturally led to regard the earth as a great magnet, and as having one pole situated to the north of us, attracting the north pole of a needle in that direction.

If we suspend a magnetic needle by its centre of gravity, so that it may move freely either in a vertical or horizontal plane, the extremity which turns towards the north will incline below the horizon, making at New York an angle with the horizon of about 72 degrees. Hence we conclude that, if the earth be a great magnet, giving direction to the needle, its pole must be situated, not on the north horizon, but almost vertically beneath us.

If the earth be really a magnet, the magnetism of soft iron ought to be decomposed by it, in the same manner as is done by a bar magnet, and such is the fact. If a bar of soft iron is held in the direction which a magnetic needle assumes when freely suspended, its lower end immediately becomes a north pole, and its upper end a south pole, as is shown by bringing a small magnetic needle near each end of the bar. On inverting the bar, it will be found that its poles have immediately changed, the lower end being again a north pole, and the upper one a south pole. If the bar is held horizontally, pointing east and west, no such effect takes place.

A similar but slightly diminished effect is produced on a bar of iron suspended in a vertical position; and iron rods which have remained long in a vertical position frequently acquire permanent magnetism.

When a bar of iron is rendered magnetic the influence of terrestrial magnetism, as a stroke of a hammer will sometimes fix the magnetism, and the poles will not be reversed when the bar is inverted. But if several blows with the hammer be struck when in the inverted position, its magnetism may be destroyed or its poles be reversed.

The action exerted by the earth upon a magnetic needle is simply to give direction to the needle, for the weight of the needle is not increased by its magnetism. Hence it is concluded that the attraction of the earth for one pole of the needle is exactly equal to its repulsion for the other. If a magnetic needle be placed upon a cork floating on water, it will soon adjust itself to the magnetic meridian; but it has no tendency to travel either towards the north or south.

Although a magnetic needle, when fully suspended, generally points nearly north and south, it is found in almost all parts of the world that the north pole of the needle deviates a few degrees from the astronomical meridian. This deviation is called the magnetic declination.

The declination is said to be east or west according as the north pole of the needle deviates to the east or west of the true meridian. The declination of the needle is very different at different places on the earth's surface. There are places where the declination is 10, 20, 30, and 90 degrees west; and there are places where the declination is as much to the east. At most places on the earth's surface, the dipping needle will not rest in a horizontal line, one pole pointing downwards and the other upward. This dip varies at different places from 0 to 90 degrees, and observations to determine its amount have been made in almost every part of the world. In order to represent all these observations conveniently upon a chart, a line is drawn connecting all those places where the dip is the same. A line connecting all those places where the needle rests horizontally is called the magnetic equator. This line exhibits numerous sinuosities in its course around the globe, but does not depart much from a great circle. It crosses the terrestrial equator near the western coast of Africa, attains its greatest southern latitude in south America, where it is 15 degrees south of the geographical equator, crosses the equator again near the meridian of New Zealand, and attains a north latitude of 12 degrees near the southern part of Hindostan.

As we travel northward from the magnetic equator, the north end of the needle inclines downward, and the dip continually increases at the rate of about 1 degree for 1 degree of latitude, until we reach the north magnetic pole, where the needle stands vertically, in latitude 70° 5, N., longitude 95° 45, W.

As we travel southward from the magnetic equator, the south end of the needle inclines downward, and this dip continually increases until we reach the south magnetic pole.

That terrestrial magnetism is not produced, in any important degree, by magnetic forces external to the earth is probable, because, if there were an external cause for magnetism, it is scarcely conceivable that some large part of it would not act in places parallel to the

geographical equator: and if so, its effects at any one place would undergo very great changes in the earth's diurnal revolution, every part of the earth being presented, in the course of the day in different aspects toward forces so acting. Now, the fact is that the diurnal changes are very small, only about one-five-hundredth part of the whole horizontal force. It would seem certain, therefore, that external bodies or spaces do not produce any sensible part of the magnetism in the planes to which the earth's axis is normal.

That terrestrial magnetism does not reside, in any important degree, in the earth's surface, is probable, because of the non-magnetic property of the materials of which the earth's surface is composed, and upon the general absence of any perceptible change in magnetism depending on the change of soil.

Humboldt adopted the idea that the principal phenomena of terrestrial magnetism could be explained by the action of a powerful magnet, of limited dimensions, near the centre of the earth; but it was found that the theory upon which this idea depended, though well representing the broad facts of terrestrial magnetism, failed in accuracy when applied to many special cases.

Hansteen suggested the theory of two large magnets within the earth, but this failed to meet the facts of observation.

Gauss attempted to explain the cause of terrestrial magnetism by supposing that magnets are distributed irregularly through the earth, and the results of observations generally accord with the necessities of his theory.

Regarding the earth as a heterogeneous compound of different substances, which may possess in some degree the properties of different metals, and conceiving (as is the opinion of many physicists) that there is in the interior a great store of caloric, which may heat the points of contact, some of them steadily and some by occasional bursts of flame, it seems within the range of possibility that such a combination, of heat with dissimilar substances, may be the cause of terrestrial magnetism. But there is no evidence of this beyond mere conjecture. It is worthy of remark that the isothermal lines on the earth's surface bear a striking ressemblance to the lines of equal magnetic intensity. On the whole, we must express the opinion that the general cause of the earth's magnetism still remains one of the mysteries of cosmical physics.—*Scientific American.*

---

### Studies that bear directly upon Industry.

The educated workman is always and everywhere the best workman. This is true even if the education he has received does not bear directly upon the industry in which he is engaged. Intelligence, natural or acquired, counts even in digging ditches. If the education of the head holds no direct relation to the employment of the hands, it may tend to make the laborer discontented; yet it will enable him, in sundry respects, to do his work easier and better.

But while some studies have only an indirect bearing upon industry others have a bearing which is direct and decided. For the workman, considered as a workman, the latter are much the more serviceable. They not only enable him to do his work much easier and better, but, by giving it an intellectual element, they cause him to take greater pride and delight in it. He who works like a machine, without thought, may work steadily from one year's end to the other; but it will be, if not with disgust, at least with stolid indifference. He will take no genuine pride and delight in the labor of his hands, as one so frequently does who works as well with his mind as with his hands, discovering somewhat of the Supreme Intelligence even in the rudest labor.

Just here, we come upon an important educational principle for guidance in the management of public schools. It is this: Other things being equal, those workmen who best understand the rationale of what they are doing, not only can do the most and the best work, but will take the most pride and delight in it. This can be verified by an inspection of those engaged in any pursuit. So there is no danger of educating workmen to an undue dislike of manual labor, provided the education bears *directly* upon the work to be done.

That workmen should take pride and delight in their work is deemed a matter of so great importance by the British government, that it sent, in 1870, a circular letter to its consular agents throughout the world, requesting them to make investigations bearing upon this matter among all classes of workmen. This the consular agents did, and they found that instruction in the underlying principles tended to increase the pride and delight taken by workmen in their work. A great and fertile truth.

Now, chemistry is one of the studies that has a direct and decided bearing upon many human employments. It teaches lessons of great value to farmers, gardeners, cooks, dyers, painters, potters, metal-workers, apothecaries, soap-makers, bleachers, etc., etc. It is as once the most practical and the most wonderful of all the natural sciences. There is no person who would not, at times, find a knowledge of chemistry of direct practical use. Then it introduces the learner into the very workshop of nature, acquainting him with her tools and her processes. It brings him face to face with the facts of the material world, and teaches him how to interrogate nature by experiments; and, in so doing, trains him to observe, to weigh, and to judge, while it gradually brings him to the condition which enables him fully to realize and believe things he cannot see with the bodily eye.

Botany and Zoology—the former treating of still life, the latter of animal life—are studies that make direct and valuable contributions to several important human pursuits. Their lesson can be practically applied by all persons engaged in producing alimentary products, and the staples used for clothing. It is to botany that decorative art goes for most of its forms and principles, and so a knowledge of botany is of service to nearly all kinds of manufactures. There is indeed, no one who would not, at times, have occasion to make practical use of the lessons taught by botany and zoology. Then they are studies better adapted than almost any other to the early years of school life. They furnish the best of object lessons for training the faculties of perception and comparison, while no other studies are so well calculated to teach the young learner to classify and to tabulate.

