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# V. P. JOURNAL

VOL. I.]

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[No. 1.

## SALUTATORY.

WITH this number we beg to offer our compliments to our readers and friends, thanking them for their interest in our work and hoping that our future relations may prove as harmonious and pleasing as the present.

As to our pretensions we will say nothing: we will make no promises impossible to fulfil, leaving to our readers the privilege of judging of our merits and deserts. Our future success and improvement will depend upon the wishes, requirements and interest of our readers, in whose hands we now confidently place ourselves. We believe we have a good cause, the honor of which we shall endeavor to maintain.

Education presents a boundless field for discussion, and Science in its broadest sense and many departments, presents most varied attractions.

If we shall have added anything to the general stock of knowledge, if we shall have in any way increased the desire for knowledge or helped to fill in any pleasing moments, we shall feel repaid.

For some time we have felt that there is a place for a Journal, dealing in a vigorous and independent manner with Educational and Scientific questions. How far this Journal will supply the place of such we do not profess to state; we issue it with the hope that it may afford means of improvement, reflection and recreation for our readers. We have not confined our attention or limited our space to the discussion of questions in any single line: wherever we can do good,

whether in the promotion of knowledge, the improvement of morals, or the rectification of error, we will do our utmost. As to our present articles, you will see that we intend to pay especial attention to the presentation of Science in a popular form: questions of Education and general public interest will be discussed: the general progress of the people—social and moral—will be carefully noted: while the pleasing field of foreign travel will be attended to by our Foreign Correspondents. We throw open our columns freely to our readers for the discussion of interesting and important questions, and we hope that they will make free use of them. Our selections will be carefully chosen from the leading writers of the day, and we trust they will prove to be among the most attractive portions of our Journal.

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QUERIES.—We propose to place at the disposal of our readers a question-drawer, hoping that it will be made use of for presenting and solving perplexing questions and difficulties, scientific and otherwise.

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REVIEWS.—We intend soon to open a review column in our journal for the purpose of noticing and reviewing new scientific and educational works as they appear. In this we would ask the hearty co-operation of publishers and reviewers.

MECHANICS' INSTITUTES.—Few persons are aware of the large number of these Institutes scattered through the country. In Ontario last year there were 97 in operation. The largest number of volumes issued last year went out from the Toronto Institute, and reached 27,073. We give a list of books issued from the Strathroy Institute: Biography, 142; Fiction, 2,977; History, 237; Poetry and the Drama, 87; Periodicals, 338; Voyages and Travels, 500; Works of Reference, 128; Science and Art, 104; Miscellaneous, 274. We thus see that Fiction preponderates. Some one asks us the question, whether the benefit resulting from this reading of Fiction justifies the expense and Government outlay.

SERPENTS.—A correspondent sends us the following note—  
“A portion, some two feet in length, of a large serpent perfectly petrified was dug out of the rock on Darche Island in Georgian Bay. The body was at least eight inches in diameter, and the rings and scales were plainly marked, beyond the possibility of a doubt. The head was unfortunately mutilated when the rock was blasted, but the shape was quite recognizable.” Not having seen the fossil, we cannot give an opinion; but we have our doubts as to its being a serpent. Fossils of the orthoceras and kindred tribes have been found varying from the size of a pencil to huge bulks one foot thick and thirty feet long. These animals, inhabiting at first a small cell, increased their house by the regular addition of chambers, increasing in size. They were the sea-rovers of ancient times. Serpents or snakes are not found in silurian rocks. We will at all times be glad to receive fossils and notes on interesting phenomena.

THE Methodist Missionary Society of Canada has determined to secure a site for a college in Japan. Other churches already have undertaken similar work, meeting with much success. This great Empire, great in its people, prosperity and possibilities will, ere long, amply repay the civilized world for these efforts at Christian civilization.

THE last report of the Minister of Education reveals the following facts concerning Head Masters of High Schools and Collegiate Institutes: Graduates of Toronto, 47; Victoria, 18; Queen's, 8; Albert, 5; McGill, 3; Trinity, 3; Dublin, 3; Aberdeen, 2; Queen's (Ireland), 2; Glasgow, 1; Mt. Alison, N.B., 1; Giessen (Germany), 1; Oxford, 1; Cambridge, 1; Certificate Holders, 8.

CO-EDUCATION in some respects has proved a success, but, in the study of medicine, experience has shown that if ladies wish to participate separate instruction is necessary in this country. The demand was made, ignored and refused for a time; but in the end was granted, as usual. As a result of

this we have lately seen the successful inauguration of two Ladies' Medical Colleges, at Kingston and Toronto. As expected they have started with a small attendance, but the promises are bright for the future. The need of such schools has been clearly shown; there is a large field of usefulness, and the ultimate success is certain. We doubt the advisability of starting at the same time *two* schools, where the work could be accomplished by one. The rivalry thus early manifested may increase and in time prove disadvantageous to both.

THE rewards, emoluments and pickings of political offices are proverbial, but how different in the case of our leading men of education and science, especially in this new world. Happily, however, we occasionally hear of a bright exception. For some time rumors have been afloat that Dr. Dawson intended to sever his connection with McGill University, and return to a field of wider usefulness and of greater profit in the old world. Whether this be true or not, we cannot definitely say: this much, however, is true, that he has left on a year's absence, cheered with a purse of \$5,000, the gift of the appreciative citizens of Montreal. May this spirit increase, and if our different institutions are unable to pay reasonable salaries to a deserving class, may our wealthy citizens show their appreciation in such practical ways.

WE are to have a grand scientific gathering, and the Government is to foot the bill. The British Association have at last decided to come over and see us next summer, and the American Association have plainly said they would like to come, only they wish an invitation, which, of course, will be given. A large number of passes are now available, and there are about five men anxious for each pass. The Canada Pacific Railway has promised a free ride to the Rockies. The cities will doubtless entertain them by the way. Montreal is already astir to provide attractions and entertainment. In other words, it will be an outing, extensive, varied and most enjoyable for the *elite* of English learning. No wonder that the proposition was so ably advocated and so eagerly adopted!