There is also much embraced in physics, "Natural Philosophy," that has direct bearing upon many kinds of labor. Then a knowledge of color is of universal service, even if regarded only from the utilitariam point of view. What shall we say of geometry, when studied for its practical applications as well as for mental discipline? That it is of direct, utilitaria service to every one, but is simply indispensable in all the mechanic arts. If properly treated, it may be made a suitable study for all ages, training the perceptive faculties, the imagination, and the reason. Yet not one person in twenty now receives any systematical instruction in this universally serviceable branch of mathematics. It is arithmetic, arithmetic, and arithmetic.

Finally, there is drawing, and it stands second to no study when we consider its direct influence upon indus-

try. The able French Commission say of it, in their report in 1865, after an extended examination of art and technical (industrial) education throughout France and Europe: "Among all the branches of instruction, which in different degrees, from the highest to the lowest grade, can contribute to the technical education of either sex, drawing, in all its forms and applications, has been almost unanimously regarded as the one which it is *most important to make common*." Then the commission advise the government that "Drawing, with all its applications to the industrial arts, should be considered as the *principal* means to be employed in technical instruction." We are glad to observe that the same view is rapidly gaining ground in this country. Drawing is also to be greatly esteemed for the mental discipline it confers, since it trains to accurate vision, exercises the inventive powers and the imagination, and gives a taste for the beautiful. As a discipline, or as an industrial instrument, no other study can take the place of drawing. We have now indicated the different studies, having a direct and decided bearing on the different industries, which must receive, universally, the same consideration that is given to arithmetic and geography, before the public schools can justly claim to meet the present wants of the great body of the people. They are the studies that will give to public instruction the industrial elements so much needed to-day; for the deal with the principles, scientific and artistic, which underlie all industrial pursuits, and impart much of that discipline of the faculties, so essential to one's success in these pursuits. Every person of average capacity who attends school six or eight months a year, from six to sixteen, should be well-grounded in the elements of all these studies; and we believe he can be so grounded without the slightest detriment to his training in other directions.—*N. E. Journal of Education.*

---

### A Plea for pure Air.

GEO. G. GROFF, A. M.

A people, to be truly great and good, should breathe pure air and drink crystal water, for they give to men strong bodies and clear minds, with true, noble and high aspirations; while impure air and turbid water lower the vitality of the body, and degrade the thoughts and hopes of the mind. It is said to be a fact that American churches, schools and homes are poorly ventilated. If this be true, and we know it to be partially so, then there is need of reform. Let us, for a moment, consider the importance of ventilation and pure air.

What do we breathe? A gas called air, composed of two elementary bodies, oxygen and hydrogen, mixed together in the proportion of one-fifth oxygen to four-fifths of nitrogen. This is a mixture, and not a compound, and surrounds the earth to a height of from fifty to five hundred miles, being very rare above two or three miles.

The oxygen is the life-sustainer of men and animals, but cannot be taken in a pure state any length of time, as it consumes the tissues too rapidly; hence in nature it is diluted with the gas nitrogen, an inert substance which cannot support life, though it is not poisonous when breathed.

Why do we breathe? Because we find it an absolute necessity. It is a law of our being, involuntarily performed, and which we cannot resist.

By what means do we breathe? Various muscles connected with the respiratory apparatus act upon the walls of the chest in such a way as to enlarge its cavity, and a partial vacuum being produced, the external air rushes in; then, the muscles relaxing, the walls of the chest relapse, and the air is again expelled.

How often do we breathe? About twenty times a minute; 1,200 times an hour; 16,800 a day, and about 9,000,000 times a year. Children newly-born breathe forty-four times per minute; at five years, twenty-six times per minute.

How much do we breathe? About thirty cubic inches at each respiration, 500 cubic feet in twenty-four hours, and 700,000 gallons in a year.

For what purpose do we breathe? That the pure oxygen of the air may enter our lungs, and there meet and remove the impurities brought to that point by the blood.

What changes occur in the air breathed? It loses about five per cent of its oxygen, which enters into the composition of the body, the gain from this source amounting in twenty-four hours to about one and one-half pounds. The loss of oxygen to the air expired is compensated for by a gain of about five per cent. of a heavy poisonous gas, called carbonic acid gas, the total amount of which given off from the lungs in twenty-four hours amounts to about one and three-quarter pounds. In addition to the carbonic acid, the expired air bears with it vapor of water and effete animal matters. The carbonic acid can be detected by passing the expired air through lime water, when a white precipitate of carbonate of lime will be formed, and if the water be left remaining in a warm room a few hours, it will become putrid from the decomposing animal matters taken off by the water from the air passed through it. It is this decomposing animal matter that causes the horribly offensive odor in ill-ventilated cars at night, and is also perceived in bed-chambers in the morning. It is even more poisonous than the carbonic acid gas.

The air normally contains about twenty-one per cent, of oxygen; when this amount is reduced below ten per cent., it will not support human life. If the amount of carbonic acid exceeds twenty per cent., it also destroys life. Hence for man's well-being be requires an exchange of air in his habitations.

What changes occur in the blood? The blood comes to the lungs from all parts of the body, of a dark venous color, bearing carbonic acid in solution and effete animal matters. They are here set free, and the oxygen from the exterior entering the blood, changes its dark color to a bright scarlet, which goes hence, coursing through the system, giving life and strength.

What harm from breathing impure air? If the air contains too much carbonic acid, the blood cannot be cleansed and oxygenized, and the person becomes dull and stupid; in fact, is slowly poisoned. By breathing air contaminated by effete animal matters, fevers of the most dangerous type are likely to result.

What is the effect of breathing dry and heated air? If the air is to dry, it has a tendency to remove an excess of moisture from the blood through the lungs, and thus cause an unnatural dryness of the tissues, which may result in serious organic diseases. Heated air may produce similar results. Dry and heated air very frequently causes headaches.

What is the structure of the lung surface when the blood and air meet? The trachea or windpipe divides into two branches, one of which goes to each lung, and in the lung divides and subdivides into an immense number of subdivisions. The lungs are composed of lobules, and each lobule is composed of exceedingly minute cells or vesicles, called pulmonary cells. The walls of these cells are about one five-thousandth of an inch thick, and upon these walls are spread out the minute ramifications of the blood-vessels. The blood

and oxigen do not meet, but communications takes place through these very thin membranes, the carbonic acid watery vapor passing out and the oxygen passing in. The surface presented by these little cells is in the aggregate very great. It is estimated by different physiologists at from 132 square feet to 2642 square feet, or about eight times the surface of the body by others.

Pure country air countains about four parts of carbonic acid in 10,000. The analysis of the air in three school-rooms showed eighteen ten-thousandths, twenty-three ten-thousandths and thirty-seven ten thousandths of carbonic acid respectively. The children in those rooms certainly could not make a very bright appearance. An analysis of the air in several churches gave on a average thirty-six ten-thousandths of carbonic acid. Now this being a heavy gas, and inclined to settle to the floor, have we not an explanation of the phenomena of the children first falling to sleep during the service, then the older members of the congregation; while the preacher, high up in the pulpit, is all the time bright and active, being above the injurious gas?

Let us quote a few historical events to show the effects of impure air. In 1756, in Calcutta, India, 143 persons, English residents, were by the natives thrown into a room twenty feet square, and the door closed. The room contained but two small windows; they were compelled to remain there all night. In the morning 120 were dead; but 23 survived that fearful night, and some of those afterwards died of low fevers. This is known in history as the "Black Hole of Calcutta." Seven years ago, the ship Londonderry met a storm at sea. The passengers became alarmed, and, interfering with the management of the ship, were shut in the cabin. In a few hours one hundred were dead; there was scarcely a survivor; and all because some one did not know, or remember, that men and women require fresh air. In Dublin Hospital, before ventilation was introduced, 3944 persons died in four years; after the introduction of ventilation, the mortality was reduced to less than one-tenth. In the same city, in the lying in hospital, before ventilation was introduced, one fifteenth of all patients admitted died; afterwards, one-eightieth. In Glasgow barracks there were fifty-eight cases of fever in two months; after ventilation was introduced, but four cases occurred in eight years. These instances might be almost indefinitely increased, but enough have been mentioned to show that ventilation is a necessity.