We do not, of course, believe that the object of the meeting is to advance the study of science, or promote scientific research: that could be done much more conveniently at home. The object is not to obtain large and appreciative audiences, for we fear that Canada offers no such field as England. The object of the meeting is, doubtless, to see the great resources of this continent, to find the attracting centre of the moving tides of migration, to rectify the popular and prevalent ideas about endless ice and snow, continual frosts prowling bears and scalping savages. We most sincerely hope that, although we may be disappointed in our expectations of grand discoveries, and wonders of eloquence, we may be able to disabuse our visitors' minds of some prevailing ideas, that they will see our fields clad in a garb of green, our citizens happy and prosperous, and our country the best country in the world.

THE Free Library of Toronto is being vigorously pushed forward, and ere long the citizens of the enterprising city will be able to enjoy the advantages of a large and, we hope, carefully selected stock of books. But as this is to be a popular library, the large majority of the works will be works of travel and of fiction. We hope that this may be the means of starting another project, equally as important, viz., the foundation of a *reference* library, consisting of full lists of the important works, on medicine, law, art and science; one to which specialists in these different branches of study might resort for further information. At present the only library of any importance in Canada is the Government Library at Ottawa, which is somewhat inaccessible to the majority of those desiring to consult such works. The library that we desire to see established should be placed where most needed, at Toronto or Montreal, or in connection with some important college: it should contain all the works—old and new—of the leading writers and authorities in the different subjects. The library at Ottawa might be taken as a beginning, but only as such. The rising men of the day, in law, medicine and science, as soon as they leave their colleges, must at once make



specialists of themselves, and to improve their skill must be brought into close communication with the special department with which they have identified themselves. The library here would come to their assistance and would aid them, where now they must go unaided or seek their knowledge in foreign lands and in foreign libraries. Money, and much of it, is needed for such an institution. If the Government of our day does not take the matter in hand, it remains for some of the magnanimous and patriotic men of our land to turn the idea into a reality.

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#### COLLEGE NOTES.

THE Universities have resumed their work, and from all we hear of renewed energy, increasing attendance, and brighter prospects.

*Trinity.*—The Arts department has opened with an attendance of about forty students. The Medical department maintains its former high position.

*McGill.*—Prof. D. P. Penhallow has resigned his position as botanist and chemist at the Houghton Experimental Farm, at Mountainsville, N.Y., and accepted the lectureship in botany in McGill.

*Queen's.*—The chair of Chemistry, which has been vacant for a year, has been filled by the appointment of Dr. Goodwin, who graduated at Mt. Alison, and, after winning the Gilchrist Scholarship, completed his course in London, Edinburgh and Germany. He has for the past year been Professor of Chemistry at Mt. Alison University, N.B.

*Toronto.*—Constant complaints are being made as to the crippled state of the finances of Toronto University, and the first remedy suggested is the abolition of scholarships in all the departments. At the same time, copying the system of the English Universities, a number of fellowships have been established, at an annual outlay of about \$5,000.

*Manitoba.*—Dr. King, the newly-appointed Principal of Manitoba College, has already shown his fitness for the position by his energetic work in raising funds to the amount of \$5,000.

*Mt. Allison.*—This University has lost two of its Professors. The mathematical chair has been filled by the appointment of Prof. Hunton, while the chair of chemistry has been entrusted to Mr. Geo. J. Laird, B.A., a graduate of Victoria. We wish these two young Professors brilliant careers.

*Acadia.*—The Baptists, wiser than some of their brethren have amalgamated their theological schools by transferring their work to McMaster Hall, Toronto. If the other churches were to follow this example, we believe that money would be saved and more good accomplished.

*Albert.*—This, we presume, will be the last year of the existence of Albert as a University: its powers as such will be merged in those of Victoria, but its existence as a college will be continued. As a training school of high character and capabilities, it will doubtless have a bright future, and will do good work for Methodism and Eastern Ontario.

*Victoria.*—The prospects of this institution are brightening, financially and numerically. Although the matriculation has not been degraded in order to attract students, her incoming class numbers 27 in actual attendance at present. The number of lady students is also increasing. "Our college opened for lectures on the 4th. In the absence of the esteemed Principal (an absence caused by the death of his brother), Dr. Wilson delivered the opening address, which was fraught with that moral strength and sound sense which characterize all the Doctor's statements. In the course of his remarks he earnestly and tenderly urged the students to maintain the highest moral character by seeking and living the truth. In his estimation, truth in both word and act, truest honor and tenderest kindness, are virtues which should be made a part of our nature at any cost. He urged the students to study for prizes, not for prizes as generally understood, but for that mental and

moral culture which is in itself the greatest prize. He requested all students to have confidence in the course of study marked out for them, to have confidence in those appointed to assist them in the prosecution of their studies, and to devote themselves fully to their work. As we listened to his soul-stirring words, we could not and would not suppress the earnest wish that Canada may ever secure such instructors for her sons."

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#### REWARD OF LABOR.

**E**VERY man has a work to do which is necessary to the well-being of the community, and no man has the right to act on any other principle than work first and wages second. Least of all should students of science make their banker's book the criterion of being on the right road. Your country will likely give you enough to keep body and soul together; she may give you luxury and honor; she may give you poverty and neglect. If so, you will fare no worse than many better men. The world seldom rewards the best work with money. Locke was banished as a traitor, and wrote his *Essay on the Human Understanding* sheltering himself in a Dutch garret. Milton was not rich nor at his ease when he composed *Paradise Lost*; not only low, but fallen from a height; not only poor, but impoverished—in darkness and with dangers compassed round, he sang his immortal song, and then was paid for it at the easy rate of £5. "The prisoner's allowance," said Richter, "is bread and water, and I often had only the latter—but," he adds, "what is poverty? The pain of it is but as the pain in piercing the ears of a maiden, and you hang jewels in the wound." In science, the man who discovered the telescope and first revealed the heavens was paid with a dungeon: the man who invented the microscope and first revealed the earth died of starvation, driven from home. Kepler, one of the greatest astronomers of any age, worked out the motions of the heavenly bodies in a dreadfully painful manner. Sixty times did he go over the calculations, and was rewarded neither with honor nor cash. He had nothing but

a pension of £18, which the contemptible Government never paid him, and so was compelled to write almanacs for print. "Is it much for me," said he, in his isolation and extreme need, "that men should accept my discovery? If the Almighty waited six thousand years for one to understand what He had made, I can surely wait two hundred years for one to understand what I have seen."