How shall we effectively ventilate our homes, churches and schools? Carbonic acid is a heavy gas, therefore it will sink to the floor; the effete animal matter will sink; and it is claimed that we must remove them by flues near the floor. This has been the theory for some time, but in practice it is found imperfect. Others say, these impurities being heated as they leave the lungs, will arise, and hence must be removed near the ceiling; but this in practice also fails of perfect ventilation. The fact is, a portion must be removed at the floor and a portion near the top of the room. Care must always be taken to place the ventilating flues near the chimney, that they may be warmed in winter, else no circulation can be established in them, as experience has amply shown. A room in an ordinary dwelling is very well ventilated by occasionally opening a door, and by this means the air from both the top and bottom of the room is changed.

Shall we ventilate our sleeping apartments by lowering the windows and letting in the cold night air? Night air is pure, and cannot injure a person on that account; but when we are in bed and closely wrapped up, the body is often very warm, and then the cold external air introduced into the delicate lung texture may cause serious injury and disease; moreover, windows being lowered, drafts are liable to ensue, and colds and catarrhs result; and during sleep the vitality of the body being lowered, we do not breathe so frequently, and much less carbonic acid is eliminated, and hence we need a less amount of fresh air. A person can sleep uninjured in any ordinary bed-room, even though there is no provision for ventilation during the night; but the air should be thoroughly changed for several hours during the daytime, and if possible, a plentiful supply should be admitted to the room.

School-rooms can be ventilated during intermissions by raising several of the windows and opening the door. Teachers will find this plan to pay most liberally. The children will be brighter, the teacher will be more cheerful and in better mode for work, and altogether the day will pass with fewer of the accustomed school-room jars and troubles. Not only should the school-room be furnished with fresh and pure air, but the teacher should earnestly try to impress upon the students the importance of proper ventilation as one of the most vital hygienic measures, and thus prepare them for lives more useful and happy than they could otherwise be.

And what can we say of ill-ventilated churches? They are certainly monuments of men's stupidity and folly, and stand in direct antagonism to the laws of our Creator. He gave us air, pure and wholesome, to breathe. How, then, can it be possible to lift up the mind in worship and adoration in an atmosphere foul and polluted? Moreover, in crowded assemblies there may be considerable danger of the air becoming so poisonous as to engender organic disease.

The atmosphere at all times maintains a constant composition. By what forces is this accomplished? By the animal and vegetable kingdoms, which mutually counterbalance each the other. The animal absorbs oxygen from the air, and expires carbonic acid; the plant absorbs the carbonic acid and sets free oxygen for the use of the animal; and the process continues, in exact balance, one of the most wondrous provisions in the world for man's happiness.—*Pensylvania School Journal.*

Lewisburg University Pa.

---

### A trip Heavenward

Reader, did you ever try to comprehend the magnitude of what we familiarly call the "Solar System," and the magnificent scale on which it has been constructed? Perhaps by a homely illustration you may be impressed with the vast meaning of the terms that are necessarily employed in speaking of the size or the distance of these heavenly bodies. Now in order to do this I propose to you a flying visit to these worlds. We will charter a railway train and give it a speed of forty miles an hour and twenty-four hours a day. This will give us nine hundred and sixty miles a day. We will start the train at the Creation as rendered by Moses, and put it in charge of the first human pair fresh from the hands of the Almighty, and start for the worlds above. Of course it will be most appropriate and natural that our train under the guidance of the newly-wedded pair should first make for the moon, and so moonward we fly and reach that pale cold world in two hundred and forty days. The ride has thus far been without jar or accident, although perhaps the longest honeymoon trip upon record of which so much can be said. Leaving the moon, we strike out boldly for the sun, a distance of ninety-two millions of miles, which we reach in three hundred

and sixteen years and come into its blazing atmosphere just as Cainan was born to Enos in his ninetieth year.

The sun we find to be a seething world of fire whose flames shoot up from eighty to one hundred thousand miles. We can not land upon this fiery orb and so we make its circuit, which we do in eight years. (Remember it would take twenty-four days to go round our great Earth.) Now we are at the centre of the grand system of worlds and we are to take the outward-bound stretch and pay our compliments to the different members on our track. In one hundred and twenty years we reach Mercury, at a distance of thirty-seven millions of miles from the sun, having seen nothing of little Vulcan, although we kept a sharp lookout for it. We reach Mercury about the time of the birth of Jared, the father of Enoch. Finding but little to interest us here we make no stop, but fly on toward the beautiful Venus, a distance of thirty-two millions, which we make in one hundred years, and now Enoch is a father and Methuselah is a boy of thirty-five. Leaving Venus, which we first mistook for our Earth, so much did it it resemble it, we go on again, taking the Earth in our way, which we reach in eighty-six years. In all this time counting six hundred and forty-two years, and passing through a distance of one hundred and eighty-four millions of miles, Adam has guided the train.

Now we start on the outward trip and roll on one hundred and sixty-six years and reach the planet Mars, a distance of fifty millions of miles, and then going one hundred and nine millions more, taking us three hundred and sixty three years, we strike the first "empty place," the first gap, which at the beginning of this century was as far as was known a planetery blank. Four little planets, or planetoids, Ceres, Pallas, Juno and Vesta, were in the first seven years of this century discovered in this empty place. No others were found until 1845, and now more than one hundred and fifty have been found making their harmonious march through this belt, more than twenty of which revealed themselves to the sharp seeing eye of Professor Christian Peters of Hamilton College. Our train arrives here two hundred and thirty-one years after Adam's death. Noah is now eighty-six years old and shall guide the train as it goes on for eight hundred and six years, making a distance of two hundred and forty-two millions of miles, when it arrives at Jupiter, whose sky is brightened by four moons as large and beautiful as ours. We reach this magnificent world, which is some thirteen hundred times as large as our Earth, about the time of the birth of Abraham.

Now a representative Jew shall conduct the train, and we go on for thirteen hundred and seventy years, passing over four hundred and thirteen millions of space, and reach Saturn whose sky is not only full of moons but most beautifully arched with three stupendous bows. We arrive here just as the Jews are carried captive to Babylon and as the Romans and Albans by the decree of the Horatii and the Curatii have fixed the site of the Eternal City, Now who shall guide our train? He must be a representative of all nations and all times, for we have two tremendous journeys to make, and kingdoms and dynasties will begin and end, and that, too, many times before we reach the world's extreme to which we are bound,—thus manned we start once more, and fly on for centuries and decades of centuries, even for three thousand and sixty years, making a distance of nine hundred and nineteen millions, and reach Uranus. But where are we in the history of our race as we touch this distant orb? We have passed all ancient and modern history, and have come to the last moment of recorded time, and yet want five hundred and twenty years to enable us to reach the planet.

Now suppose having lived out the human race we begin again, with Adam in charge, who shall finish out these five hundred and twenty years and land us safely upon Uranus. Adam is just now in his prime, and shall start us on the last great stage of this almost limitless journey. We go on for three thousand four hundred and forty-six years and through one thousand and thirty-four millions of miles of space and come to the outer edge of planetary worlds and behold Neptune, whose size, motion, place, distance and time of revolution were all determined through mathematical tables in a library in Paris, before anybody had caught sight of its bright disk through the "optic glass." We reach this limiting world just as the Roman world is giving way to kingly power, when

> "Even at the base of Pompey's statue,
> Which all the while ran blood, great Cæsar fell."

Thus it has taken us to pass from the sun, the centre of the system, to the outmost orb, a distance of two thousand, eight hundred millions of miles, a time equal to one and two-thirds the life-time of our globe. And yet this distance, great and incomprehensible as it is, is but an infinitesimal unit, when compared with the distance beyond. It represents the magnitude of only our little system, which is but one among the thousands, whose central orbs we see glittering in the clear sky above us.

Will you ride a little farther? Well, then hold your breath for a little, as we stretch out to Alpha Centauri, the star, nearest to us, whose distance has been determined. It will require seven thousand five hundred such journeys as that though the solar system to reach this orb, and its distance is two hundred and twenty-four thousand times our distance from the sun. And if we should visit the most remote of the stars, whose distances from us have been determined, it would take sixty thousand such journeys, and require six hundred millions of years. And were we on that orb now, and could we send a telegraphic message back to earth, with a velocity that brings us a message from China in two seconds, it would be three hundred and four years in making the distance, and even light itself, the swift messenger of the sun, which comes to us from that luminary in eight and one-quarter minutes, would be twenty-eight years in reaching us from that star, and if the star should be struck out of existence at this moment, its light would continue to stream down upon us for twenty-eight years. Hence when we look out upon the starry heavens, we see them not as they are in fact now, but as they were ten or twenty, or a hundred, or a thousand years ago.

But we have finished our trip, and will rest; and although it seems to us that we have made a bold push into space, let us realize that we have made no sensible approach to the infinite shore beyond.—*National Teachers' Monthly.*

NOAH Y. CLARKE.

Canandaigua Academy, N. Y.

---

## Some Pedagogic Errors.

(PATERNALLY DEDICATED TO YOUTHFUL TEACHERS.)

During a recent ramble among schools I jotted down in my note-book a few errors, as they seemed to me, which I detected in the work of certain teachers.

Believing these faults—I am almost inclined to term them radical defects,—to be more common among inexperienced instructors than we are willing to admit in these days of Centennial glorification, I venture to reproduce my criticims, with a few comments thereon, for more general comparison.

1st. "*Tha teacher talks too much.*" This is an especial temptation to an instructor who is well versed in the subject under consideration. Saturated with knowledge, he is like a wet sponge, needing only a touch to cause his information to drip out upon the class. In the recitation criticised as above, the teacher was intelligent, almost learned. His remarks were excellent and the pupils were interested, and perhaps instructed: but the time was so occupied that there was no opportunity for regular recitation work. No test was made of the pupils' preparation of the lesson, no searching questions were asked, no analysis of the subject was given. It was merely a delightful talk to a number of girls by a scholarly gentleman. It was not teaching. In a neighboring school I witnessed a similar recitation and while conversing with one of the pupils after class, he slyly remarked, "We always get Miss——, to talk about something when we haven't got our lesson." Now, the lecture system is beneficial only to advanced pupils, young men and women thirsting for knowledge, who have absorbed all their text-books contain, are eager to know what their professor can impart, and whose minds are trained to receive and retain information. (*)

With young pupils, mere beginners in study, ignorant of the methods of mental acquirement and assimilation, with no especial taste for work and no power of concentration, there must be class-drill and proofs of previous labor demanded. The recitation is for the benefit of the pupil, not the teacher. In general, it is mentally more profitable to tell a thought than to receive it. Under the talking system pursued in some schools, the teacher grows much faster than his pupils. He is actively employed all the time; While they are mere recipients, delighted sometimes, indeed, but not held to labor for what they wish to know. He acquires a choice of words, and learns to talk fluently and to tell what he knows; while they get neither experience in expression nor criticism on their use of language and their grammatical mistakes.

A little information may often be imparted to great advantage, it is true, but only to enliven the monotony of hard work and to act as a stimulant to fresh exertion. *The maximum of talking on the part of the pupil, and the minimum of talking on the part of the teacher is the perfection of a recitation.* In my own classes when topical recitation are fully established, I have always required the class to conduct the entire recitation from the blackboard diagrams, with only an occasional suggestion or remark during the progress of the work, and a general commentary at the close.

2d. "*The teacher makes no point.*" In the recitation I witnessed, there seemed no special goal to be reached, but the pupils were wandering aimlessly about, toiling to get over a certain number of pages of the book. When they finished, it was with an air of relief that another task was performed. On no cheek was there the glow of victory. No one seemed to feel that he had taken a steep, a definite, measured sted in the path of knowledge, and had gone up a little higher to a better outlook. Neither teacher nor pupil appeared to grasp the relations of that lesson to the one of the day before, and the one assigned for the succeeding day, whereby it became a link in the chain of the term's work, which, if dropped out by inattention or absence, would break the whole asunder.

Now, every lesson should have an object, else the children had better be out on the play-ground breathing fresh air, and developing their muscles. The class should assemble for a specified purpose: to master some difficulty clearly perceived beforehand, upon which they have worked during the time of preparation and are to report their success; to give clearer intelligence about what they have done; to get fresh facts; and to prepare for a new struggle and advance. They should know where they stand when they come to class, and whether they have conquered the point of the lesson; and when they have, it should be with a distinct idea of something they have gained or failed to gain. At the close of each lesson, the teacher should tell the class the object of the next day's work, give directions about doing it, and remove any insurmountable obstacles, thus preparing the way for intelligent, profitable and economical labor on the part of the class, and preventing the necessity of individual help, which is so annoying to the teacher and often so injurious to the pupil. If the teacher unfortunately uses a text-book which does not give an analysis of the lesson in bold paragraph headings, he should prepare such an outline and let the students classify the lesson. Many studies admit of a uniform analysis. Thus, in Chemistry I have used the following topical outline—Source, Preparation Properties, Use, Compounds; and in the Periods of Geology—Location, Kinds of Rocks, Fossils, Remarks. These titles answer as labeled pigeon-holes in which the pupil can sort off all the facts of the lesson, and, to *stretch* the figure, are like elastic bands, which will expand to receive all the knowledge one may gather in future life. They aid alike in learning, reciting and retaining a lesson, and are invaluable in all teaching and studying worth the name.

When a scholar thus looks over the advance lesson, finds the thick underbrush parted by a strong hand, so as to give him an unobstructed view to the end, detects its point, has its analysis clearly in is mind, and is warned of the dangerous places—he feels as if he half knew the lesson already, and sets about it with a light heart and an assurance of success. Such a course begets in him confidence, both in himself and in his teacher. With each lesson there is a consciousness of something done under the direction of a skillful guide. School work is reduced to a system; the pupil knows where he is, and how fast he is advancing; he is constantly reaching a result, and with the satisfaction of progress, the delight of acquisition, and the pleasure in employing his powers usefully, he finds a daily interest in his work.

3d. "*Pupils are kept in at recess and after school to study.*" This is literally a *crying* evil. It is a custom handed down to us from the past, and sanctioned by age; but teachers are perceiving its enormity, and are fast discarding the practice. It is both unnecessary and injurious. Scholars may be profitably directed to remain after school for the purpose of receiving suggestions, counsel, etc., from the teacher, but not to study, and *at recess*, NEVER! The object of an intermission is to preserve the health of the pupil. Nature demands this, and it is her right. No teacher should rob a child of legitimate exercise, It is a physical wrong. Moreover,

(*) It is a curious fact that while we are turning to the lecture-system from the over-exact text-book recitations of our fathers, the Germans, of whom we learned the new art, are beginning to perceive their mistake and considering the propriety of introducing recitation-drill even in their Universities. Strangely too, the privilege of attending the socalled "Discipline Exercises," the nearest approach to a regular recitation, is eagerly sought after and granted only to the best scholars.

in play the superabundant flow of the animal spirit is worked off, and that force is employed in throwing a ball, or running a race, which would otherwise find vent in mischief or restlessness. The whole fifteen minutes usually given is demanded, and the thoughtful teacher, instead of depriving a pupil of any of those precious moments should urge every one to use them in the best manner possible, It is well to explain this object especially to the few studious girls who are inclined to keep their desks at that time, and to convince them of their duty to preserve their health, and that play-hours should be as sacredly devoted to recuperation as study hours to work. Even when the weather is unfavorable for outdoor sports, the necessary relaxa- can be secured by throwing open the windows far enough to obtain fresh air (taking pains that no one shall receive the direct draught) and then putting the school through the light gymnastics.