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## UNIVERSITY CONSOLIDATION.

**A**GAIN and again we have thought this question dead, but the slightest change in collegiate affairs, the progress of one institution or the wants of another, seems almost certain of reviving it. It has lately been brought before us and this we offer as our apology for introducing the subject here.

Since the work and standing of the Denominational Colleges have been recognized, and their abolition deemed impracticable and impossible, we are now offered a new scheme, viz.—that of uniformity in graduation, the formation of one consolidated and universal examining body. This would remove the examination of students from the hands of the Professors by whom they have been trained, and would grant this power to a class of men whose acquaintance they form for the first time on examination day. Is this wise? Is this an improvement? We think not, looking at the question both from experience and from careful consideration.

In Canada and the States our Universities are such but *in embryo*: some are rapidly developing while others show but feeble signs of life. We hope and expect that in the course of years they will rival the great Universities of the Old World. There the Professor is independent: his standing and his future career are in his own hands: he is free to lecture as he sees fit: his enthusiasm is increased and his peculiar modes of teaching and lines of thinking are developed: his office is that of a leader among men. Such, we believe, should be the Professor's position: he should fit his men for life, not for a special examination: he should be given his freedom, both in the choice of subjects and in the mode of

treatment: the training of the men under him should be left unfixed and unrestrained, so that by his own personal acquaintance he may guide their course, arouse their ambitions and infuse some of his own enthusiasm and love of work.

What effect will uniformity of examinations have upon the class of true Professors? Instead of being leaders and guiders of men, they will tend to become tutors and coaches: their enthusiasm for true work will be weakened: their original modes of treatment will be laid aside, investigations and discoveries will be checked, and the soul of their duties will be strangled. Our colleges will tend to become immense cramming machines, the standard being arranged according to the number of victims. The Professors, instead of seeking new roads to discovery and invention, will wear along in ruts, and, worst of all, most of them will travel in the same rut.

The value of a degree, we believe, consists in the training undergone, the love of work and the mode of working acquired, not in the amount of work done or of knowledge obtained. It should represent the man who has done the work, not the work itself. If, however, we are to have these universal, unvarying and invariable laws regulating the work to be passed, we believe that it will take the very soul out of collegiate training by degrading the man below his work. If we are to have ambitious, energetic and enthusiastic graduates, let us not have the talents and energies of our independent thinkers and workers bound down and restrained by a rigid, inflexible course of study. Grant more independence to our teachers, so as to develop their peculiar modes of teaching, and let each man be judged and awarded by his results. Let us not have the avenues to new discoveries and improvements closed by such restraining influences. Let not the unhealthy ambition to "get men through" replace the healthier ambition to do work well and develop men. If this change be carried out, the future progress of our University career will be replaced by the coaching school and cramming college, our Professors will be turned into tutors, and our students treated as school-boys.

THIS country is, in extent, but little less than the whole of Europe. Europe cannot boast of many acres more than Canada through which the plow can be profitably passed. Therefore this Dominion can sustain nearly as large a population as Europe now possesses, and since it can, probably it ultimately will. These immense numbers of the human family will be what we make them. We are standing at the source of what will be a mighty human river, and have the power of shaping its course and forming its character. We may so direct it that it shall be a joy and a blessing to the whole earth, or we may leave it to soak in slow shallowness amidst bankless, boundless marsh, through poisonous reeds and slime, exhaling disease and death. The destinies of this great country are in the hands of the present generation, and we all, collectively, will have to answer to those who come after us for the condition to which we bring it. We are laying the foundations of what will be a stately and many-mansioned building. The character of the superstructure depends largely upon the character of the foundation. It is our business to lay broad, deep and secure foundations on which the ages may build.

Strength and stability cannot be measured by extent of territory. Bigness in a man is no proof of greatness. Bigness in a nation is not greatness in a nation. It may be opportunity for greatness, but it is not greatness itself. Put the cluster of British Isles beside the mass of South America, and then consider whether any race of men need care how much ground they stand upon. There are men living who stood in a blank wilderness where now stands cities larger than Athens in its palmiest days: Palestine is not much larger than many an Australian sheep-run or North-West cattle-ranche; yet where are the peoples that have scored deeper marks on the world's history than the Athenians and the Jews?

The test of a nation's condition is not its political constitution. No political constitution can ennoble knaves; no form of Government can free men from their faults, or change scampdom into Paradise.

Still less does national prosperity consist in wealth. We all admit in words that virtue ought to be first, but the working faith of most is in the power and beauty of money. Give them money, and morality, they think, will follow of itself.

Nor does prosperity consist in our multitude of men. Fill your nation with rascals and it is but the case with any other vermin—the more the worse. It is one thing, both in a man and a nation, to gain flesh, it is another thing to be swollen with dropsy. A little milk and flour are better than much chalk and arsenic, and a few good and healthy men are more to be desired than a multitude of diseased rogues.

The strength of a nation consists in character, in the unity and virtue of its men, not in its gold, nor laws, nor numbers, nor standing room. A little group of wise hearts is better than a wilderness full of fools. Only that nation which gains itself gains true power.

We owe much to our country. What is our stock in trade—the mental and moral wealth with which we can honor her demand?