Keeping a pupil after school to a learn a lesson is wrong in principle. It begets a dislike for the teacher, the school-room, the study, and all connected with it. What should be a delight, is made a punishment. Moreover, it punishes the teacher as much as it does the pupil. It wearies him unnecessarily, and, depriving him of time for rest and study, unfits him for work, and so robs the school of its right—his best services. The difficulty with the pupil is generally an inability to concentrate the mind upon the lesson. If that can not be secured during the fresh, vigorous hours of the day, under the inspiration of the class, and the example of companions, the teacher may well despair of success under less favorable conditions.

I can not sum up the matter better than in the words of Superintendent Harris, "The cure prescribed (i. e. retention after school) only aggravates the disease. Prepare the lesson so that the pupil can carry it by storm, and never allow him to make a dissipated, scattered attack upon it."—*The National Teachers' Monthly.*

J. DORMAN STEELE.

---

## Health Reform in the School-Room.

Education is a term easily defined, yet very seldom fully realized in the schooling of our youth. Its Latin derivation makes it signify leading out or drawing out, rather than cramming, or filling up. We believe the word education to mean the drawing out, or developing, of all the mental and bodily powers symmetrically.

We can not complain at the importance given to mind culture as far as it has to do with mere intellectual advancement, yet there are vast resources of mind and soul that remain untouched by the hand of education.

We do not intend to touch the metaphysical in this article, but we would urge the wants of a better physical education. Our people are far from being too practical, yet they spend all their resources of body and mind in one direction alone—money getting.

Money, ambition, self indulgence, pride are leading us to corruption, decay, ruin. Indeed, it is from the cradle to the school, through school into life, through life into the grave, but a series of anticipations on our part, a race, with success just beyond our reach like a will-o-the-wisp, and death at our heels—but it usually turns out the same, death victorious, and human pride and ambition finally yielding to its power. There is truly a great need of health reform, if we would see men and women of our generation fulfilling the promises of success and happiness that might be theirs to realize.

Perhaps some one is ready to skip this humble article and pronounce this idea of health reform a mere hobby. Let him call it a hobby when he can deny or explain away the fact, that of every one hundred persons in our land to-day, at least an average of ninety-five are sick, are prematurely old, are dying before their time. Our habits of living beget many diseases, that are sapping away the vitality our our nation. So many cases of reckless dissipation, yes of drunkenness, are the outgrowth of our system of education. We will give one illustration. A young man of more than ordinary ability is urged forward to meet the fond hopes of parent and teacher, his ambition is fed and nourished until it becomes a mighty power ruling him at its will, his intellect is crowded forward until it has far outgrown the weak and poorly developed body. This can not sustain the stress of an active cultured mind under the rule of such an ambition. Recourse must be had to some outside influence to tone up the body's weak energies, and, little by little, the young man accustoms himself to resort to stimulants in his hours of efforts until, after a time, the base appetite is fixed upon him, and they young man of intellect and promise sinks into the hopeless debauchee before he even dreams of danger.

Surely there is a great mistake in our plan of living and a greater mistake in our plan of education. Where is a better place to begin to live healthfully, and to teach others so to live, than in the school-room wherein habits of thought and of living are formed that cling to us throughout our lives?

Are our schools performing their mission in doing all they can to teach our youths to live properly and healthfully, so that they can go forth at graduation, strong and vigorous, ready for life's battles? Ask the young men and women in our college halls to-day, get your reply from the thousands of newly-made graves that contain the buried hopes of fond teachers and bereaved home circles, or, more forcibly still, get your answer from the pale, puny, consumptive faces of scholars, who barely escape with their lives, who have gone forth, not to bless the world, but to burden society and friends with their brief, perhaps useless, lives.

The scholar should learn how to live, as well as what to do while he lives. Of what account is the most liberal education to the invalid, the consumptive, the prematurely old?

Now comes the practical question, wherein do our schools lack in the training they afford?

They fail to give the student a through knowledge of himself. Very true he gets a good idea of his bodily stsucture, the general functions of its organs, the exact number of bones and muscles, the mechanical uses of each; but of the great question of his powers and weaknesses, of the question how to relate himself to persons and things about him, to live the most happily and successfully, of the question how to save or waste his vital force, of all these, not a word of advice does he receive, indeed, it is all a chance, this physical life, and woe and suffering to that one who ignorantly steps beyond the path of law and right living.

Granting it to be the mission of schools to teach people how to live, the question arises, how can our district school-teachers benefit their scholars, in this respect? They are with them but three or four months in the year, they have them but six hours in the day—have no control over their habits of life, or of person. Three things the teacher can do, each of which will have its effect. He can introduce the study of Physiology and Hygiene into the school-room, thus acquainting the scholars with the mechanism of their bodies.

The teacher should be a student beyond the mere text-book, not everything is found written down in text-books that a teacher should impart. Habits of life, habits of thought must be instilled into the scholars' minds, which only the true teacher can impart.

Teachers should be examples of real healthful living; teachers should be reformers by inquiring into and obeying all the laws of their physical life, and thus giving force and zest to their precepts by real consistent example.

Not all good comes from scholars' associations with each other. Secret and pernicious habits are contracted, habits that in thousands of cases have been effectual in dragging down promising boys and girls into the lowest depths of misery and suffering. Parents fail to detect this gradual decline, or, if they do, they can not guess its origin; friends know not how to interfere; of all others, the teacher is best fitted to speak the words of warning that shall save the boy or girl from promature weakness or death. The subject of food, of healtful dieting, has been laughed at jeered at, and ridiculed only to gain ground among our people, until the more intelligent and thoughtful are beginning to accept the reform in food as they are also that of dress. Plain healthful food, warm, healthful dress, simple and natural habits, all these, with a body well trained and cultured, free from disease and dissipation, will afford a fitting abode for the active, well-cultured intellect of the present age. The school is the place to train the scholar in all these requirements, because the mass of the people, young and old, are groping in the dark yet, on many of these questions.

Schools should be beacon lights to warn the youth of the many dangerous places that threaten them. The teacher, if a true teacher, should be so thoroughly posted on all questions of physical endurance, that he can instruct his scholars as to the care of their bodies, the saving of their vital power, and the certain effects that must follow irregular habits of any kind.

One course pursued brings happiness and health, another suffering and sickness, one brings prosperity, another adversity. Learning these from experience, from research and from reason, we can not fail to im part instruction in a science outreaching all others in its effects, as it excels all others in its unchanging exactness. The health reformer in the school is working for his community, his country, his kind, inasmuch as he is working to improve and strengthen mind, soul and body.—*The National Teachers' Monthly.*

S. H. GOODYEAR.

Dansville Hygienic Seminary.

# OFFICIAL NOTICES.

## Department of Public Instruction.

### APPOINTMENTS.

#### SCHOOL COMMISSIONERS.

His Excellency the Lieutenant Governor has been pleased, in virtue of the powers conferred upon him by the 48th and 136th clauses of chap. 15 of the Consolidated Statutes of Lower Canada, to make the following appointments of school commissioners, to wit:

County of Arthabaska, Arthabaskaville.—Antoine Gagnon, esquire, continued in office, no election having taken place in July last.

County of Chicoutimi, Saint Félicien.—Messrs. Jean Lachance, Etienne Beaudoin, Joseph Savard, Jean Baptiste Drolet and Eusèbe Simard. New municipality.

County of Drummond, Kingsey.—The Reverend Thomas Quinn, *vice* the Reverend F. X. Désaulniers.

County of Drummond, Saint Bonaventure of Upton.—Mr. Honoré Beauchemin, *vice* Mr. Joseph Rousseau, deceased.

County of Lévis, Saint David.—The Reverend Mr. D Déziel and Messrs. Jean Fouquette, Pierre Bégin, Michel Couture and Louis Bégin.

County of l'Islet, Sainte Perpétue.—The Reverend Mr. J. B. Soulard, continued in office.

County of Richelieu, Sainte Victoire.—Mr. Paul Ethier, *vice* Mr. Pierre Ethier.

#### ERECTING AND BOUNDING SCHOOL MUNICIPALITIES.

His Excellency the Lieutenant Governor has been pleased by order in council, dated the 25th of January last, and in virtue of the powers conferred on him by the 30th clause of chapter 15 of the Consolidated Statutes of Lower Canada.

1. To erect into a new school municipality, under the name of Saint Felicien, all the lots of township Ashuapmouchouan, county of Chicoutimi, north west of the river Saint Ours, and township Demeules and Parant, same county.

2. To define, as follows the limits of the school municipality of Saint Louis des Ha! Ha! to wit: comprising lots sixty one to sixty five in ranges B and C inclusively of township Armand, lots forty two to forty nine inclusively, also lots A. B. C. of the first range of township Cabano, lots forty two to forty eight of the second range, and forty six in the third range of township Cabano aforesaid, this line from there inclusively continuing on the south west side of the new Temiscouata road, on the line separating the seigniory from the crown lands, running south east to the limits of the municipality of Notre-Dame du Lac Temiscouata, and on the north west of the said road following the line which separates the seigniory from the crown lands, and running south east to the river Touradis inclusively.

# POETRY.

## Grandmother Gray.

Faded and fair, in her old arm-chair,
Sunset gilding her thin white hair,
Silently knitting, sits Grandmother Gray;
While I on my elbows beside her lean,
And tell what wonderful things I mean
To have, and to do, if I can, some day:
You *can* talk so to Grandmother Gray—
She doesn't laugh, nor send you away.

I see, as I look from the window-seat,
A house there yonder, across the street,
With a fine French roof and a frescoed hall;
The deep bay Windows are full of flowers;
They've a clock of bronze that chimes the hours,
And a fountain—I hear it rickle and fall
When the doors are open; "I mean," I say,
"To live in a house like that, some day."
"Money will buy it," says Grandmother Gray.

There's a low barouche, all green and gold,
And a pair of horses as black as jet,
I've seen drive by—and before I'm old
A turn-out like that I hope to get,
How they prance and shine in their harness gay!
What fun' twould be, if they ran away!
"Money will buy them," says Grandmother Gray.

"To-morrow, I know, a great ship sails
Out of port, and across the sea;
Oh! to feel in *my* face the ocean gales,
And the salt waves dancing under me!
In the old far lands of legend and lay
I long to roam—and I shall, some day."
"Money will do it," says Grandmother Gray.

"And when, like me, you are old," says she,
"And getting and going are done with, dear,
What then, do you think, will the one thing be
You will wish and need, to content you here."
"Oh, when in my chair I have to stay,
Love, you see will content me," I say.
"That, money *won't* buy," says Grandmother Gray.

"And, sure enough, if there's nothing worth
All your care, when the years are past,
But love in heaven, and love on earth,
Why not begin where you'll end at last?
Begin to lo lay up treasure to-day,
Treasure that nothing can take away,
Bless the Lord!" says Grandmother Gray,
—*Mary Keely Boutelle, in November Wide Awake.*

## MISCELLANY.

*Queen Victoria's new Title.*—The new title of the Queen is to be rendered in India as Kaisar-i Hind. This is the Parsee or Persian form, Persia being the court language of India; in documents intended for the Hindoo population it will be given as Hind-ka-Kaisar. As Dr. Birdwood is connected with the India Office, it is supposed that he knows the exact form of the title, and he has written that it 'might be' Maharaj Adhiraja Sri Rani Victoria, Kaisar-i-Hind. As medals and documents are being prepared for the great ceremony about to take place at Delhi, when the new title will be proclaimed, it is presumed to be the form of words which will be used, and some explanation of them may be useful.

Maharaj is Maha, 'Great,' and Raj is from Raja, a 'King.' It has involved a considerable amount of debate as to whether it is according to the genius of Oriental forms to give a woman a title in the masculine gender. So few women have reigned supreme in India the precedents are scarce, the Begum of Bhopal being almost the only one to refer to.

Adhiraja, the second word in the title, would be "First King," This in an old form of a title, Buddha was termed Adnaud, the First Lord, and Siva was called among his many names Adiswar, which is again First Lord; Iswar, or Iswara, being generally rendered the same as Naut. Adhiraja is, of course, also masculine.

Sri is a word of honor given to people of rank and it forms part of the title of almost all Rajahs of India; but it is not uncommon to give it to gods, and as many titles have been objected to from having been degraded, it might be asked if it is in good taste to give our Queen a title that is used by Siva and Vishnu? If this word is the same as that in Srinuggur, the principal town in Cashmere, which means 'City of the Sun,' then this new title will give historical material by which it will not be difficult to prove that her gracious Majesty is nothing else than a solar myth.

When Max Muller was looking up titles, why did he not suggest the very old one and the most important of those given to Buddha, which was Chakravartaraja? This one has never suffered degradation, for it was a spiritual rather than a temporal title. It might be translated 'King of the Region of the Wheel;' but as the wheel here meant was the great turning movement of the celestial heavens, it might have been most appropriate for that sovereign on whose realm the sun never sets.

Rani, the next word we have to deal with is simply 'Queen.' As every person in India knows the word in that sense, it would be a curious point to have some statement as to the number of natives who will know the meaning of Kaisar—as a title applied to a person, the probability is that not one in a million ever heard it used in that sense, or will have the slightest idea of it as a term of authority. Such being the case, the word Rani, which is familiar even to children, coming directly before Victoria, will express as clearly as words can that their supreme ruler is 'Queen Victoria.'—*London Daily News.*

*Harmony of Science and Religion.*—Now, at eighty-two and a-half years of age, still, by God's forbearance and blessing, possessing my mental powers unimpaired, and looking over the barrier beyond which I soon must pass, I can truly declare that, in the study and exhibition of science to my pupils and fellow-men, I have never forgotten to give all honour and glory to the infinite Creator—happy if I might be the honoured interpreter of a portion of His works and the beautiful structure and beneficent laws discovered therein by the labours of many illustrious predecessors. For this I claim no credit. It is the result to which right reason and sound philosophy, as well as religion, would naturally lead.

While I have never concealed my convictions on these subjects nor hesitated to declare them on all proper occasions, I have also declared my belief that, while natural religion stands on the basis of revelation, consisting, as it does, of the facts and laws which form the domain of science, science has never revealed a system of mercy commensurate with the moral wants of man. In nature, in God's creation, we discover only laws—laws of undeviating strictness, and sore penalties attached to their violation. There is associated with natural laws no system of mercy. That dispensation is not revealed in nature, and is contained in the scriptures alone.

With the double view just presented, I feel that science and religion may walk hand in hand. They form two distinct volumes of revelation, and, both being records of the will of the Creator both may be received as constituting a unity, declaring the mind of God; and, therefore, the study of both becomes a duty and is perfectly consistent with our highest moral obligations.

I feel that, as this subject respects my fellow-men, I have done no more than my duty; and I reflect upon my course with subdued satisfaction, being persuaded that nothing which I have said or omitted to say in my public lectures, or before the college classes, or before popular audiences, can have sanctioned the erroneous impression that science is hostile to religion.

My own conviction is so decidedly in the opposite direction, that I could wish that students of theology should be also students of natural science—certainly of astronomy, geology, natural philosophy and chemistry, and the outlines of natural history.—*Prof. Silliman in the Phrenological Journal.*

*Relics of a Dead Race.*—Mr. A. J. Conant, the artist, returned recently from the Ozark Mountains, where he passed a week in exploring some remarkable caves on the the Gasconade and tributary streams, lying principally in Phelps and Pulaski counties. Mr. Conant, about two years ago, made some interesting discoveries in the region mentioned of human skulls and skelestons, supposed to belong to a people who existed before the historic period, and as it is understood that he has been engaged since 1862 in collecting the material of a work on archæology, it may well be supposed that he is enthusiastic in following up his discoveries.