In the first place we are Canadians; we come of a fine stock and our country has a right to expect much from us. Our race is of the best Northern blood. We are rich in an inheritance of honor bequeathed to us through the noble history of the Empire to which we belong. We are not dissolute in temper; we have the firmness to govern and the grace to obey. We are under a sky and upon a soil favorable to the development of the most robust qualities. The northern nations of the Old World have been larger limbed and stouter hearted than the children of those effeminate regions where the soil yields its harvests without labor, and warmth generates indolence and languor. The future of America, it is likely, will, in this respect, resemble the past of Europe. The hardy race which will yet dominate in this vast continent will probably be the men bred in this Dominion.

We are proud of our race, but we have not made it what it is. It takes many generations to breed high qualities of either mind or body. What we have in bone, blood and character, have been earned for us, no thanks to ourselves, by

twenty generations of ancestors. We have yet to justify our pride of race—that is to say, we have yet to earn the right to be proud of it. We are proud of our land, but we did not spread its glittering lakes nor shape its fertile shores. Before we boast of our country, before even we venture to call it ours, ought we not to weigh the exact share we have had in adding to it or adorning it—to calculate seriously the influence upon its development which the thoughts of our minds or the work of our hands has exercised?

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#### A PLEA FOR SCIENTIFIC EDUCATION.

THE first demand made upon us by our race and nation is that we be good men: true in word, just in action, pure in spirit—perfect men in what old-fashioned people used to call (and what we hope we shall never become so falsely scientific as not to call) the fear of God. Education is but a weapon that may be used for good or evil, according to the characters of those who possess it. The three R's, if not built on justice, purity, truth and reverence, will only produce what Miss Nightingale calls a fourth R of rascaldom.

Only second in importance to character is equipment—we mean Education. We have not the same views as our fathers had on the subject matter of education. Our children will not think as we do. We cannot tell what Canadian thought will be on these subjects a century hence, but we may know, if we are modest, that it will not be identical with ours. Education should be for the times in which we live, and for the country to which we belong. Canada is not England of the seventeenth century, nor England of the nineteenth. The Canada of a century hence will not be the Canada of to-day. Before we can take a step in the right direction, it is essential to know what our country needs in this year of grace 1883.

A settler in a new country builds his shanty, clears the forest, sows wheat and plants potatoes, before he adorns his grounds with fountains and statuary, and gives himself to landscape gardening. Croquet lawns and flowers are very



desirable: but if the man is to live, the potato patch must come first.

Canada is in the wheat and potato stage of development. Our country is new and but partially subdued. Its forests, its fisheries, its coal fields, its gold, iron and copper mines, its agricultural resources, are but imperfectly known. If we would know what our country is made of, and how to make the most of it, we must give the first place to scientific education. Canada will always be an agricultural country. It is destined to be the chief granary of the world. The elementary rules of the farmer's art are the simplest, and the rude practices of it the easiest; yet between the worst agriculture and the best lie agricultural chemistry, the application of machinery, the laws of the economy of force, and the most curious problems of physiology. The near future will witness a decided movement in the direction of large farms divided and subdivided into departments, each department directed by a specialist in science.

There is much to be done, and much will be done, during the present generation. Many breakwaters will be built where now the sea wars against harborless cliffs. Marshes will be dried, and the morass will give means of life instead of breathing the unclean pestilence. A net-work of railways will be spread over our land. There will be many Victoria Bridges. Harbors, docks, piers, canals, viaducts, tunnels will be multiplied; and the construction of these various engineering and architectural works that will overspread our land, and of the mines that are to run beneath it, will be directed from beginning to end by men of scientific education. Our Dominion controls sea as well as land. Three oceans wash our shores. We have large inland seas: We are now the fourth maritime power in the world, and with proper education we may, at no distant day, equal the sceptred isle. This is possible, but that it may be accomplished, honesty and skill must take the place of trickery and ignorance. During the last three seasons nearly 500 lives have been lost on our inland waters. The captain who miscalculates runs his ship ashore, and there is

loss of life and property. The engineer who misapplies his formulas for the strength of materials builds a Tay Bridge, and a Tay Bridge breaks down.

The objects of knowledge have multiplied beyond the powers of the strongest mind to keep pace with them all. One must choose between them. He must take one line, and rigidly and sternly confine his energies to it. In making that choice he may be guided by his tastes, but chiefly by the demands of his age and country. Until the forces of nature in this land are conquered to man's use, the study of science in its various branches is an indispensable necessity. History, poetry, music, logic, moral philosophy, classical literature, are excellent as ornament; but as they must, in the present stage of our country's development, occupy the leisure part of life, so they should occupy the leisure part of education.

We shall be asked whether, after all, these are not low objects for human beings to set before themselves. Is not spirit more than matter, and felicity more than food? Is there no such thing as pure intellectual culture? We think it can be easily shown that these facts which the partially developed state of our country makes it desirable for us to know, are the natural food which God intends for the intellect. Where you find one man fitted for the study of words, you find fifty men fitted for the study of things. But admitting, for the moment, that they are not so elevating as literature and philosophy, our reply would be that no man has the right to consider the planets and stars as revolving in their orbits merely to preserve inviolate a system of which he regards himself the centre. No man has the right to make self-culture the chief object of his existence. It is not a man's chief business to build himself up in perfect symmetry—faultily faultless, icily regular, splendidly *nil*.

JAMES ALLEN, M.A.

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“Let there be light and there was light; tis so: For was, and is, and will be, are but is; and all creation is one act at once, the birth of light.”—*The Princess*.

## ORIENTAL SKETCHES.

**M**Y first insight to true Orientalism was received at Constantinople at the moment of landing from the steamer. As my friend and I stepped ashore, a custom-house officer made his appearance, looked significantly at our baggage, placed his hand behind him, and half-turned his back towards me, murmuring at the same time the magic word "Baksheesh!" Mechanically, my hand went into my pocket, a silent transfer, and in another moment our baggage was passed and we were free to proceed on our way. "Baksheesh" is the key and the only key that will open the way through all obstacles in the East: and you are never allowed to forget it. Bribery is practised most unblushingly; even justice is bought and sold, the scales always turning in favor of the highest bidder. Either in commerce or in politics it is the same. Every man you have anything to do with has his price, and you have to pay it; the bribe increases in proportion to the position and wealth of the recipient and the interest you have at stake.

Surrounded by such corruption, despotism in its worst form is the style of Government. But in spite of his presumably absolute power, the poor Sultan leads a most unenviable life. Constantly harrassed by fears of assassination he never appears in public but once a month, when he attends a mosque for prayers. On one of these occasions it was that I had the pleasure of seeing His Sublime Highness. From his palace gates to the mosque, which was in close proximity, he had stationed a cordon of troops, who prevented the crowd from approaching within a hundred yards of his intended course. The Sultan, when he appeared, rode a magnificent milk-white Arab horse richly caparisoned. In person, he was a tall, slight man, of a very pale sallow complexion, black hair and beard. His costume was very simple, consisting of a dark brown uniform, the universal Fez, a single decoration, a star on his breast being the only insignia of rank.

In Turkey, everything seems reversed, when compared with our Western habits. They read and write from right to left. When entering a house they take off their shoes, and

keep on the Fez; when making a call at a friend's house they wait outside until the ladies have retired to their private apartments. A Turk must never be asked as to the welfare or health of his family. Time is no object to an Oriental, and a merchant and his customer will spend half a day bargaining over the most petty transaction. Lying is a virtue, if it is well carried out, and, to possess the qualification of a "magnificent liar," is to have a good business reputation. There is no Sabbath, but the faithful believer in Mahomet, if a strict observer of his religion, prays five times every twenty-four hours. Mahommedanism, in a most fanatical form, reigns supreme in Constantinople. Mosques are numerous, and the shrill voice of the Muezzin is heard at regular intervals during the day calling the faithful to prayers. The hated Christians are not permitted to enter the mosques, but in some cases religious scruples can be overcome by a judicious use of Turkish dollars. By this means we were able to inspect the interior of the celebrated Mosque of St. Sophia. But on attempting the same procedure at another mosque, we narrowly escaped rather unpleasant treatment at the hands of a mob that the priests threatened to set on us, with sticks and stones. The Dervishes are a peculiar set of religious enthusiasts amongst the Mahommedans, some of whom practice odd modes of worship. They are of different sects and have different styles of worship. The Dancing Dervishes, for example, seat themselves at first in a circle, and after reciting some passages from the Koran, their Sheik or Chief gives a signal, whereupon they all stand up and commence walking in a circle. Presently they change this to a spinning motion, with arms extended, until, in an apparently ecstatic state they become exhausted, when all suddenly stop at another signal. The chief article of their apparel is a long, drab skirt, very full, so that when spinning at full speed it spreads out like a huge umbrella-top, and adds considerably to the novelty of the entertainment. The howling Dervishes have an equally absurd form of worship. They also stand in a circle facing their Sheik in the centre, and after a short recitation on his

part from the Koran they all begin to repeat the phrase, "*La illaba il Allah.*" "God is God; there is but one God." The ejaculation of this sentence is repeated with various motions of the body, more or less energetic and with continually increased strength of voice, until suddenly, in a half-frenzied manner, they drop into a gasping imitation of the same sounds. A signal from the Sheik also puts an end to this. The performance will be repeated for about an hour.

I was much disappointed with Constantinople. Both the people and the city showed that poverty was general. Undoubtedly their protracted war with Russia had drained all available resources. Even, when I was there in the winter of 1880, thousands of poor Bulgarian refugees still lingered in the city, depending upon the charity of the Turks, quite unable to return to their former homes. The poor wretches were huddled together in miserable hovels made of mats, bits of boards and bushes, half clad and starving in mid-winter.

In contrast with this, for a charming picture of Oriental life I know of nothing more striking than a street scene in the native City of Cairo. The Muski, as the principal thoroughfare is called, is a narrow street, guiltless of pavement, and crowded with a busy, jostling throng of people. Such a medley can scarcely be described. There may be found representatives from nearly every nation in the East; the native Egyptians of all classes from the negro slave and the fellahen or peasants to the portly Pacha on a Mecca donkey; the staid Turk with closely-folded turban and flowing garments; the sharp-featured, dark-eyed Greek; an Arab Sheik from the desert with brilliantly colored koffiyeh and abayah; a Jew with ringlets and garberdine, a Persian with a cone-shaped black fur hat, a ragged Dervish, a gaily-attired seiboy. As is usual with Orientals, the women are veiled whenever they appear on the street. The higher classes wear the yashmak or muslin, as in Constantinople, but the lower classes wear a long narrow contrivance that is suspended so as to cover the lower part of the face and hang to the feet. Nearly all are pedestrians; some, however, go on donkeys.

The donkeys of Egypt do not bear the usual bad character that has been given to the donkey. They are docile, speedy and very comfortable to ride. Each donkey is attended by a small boy who carries a stick as a persuader, and who runs along behind, shouting out warnings to the people in front: "Ashmelak"—"look out for your right foot;" "Shemalak"—"look out for your left arm;" "Riglak"—"look out for your back." These donkey boys are noted for their astuteness, and are bright specimens of the genus street Arab. They crowd about the hotels, seeking patronage and extolling their animals. They salute you with "Hi! Master, dis berry fine donkey; him called Roger Tichborne." "Master, dis Antika, him Prince o' Wales' donkey!" One was irresistible, who cried, "My donkey, Bishop o' London; him debbil to go!"

The peddlers and perambulating merchants that frequent the streets are another feature that attracts one's attention. The vendors of fruits and sweetmeats, cooks and water-carriers are most frequently seen. Each advertises his wares by a peculiar cry. As an example, the water-carrier usually says: "Ya awand Allah!" "May God recompense me;" but at the same time he expects his customers to make themselves the Divine agents for conveying recompense to him. The jingling of his brazen cups and his sonorous cry may be heard all over the city. The cooks are very numerous, being counted by thousands, as the mass of the people depend upon them for their meals instead of performing the necessary cooking operations at home.