He and his party first visited Bruce's Cave, so named after one of the early settlers, who made saltpetre from the cave deposits. The cavern is in the limestone formation, with an entrance about one hundred and thirty feet in the bluffs above the Gasconade river. They first entered a spacious chamber, but, as the passage narrowed, the party were forced to get down on their knees and crawl some distance. They next made a nearly perpendicular ascent of fifty feet, when they entered a large chamber sparkling with stalactites of a snowy whiteness like alabaster, with hundreds of bats hanging in festoons from the roof. Having explored the caverns, the work of excavating began at the mouth of the cave, where bones and implements were found. They made a vertical section of six feet, and studied the stratification of the soft deposits. The layers changed from a black, rich soil, to ashes, alternating with strata composed of soil and ashes intermixed. It was in these strata that human bones and fragments were found. The skulls exhibit a low facial angle, and the teeth, some of which dropped out, are as well preserved as if drawn by a dentist yesterday. There is the skull of an old man, known from the knitting together of the sutures, and one of an infant of almost wafer like thinness, and the several parts separated at the sutures. Beside the skulls there were found arrow and spear heads, flint implements knives and awls for sewing skins, made of bone, very hard and polished; also the bones of the turtle, deer and wild turkey, intermingled with various fragments of carnivorous and browsing animals not yet identified. Great care was required in exhuming these remains, as the skulls were liable to be broken by the pick.

The second cave explored was about a mile distant from the former, and is locally known as Ash Cave, from the fact that there is a deposit of ashes from the saltpetre manufactured there about thirty years ago. These saltpetre operations have

so far disturbed the original deposits that nothing satisfactory could be obtained, except one corpse, which was found in a sitting posture, with the knees drawn up to the face. With this corpse was also found the nearly entire skeleton, very much decayed, of an elk or large sized deer.—(From the *Missouri Republican.*)

*Sleeplessness.*—Thousands suffer from wakefulness who are otherwise in good health. To some of them this becomes a habit, and too often a growing one. Some resort to soporific drugs, and this is how the opium crave is often initiated. Others find wine or spirit occasionally effectual, and are thus induced to take alcohol every night, and not a few, it is to be feared, have in this way laid the foundation of intemperance. There have, however, never been wanting people who have found a way of going to sleep without resort to such measures. The mesmerists at one time were popular, and from them a host of people learnt that looking at any fixed point steadily would often succed in inducing sleep. In the dark, however, this is not so easy; but this difficulty was not felt in Braidism, which consisted merely in closing the eyes and trying to think they were watching attentively the stream of air entering and leaving the nostrils. It was asserted that whoever would will to see this stream as if it were visible would infallibly soon fall asleep. We have known the plan succeed, and it is evidently the same in principle as fixing the attention on any single visible object. Another plan has just reached us proposed by an American physician. Dr. Cooke, who tells us that in numerous cases of sleeplessness it is only necessary to breathe very slowly and quietly for a few minutes to secure refreshing sleep. He thinks that most cases depend on hyperæmia of the brain, and that in this slow breathing the blood-supply is lessened sufficiently to make an impression. Certainly, when the mind is uncontrollably active, and so preventing sleep, we have ascertained from patients, whose observation was worth trusting, that the breathing was quick and short, and they have found they became more disposed to sleep by breathing slowly. This supports Dr. Cooke's practice, but at other times his plan quite failed. It is certainly worth anyone's while who is occasionally sleepless to give it a trial. In doing so they should breathe very quietly, rather deeply, and at long intervals, but not long enough to cause the least feelings of uneasiness. In fine, they should imisate a person sleeping, and do it steadily for several minutes.

*The value of light in the nursery.*—Vegetables and animals grow very poorly in the dark. The element of sunlight gives heat, moisture and air their efficacy in developing plant-life, and the genial light of the sun promotes absorption of the air by the skin, and thus enriches the blood and contributes to the health of all the tissues. Therefore, nurseries and family rooms, should be the sunniest in the house, while shady rooms should be avoided, as having a bad influence upon the bodies of infancy, and as containing too often the germs of disease. If dampness be added to darkness, we have fruitful sources of severe disease. Let, then, infants bask in the life-giving rays of the great source of life and health. If feeble and sick, do not deprive them of its strength-giving power. The genial rays of that force, that gives colour and vigour to the vegetal world, also gives health and strength to the animal. Air for respiration is a necessity, and the sunny light increases the peculiar forces of it. Dark and damp places are the favorite gardens of disease, whose germs the dry and warm rays of the sun scatter at once, or rather forbid their entrance. So we see, that a warm room and pure air have the same influence upon plants and animals. Any one can observe, that both plants and animals make a less vigorous growth and a less healthy development, when they are kept in sunless rooms. A well ventilated nursery, an abundance of pure air, and the life-giving forces of the sunny rays will do more towards restoring the feeble, the convalescing, and even the sick, than all the stimulants, or tonics, in the wide world. We beseech mothers to expose their infants to the invigorating rays of the great source of all health and life. Medicines are expensive luxuries. The sun's rays cost nothing, you may have them without money, without price, and still thousands of infants are kept in the dark rooms of death instead of the sunny rooms of life.

*Open your windows and doors*—It is a common error to suppose that a room can be ventilated by opening a window a little at the top. There must be an inlet and an outlet for the air. It is another mistake to suppose that foul air goes to the top of a room. It is the heated air that goes to the top, while the chief impurity, carbonic acid, falls to the bottom. It is the lower stratum of air that needs to be removed. If the window only be open, the cold air, being heavier, pours down into the room, causing draughts; if the door be open or ajar, the same things occurs. The perfection of ventilation may be obtained in a room with a fire place by simply providing proper inlets for the air, on a level with the floor, and carried vertically upward into the room for about four or five feet.

*Effect of Cold on Children.*—We condense the following from a seasonable and practical article on this subject in this *British Medical Journal.* The old and young, whose health and existence depend very much, if not entirely, upon others, are the chief sufferers at this period of the year. It is important, therefore, that those whohave the care of either young or old should consider their responsibilities, and endeavour to carry out judiciously such precautions as may oppose the dangers of our winter season. The English mother has a love of hardy children, and thinks fresh air, or even the atmosphere of London streets, is of vital importance to their health. The idea of having no fire in the bedroom is another of her favorite maxims: and among the wealthier classes the luxury of seeing the arms, neck, and legs of those just beginning to walk seems to be particuliarly delightful. We do not certainly desire to see the system of swaddling introduced into England which prevails in France, not that our young ones should, like those of Northern Europe, resemble litlle round bundles of clothes more than anything else. But we seriously think that many lives are sacrificed to ignorance and erroneous ideas. Among the poor the scantiness of schildren's clothing is quite remarkable. Winter and summer are not distinguished by any change of dress; short sleeves, bare necks and legs, are not the exception, they are the rule; cotton or thin stuffs are not changed for woollen or flannel, and so on in all other respects; beyond a shawl or some such addition, there is very little difference between their clothing in summer and winter. And yet this system is not the result of carelessness. It has become a custom, and one that has many supporters. There is no doubt that, if used to test the character of the child, very much as we see aboy holding up a terrier by its tail or its ear to show its pluck by its silence, it has certain advantages.

It does not occur to most people that the air inside their houses, if they are properly ventilated, is as pure as the air outside. We should say that no shild too young to walk or run should be taken out when the external temperature is below fifty degrees; that the rooms in which they live and sleep should never be below fifty-eight degrees; and the day room should be three or four degrees warmer. The practice of wheeling children about in perambulators, sitting or reclining in one position without exercise, is particularly harmful. We would earnestly appeal to mothers to put aside all feelings of vanity, or what is sometimes miscalled natural pride, and cover the arms, neck, and legs of their children as a simple sanitary precaution. High frocks, longs sleeves, and warm stockings should be worn out of doors; hats which cover the head, and boots which keep the feet as dry and warm as possible. On coming in from our streets, nearly always damp, both boots and stockings should be changed; and if the feet be cold, a warm foot-bath should be used for a few minutes. The exquisite pains of chilblains could be saved to many children by this use of hot water for hands and feet. We see that flannel has yielded to merino, chiefly on account of the greater convenience of ready-made under clothing; but there is nothing equal to flannel in the property of preserving warmth.

There is one important point which is the question of the day with mother and nurse, and that is the morning bath. Let the room be well warmed before the child is taken out of bed, and let those who think a cold bath an absolute necessity remember that on a summer morning their children enjoy it; and if they keep the temperature of the water the same all the year round, that is, about fifty-five or sixty degrees, they may obtain all the benefits possible. Let them think how unreasonable it is to take water not much above freezing point and attack the nervous system, already depressed, by a shock which is followed by a reaction which requires the whole morning to recover from. We have no hesitation in recommending a warm bath early in the day, followed by a simple douche of cold water, as far preferable to the cold bath; or a warm bath at night for the sake of cleanliness, and none at all in the morning. It may be taken as a rule that, in the case of

children, sudden changes of temperature are dangerous, and that fifty-eight to sixty degrees may be taken as the safe average temperature in which they should be constantly kept.