The wealthy Egyptians have built up a new and handsome quarter in the City of Cairo, after the French style. They also use carriages, but these are only used in the modern part of the city. Each carriage, as it passes through the streets is preceded by a scis-boy, who runs on in front to shout warnings, similar to those given by the donkey boys; and even to thrust aside the slow and unwary pedestrians in the street. The wealth of the country is most unevenly divided. There is a fair amount distributed amongst the inhabitants of the Cities of Cairo and Alexandria, but throughout the

country a miserable state of affairs exists. The land is owned by the Government or a few Noblemen, who rent it out to the Fellaheen or peasants, at such exorbitant rates, that the unfortunate people can barely reserve a livelihood for themselves. They depend entirely on agricultural pursuits; and in Egypt, the most arduous labor is entailed upon the agriculturist, since they have to depend so much upon artificial irrigation. Their appliances are of the rudest description, so that manual labor has to supply mechanical deficiencies. The Egyptian Government has of late conferred considerable benefits upon the Fellaheen, but much remains to be done for them. A better system of Government must be inaugurated before they will ever rise very much above their present condition.

F. W. BARRETT, M.A.

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#### TRUTH AND FICTION.

**A**RAGO has related the following episode in the life of Euler, the great mathematician, in order to illustrate the usefulness of the study of science, and the wonderful field of illustrations—startling, accurate, and truthful—which is thereby laid open to the ministers of the day.

“Euler, the great Euler, was very devout. One of his friends, a minister of one of the Berlin churches, came to him one day and said, ‘Religion is lost, faith has no longer any basis, the heart is no longer moved, even by the sight of the beauties—the wonders of creation. Can you believe it? I have represented this creation as everything that is beautiful, poetical and wonderful; I have quoted ancient philosophers and the Bible itself; half the audience did not listen to me—the other half went to sleep or left the church.’

“‘Make the experiments which truth points out to you,’ replied Euler. ‘Instead of giving the description of the world from Greek philosophers, take the astronomical world; unveil the world such as astronomical research has constituted it. In the sermon which has been so little attended to, you have

probably, according to Anaxagoras, made the sun equal to the Peloponnesus. Very well! Say to your audience that, according to exact incontestable measurements, our sun is 1,200,000 times larger than the earth.

“You have, doubtless, spoken of the fixed crystal heavens: say that they do not exist, that comets break through them. In your explanations planets were only distinguished from stars by movement; tell them they are worlds, that Jupiter is 1,400 times larger than the earth, and Saturn 900 times; describe the wonders of the ring; speak of the multiple moons of these distant worlds.

“Arriving at the stars, their distance, do not state miles; the numbers will be too great, they will not appreciate them; take as a scale the velocity of light; say that it travels 186,000 miles per second. Afterward add that there is no star whose light reaches us under three years; that there are some of them with respect to which no special means of observation has been used, and whose light does not reach us under thirty years.

“On passing from certain results to those which have great probability, show that, according to all appearance, certain stars could be visible several millions of years after having been destroyed, for the light which is emitted by them takes many millions of years to traverse the space which separates them from the earth.’

“Such was, gentlemen, shortened, and only with few modifications in figures, the counsel given by Euler. The advice was followed. Instead of the world of fable, the minister presented the world of science. Euler waited for his friend with impatience. He arrived at last, with dull eye, and in a manner which appeared to indicate despair. The geometer, very much astonished, cried out, ‘What has happened?’

“‘Ah! Herr Euler,’ replied the minister, ‘I am very unhappy; they have forgotten the respect which they owed to the sacred temple—they have applauded me.’”

The arguments here presented are as forcible now as they were half a century ago. We have too much fable, too much



fiction, too much useless controversy. Let us have facts, whether they be revealed in the scrolls of the heavens, the rocky pages of the earth, or the unfathomable waters under the earth. If religion is to fulfil her great mission, she must consult the great book of nature, acknowledge science as her true sister, harmonize the two great books, Nature and the Bible; casting aside the worn-out garments of doubts, disputings and uncertainties, she must clothe herself in the pure white robes of Truth.

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#### HELIUM.

THE recent discovery by Prof. Palmieri of a substance in the lava of Vesuvius, which gives a spectrum identical with that of a substance named helium, the incandescent vapour of which enters, according to recent observations, into the constitution of the corona, is deeply interesting. The coronal light, when examined spectroscopically, furnishes a faint continuous spectrum, on which stand out a group of brighter lines. Among these, one in the green, known as 1474, and a yellow line near D, ascribed to a substance termed helium, had, so far, failed to be recognized among the bright lines of the spectra of terrestrial substances. From this it was concluded that the corona of the sun contained either an element not included among those with which chemistry is familiar, or, what would be theoretically more interesting, that these lines represented the spectrum of an element, the atoms of which had been dissociated by the great heat prevalent on the surface of the sun. The possibility of such dissociation enters into certain theoretical conceptions of the nature of the atoms of the various elements according to which they are regarded, *not* (as the name indicates) as particles, which can not be cut or split into parts, but as groups of smaller particles alike in size and properties, from which any elementary atom might be built by taking the appropriate number of them and grouping them in certain, as yet not discovered, configurations. The number of particles and the configurations being constant

for the atoms of a given element, different for those of different elements. These groupes have so far withstood the dissociating effect of the agencies we have been able to bring to bear upon them: still such negative results are ascribed to the low intensity of the terrestrial agencies at our command. These groupes might yield, it is thought, to the dissociating effect of the intense heat on the surface of the sun. Such dissociated element or elements would, on account of their low specific gravity, be looked for just where the corona is observed, *i. e.*—enveloping the sun as an atmosphere. Together with the *debris* of fractured atoms we might expect to find in this atmosphere the lightest-known element—hydrogen. The lines of this element are in fact associated with those of 1475, and of helium in the line spectrum of the conora. Such a theory is captivating, from the fact that it aids in the conception of an evolution of atoms. Granted the possibility of dissociation by heat of the various atoms of the elements, and it will not be difficult to think of all the elements having once been dissociated, and conceive of the whole universe having had its origin in a parent substance, consisting of particles alike in form, size and quality, and in that state of intense agitation corresponding to an elevation of temperature of which we have now but an inadequate conception. The particles would then represent the building material entering into the architectural structures of the various atoms. A decrease in the original temperature would be accompanied by aggregation—grouping. The degree of aggregation or the complexity of the groupings and the number of particles entering into each configuration would be regulated by the special temperature to which the constituting substance had fallen, so that the complexity of any one atom would be directly as the atomic weight, but inversely as its temperature of dissociation. The temperature at which dissociation of the atoms of a given element would take place would then mark the temperature at which the element was first formed. If we arrange the elements according to their resistance to dissociation (providing this had been determined), we would

have a thermometric series which would indicate the temperatures through which gross matter had passed, in which, like the freezing and boiling points of a common thermometer, the elements would mark certain fixed temperatures, which would mark certain epochs of evolution.

The discovery of Palmieri will no longer allow us to look at helium as a substance, which resulted from the probable breaking down, by heat, of a known element. Still it must be remembered, that it is quite easy to be mistaken in the coincidence of spectral lines. The mistaken coincidence of the green line in auroral light, observed by Winlock, with the line 1474 in the spectrum of the corona, is a case in point. In view of such possibility, evolutionists will await with considerable interest the corroboration of the observation made by Palmieri before taking it as a factor to be considered in their special theory of the evolution of atoms.

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POT-HOLES.—A paragraph went the rounds of some of the newspapers a few weeks ago respecting certain curious wells hollowed out of the solid granite near Kingston. No attempt was made to explain their origin. Such wells, of various sizes, are by no means uncommon in the Laurentian range, east of Kingston. They are called Pot-holes or sometimes Devil's Boiling Pots. Is it not curious how popular imagination always associates the name of his Satanic Majesty with unaccountable things in the realm of nature? Angels are never credited with such doings. A brief study of pot-holes in the Thousand Islands or on the Upper Ottawa soon shows their origin. They are holes of all sizes, from a foot or two in width and as much in depth to immense wells ten feet wide and twice as many deep. They occur on the edge or bottom of ancient and still existing water courses. At the bottom are found a few well rounded stones. Every one has noticed how the eddies at the margin of a stream whirl leaves and sticks in their vortex. Just so pebbles and stones are whirled about at the bottom of large eddies and whirlpools till the rock beneath is worn into

shallow hollows or deep wells. If the water course becomes dry in the course of time these well-rounded and polished pits are left with the tools used in making them still lying at their bottom, and form an object of wonder to the unlearned and of interest to the geologist.

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#### A NEW METHOD IN BLOW-PIPE ANALYSIS.

**B**LOW-PIPE analysis is valuable from the ease and speed with which it enables us to detect elements in their compounds. Its results are excellent and perfectly trustworthy for a considerable number of elements; for others its methods are unfortunately less decisive; and for a few, no satisfactory blow-pipe test has been found, and recourse must be had to the far slower and less convenient processes of wet analysis. Any extension of its rapid methods is of great advantage to mineralogists and others who wish to make a rough analysis of minerals and ores without having all the resources of a laboratory at command.

By far the most important discovery of late years in blow-pipe analysis is that of the use of hydriodic acid as a test,—a method which will be fully described in the proceedings of the Royal Society of Canada for this year. No account of the method has yet appeared in print, so that a brief description here may prove interesting to blow-pipists. Enquiries as to the method have already reached Dr. Haanel from England; and, no doubt, his already high reputation as a scientist will be largely increased when the beautiful tests he has discovered come into use here and in Europe.

The appliances needed for these tests are very simple. In addition to the ordinary blow-pipe tools, one requires only a little strong hydriodic acid (made by letting sulphuretted hydrogen bubble up through water in which iodine is suspended) and some plaster tablets (easily made by pouring plaster of Paris mixed with the right proportion of water upon a glass plate and dividing the sheet, while moist, into suitable slabs).

A small piece of the substance to be examined is put in a cavity made at one end of a tablet. This is moistened with a few drops of the acid, and the blow-pipe flame is allowed to sweep over the assay. In many cases volatile iodides are formed which are deposited on the cool plaster surface beyond. Most of the coatings thus obtained are exceedingly brilliant and characteristic. Some twenty elements may be recognized in this way by their coatings. Curiously enough, they belong almost exclusively to three rows of Mendelejeff's periodic system and to no others.\*

The colors thus formed on the smooth, white surface of the tablets are simply wonderful in their strength and richness, and yet as delicately shaded and blended as the tints on the petals of a flower. Bismuth gives a rich, velvety-brown; Molybdenum, a deep, soft blue, like that of violets †; Mercury, a dull yellow, spotted with powerful scarlet; Lead, a beautiful yellow; and other metals' coatings almost as striking. Arsenic flames out upon the tablet in orange and yellow. It seems as if the mark of Cain were set on the brow of this murderous element, so numerous and striking are the tests by which it is detected.

An important feature of this latest contribution to the blow-pipe tests consists in the fact that two or more elements may be recognized by it at once, something that can hardly be said of any other method of analysis. If two or three elements are combined in a mineral, the more volatile coating will be formed first, or several coatings may be formed at once, but at slightly different distances from the assay, so that each may be distinguished.

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The list is as follows:—

Arsenic, reddish-orange.

Lead, chrome-yellow.

Tin, brownish-orange.

Silver, grayish-yellow (cold), canary-yellow (hot).

Antimony, orange-red.

Mercury, yellow (volatile) and scarlet.

Selenium, reddish-brown.

Bismuth, chocolate-brown.

Cobalt, greyish-brown, edged with green.

Thallium, orange-yellow and purplish-black.

Molybdenum, deep ultra-marine.

Tungsten, faint greenish-blue.

Copper, cadmium and zinc, all white but differentiated by simple tests.

† This is an oxide, however, not an iodide.

Enough has been said to show the value and interest of Dr. Haanel's tests, and the method has been roughly sketched. If the description appears somewhat too enthusiastic will those who work with the blow-pipe try it (with a little patience, for any new method requires practice), and they will be as delighted as the writer with the rapidity and beauty of the method.