## Book Notices.

Messrs. A. S. Barnes & Co., announce that the editorial care and supervision of "Davies Mathematical Course, has been placed in the hands of Prof. William G. Peck, who has been associated with Prof. Davies for many years in the work of preparing and revising Mathematical text-books. Prof. Peck is a graduate of the U. S. Military Academy, and like Prof. Davies, he was for a long time engaged in teaching Mathematics at that institution, and like him, he has had an extended experience in Collegiate instruction.

The plan of the Mathematical Course, its general scope, and its methods of presenting Mathematical truths, have grown out the varied experience of a long and active life, wholly devoted to a single object, and they have been approved by thousands of his fellow educators.—These leading features will not be changed; on the contrary, every effort will be directed to their continuance and to such improvements as will keep the course in harmony with the general progress of education.

[It is designed to affect a complete revision of the Series within the limits proposed, and to this end, all agents, teachers, and pupils, who may be aware of any errors either in the text, or in answers to examples, are invited to communicate the same, either to the publishers, or to Prof. William G. Peck, L. L. D., Greenwich Conn.]

New-York, New Orleans, and Chicago.

*An Author's Success.*—A few years ago a school-book agent visited a flourishing school in Central New-York, and learned in conversation that the principal had been teaching chemistry on a plan of his own from his manuscript. Hoping to repay the favors he had received, he offred to look into the plan, and show the manuscript to his employers, with a recommendation to publish it for the use of other schools. He sent the manuscript to New-York, and went his way. The publishers discussed the matter, were much interested in the plan of the work, and as it was brief and elementary, they concluded to bring it out as a venture. They called it, "Fourteen Weeks in Chemistry," as it could be easily learned by pupils in school during the ordinary application of a single term. There had been some inquiry for text-books that should cover less ground than was common, that would interest and inspire pupils to a love of the subject, and that could be mastered quickly. The haste that marks every thing in American life was becoming necessary in study, and the short road to learning was beginning to be asked for. A scientific book had hithertoo been especially dry and cumbersome. The work on chemistry now contemplated was bubbling over with interest. The experiments were such as made plain every dry fact, and their selection was judicious in that facts not important in daily and pratical life were rigidly excluded, and the child was not called upon to learn them. The style of the writer was not crude and home spun, but bright and sparkling, with a tendency to carry the interest of the reader along despite his repugnance to scientific matters. Thus the writter hoped to induce many of his pupils to love the science he taught them, and to follow it further after he was through with them. All this impressed few publishers, as before said, and they invited the author to prepare it carefully for the press, and when ready, gave the little book to the public. The reception it met was most flattering. Letters of congratulation poured in from fellow-teachers, and all acknowledged the growing need of texts on such a plan. The success was so complete that all the costs of bringing out the work were paid back within a few weeks, and the publishers invited the successful writer to prepare a "Fourteen Weeks in Natural Philosophy," the material of which was already in his possession. The book came out, and immediately carried the schools by storm, and outsold the Chemistry two to one per annum. Next followed an Astronomy, then Geology, then Physiology. The books found open arms awaiting them, and seemed to pour from the press, edition after edition, to gratify a clamoring demand. Children who never had cared before to know about things in science, saw these books in the hands of mates, and bought and read for themselves, and whole communities were found suddenly awakened to a love for a study that possessed no attraction in the days of childhood. The books were sufficiently and judiciously illustrated; they were provided with valuable notes and references, review questions, directions for practical experiments, interesting scientific anecdotes applicable to the text, and full indices. They were accurate, because of the incessant watchfulness of the author, who gradually relinquished the details of his school to an assistant, and finally, after a year or two in Europe, the whole school, and devoted himself to his rapidly growing and prosperous books. He visited Europe several times, and remained for study and research; attended the lectures of eminent scientists and learned from their lips the wonderful things his books make common. While abroad he ransacked the noted libraries, and gathered material for histories of Germany, England, and France. Of these, France was lately published, and is known as the "*Brief History of France*," and his "Brief History of the United States, previously published, has attained a magnificent circulation, and annually increases the ample income he is now receiving. Out of the latter has grown the standard and popular "Centenary History; or, One Hundred Years of American Independance," which gives to young people and adults, whose lives are hurried, the main facts of the American History, without burdening the reader with those that are unimportant, and covers our whole history as a nation in a single elegant volume of 700 pages.

The present year is not too short to have seen already the appearance of a new text from this facile pen. It is "*Fourteen Weeks in Zoölogy*" this time, and the critics are even now sharpening their pens for the dissection. It is pronounced by those who have already seen it altogether equal to the emergency, and the publishers hereby invite all readers to revive their knowledge of elementary and popular science by procuring a set of "Steele's Fourteen Weeks Course in all the Sciences," by Prof. J. Dorman Steele, F. R. S., Ph. D.

6 vols., 12mo, cloth, $9.80.
7 vols., 12mo, half calf, $26.25.
The Brief Histories of the United States and France, 12mo, cloth, each, $1.50.
The same. 12mo, half calf, each, $3.75.
The Centenary History. 600 pages, 8vo, cloth, $6.00.

A. S. BARNES & Co., Publishers.

—The YOUNG FOLKS' BOOK OF AMERICAN EXPLORERS is as distinctly a "new departure" in our historical literature as was its predecessor, the "Young Folks' History of the United States." The "Book of American Explorers" is a series of narratives of discovery and adventure, told in the precise words of the discoverers themselves. It is a series of racy and interesting extracts from original narratives, or early translations of such narratives. These selections are made with care, so as to give a glimpse at the various nationalities engaged.—Norse, Spanish, French, Dutch, English, etc.,—and are put together in order of time, with the needful notes and explanations. The ground covered may be seen by the following list of subjects treated in successive chapters:—The Traditions of the Norse-men, Columbus and his Companions; Cabot and Verrazzano; The Strange Voyage of Cabeza de Vaca; The French in Canada; Hernando de Soto; The French in Florida; Sir Humphrey Gilbert; The Lost Colonies of Virginia; Unsuccessful New England Settlements; Captain John Smith in Virginia; Champlain on the War-Path; Henry Hudson and the New Netherlands; The Pilgrims at Plymouth; The Massachusetis Bay Colony.

Besides the legends of the Norsemen, the book makes an almost continuous tale of adventure from 1492 to 1630, all told in the words of the explorers themselves. This is, it is believed, a far more attractive way of telling than to rewrite them in the words of another; and it is hoped that it may induce young people to explore for themselves the rich mine of historical adventure thus laid open.

LEE & SHEPARD, *Publishers, Boston.*

KRÜSI'S INDUSTRIAL DRAWING—*A series upon Elementary Architecture*, by Charles Babcock, Professor of Architecture, Cornell University.

This series shows the plans, elevations, and working details of buildings, and something of the historic order of architecture. It includes the work usually given to students in architecture, and is entirely of a practical character. While answering the purposes of the professional student, this series is specially prepared to supply a growing demand for some specific knowledge of building and architecture for the general public, and it will be found adapted to classes in the High Schools, Academies and Colleges.

D. APPLETON & Co.,
549 & 551 Broadway, New-York.

*New Paper.*—We have received the Third Number of SCHOOL and HOME, a new Journal of Education, Literature, Science and Art, published in New-York, Judging from the present number it worthily upholds its title. We welcome it to the arena of letters and wish it every success—it will prove a welcome visitor both to the Study room and to the Home circle.

## Teacher Wanted.

Wanted for School Section No. 2, Chapeau Village, a first or second class Male Teacher, to whom a liberal salary, will be given, for further particulars. Apply to Daniel Coughlin, Esq., Chairman, or the undersigned.

Allumette Island,
Feb. 12th 1877.

TERENCE SMITH,
Secretary-Treasurer.

Printed by Léger Brousseau, 9, Buade Street, Quebec.