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WEIGHTS AND MEASURES.—The amount of time and trouble expended every year by school-boys in learning the tables of weights and measures, and their teachers in keeping them at this distasteful work must be something enormous. Many a boy has cried over his work at night and had horrible dreams afterwards of "rods, poles or perches," and other instruments of torture which awaited him next day at school. The hatred felt toward his "tables" by the school-boy is no reasonless prejudice. We consider ourselves a practical people, wishing to go directly to the point in what we do, and yet we retain one of the clumsiest systems of weights and measures imaginable. We are inclined to smile at our slowly moving English relatives, because they do not adopt a decimal system in place of their unhandy pounds, shillings, pence and farthings. A decimal system of weights and measures of unrivalled simplicity is in use among most of the European nations—a system understood at sight—learned with ease in a day—and wonderfully reducing the labor of all calculations where weights or quantities are concerned. This is the French metrical system. Men of science have adopted it the world over. There is not an argument in favor of our present system except that we are accustomed to it, and would have to pass through a period of confusion before a new method could come thoroughly into use. Notwithstanding the inconvenience of change, if Canada were to adopt the metrical system, she would soon enjoy the benefits of simplicity and uniformity in all commercial transactions, and might be proud to be the first of the English-speaking nations to effect such a sensible reform.

## ORIGIN OF NUTS.

THIS kiln-dried walnut on my plate, which has suggested some abstract cogitations to my mind, is shown by its very name to be a foreign production; for the word contains the same root as Wales and Welsh, the old Teutonic name for men of a different race, which the Germans still apply to the Italians, and we, ourselves, to the last relics of the old Keltic population in Southern Britain. It means "the foreign nut," and it comes, for the most part, from the south of Europe. As a nut, it represents a very different type of fruit from the strawberry and raspberry, with their bright colors, sweet juices, and nutritious pulp. These fruits which alone bear the name in common parlance are attractive in their object; the nuts are deterrent. An orange or a plum is brightly tinted with hues which contrast strongly with the surrounding foliage; its pleasant taste and soft pulp all advertise it for the notice of birds or monkeys, as a means for assisting in the dispersion of its seed. But a nut, on the contrary, is a fruit whose actual seed contains an abundance of oils and other pleasant food stuffs, which must be carefully guarded against the depredations of possible foes. In the plum or the orange we do not eat the seed itself: we only eat the surrounding pulp. But in the walnut the part which we utilize is the embryo plant itself; and so the walnut's great object in life is to avoid being eaten. Accordingly, that part of the fruit which in the plum is stored with sweet juices is, in the walnut, filled with a bitter and very nauseous essence. We seldom see this bitter covering in our over-civilized life, because it is, of course, removed before the nuts come to the table. The walnut has but a thin shell, and is poorly protected in comparison with some of its relations, such as the American butternut, which can only be cracked by a sharp blow from a hammer; or even the hickory, whose hard covering has done more to destroy the teeth of New Englanders than all other causes put together, and New England teeth are universally admitted to be the very worst in the world. Now, all nuts have to guard against squirrels and birds; and, therefore, their peculiarities are exactly opposite

to those of succulent fruits. Instead of attracting attention by being brightly colored, they are invariably green like the leaves while they remain on the tree, and brown or dusky like the soil when they fall upon the ground beneath ; instead of being enclosed in sweet coats, they are provided with bitter, acrid, or stinging husks ; and instead of being soft in texture, they are surrounded by hard shells like the cocoanut, or have a perfectly solid kernel like the vegetable ivory.

The origin of nuts is thus exactly the reverse side of the origin of fruits. Certain seeds, richly stored with oils and starches for aiding the growth of the young plant, are exposed to the attacks of squirrels, monkeys, parrots, and other arboreal animals. The greater part of them are eaten and completely destroyed by these, their enemies, and so never hand down their peculiarities to any descendants. But all fruits vary a little in sweetness and bitterness, pulpy or stringy tendencies. Thus a few among them happen to be protected from destruction by their originally accidental possession of a bitter husk, a hard shell, or a few awkward spines and bristles. These the monkeys and squirrels reject ; and they alone survive as the parents of future generations. The more persistent and the hungrier their foes become, the less will a small degree of bitterness or hardness serve to protect them. Hence, from generation to generation, the bitterness and the hardness will go on increasing, because only those nuts which are the nastiest and the most difficult to crack will escape destruction from the teeth or bills of the growing and pressing population of rodents and birds. The nut which best survives, on the average, is that which is least conspicuous in color, has a rind of the most objectionable taste, and is enclosed in the most solid shell. But the extent to which such precautions become necessary will depend much upon the particular animals to whose attacks the nuts of each country are exposed. The European walnut has only to defy a few small woodland animals, who are sufficiently deterred by its acrid husk ; the American butternut has to withstand the long teeth of much more formidable forestine rodents, whom it sets at naught with



its stony and wrinkled shell; and the tropical cocoas and Brazil nuts have to escape the monkey, who pounds them with stones, or flings them with all his might from the tree top so as to smash them in their fall against the ground below.

Our own hazelnut supplies an excellent illustration of the general tactics adopted by the nuts at large. The little red tufted blossoms, which everybody knows so well in the early spring, are each surrounded by a bunch of three bracts; and as the nut grows bigger, these bracts form a green leaf-like covering, which causes it to look very much like the ordinary foliage of the hazel-tree. Besides, they are thickly set with small prickly hairs, which are extremely annoying to the fingers, and must prove far more unpleasant to the delicate lips and noses of lower animals. Just at present the nuts have reached this stage in our cospes; but as soon as autumn sets in, and the seeds are ripe, they will turn brown, fall out of their withered investment, and easily escape notice on the soil beneath, where the dead leaves will soon cover them up in a mass of shrivelled brown, indistinguishable in shade from the nuts themselves. Take, as an example of the more carefully protected tropical kinds, the cocoanut. Growing on a very tall palm-tree, it has to fall a very considerable distance toward the earth; and so it is wrapped around in a mass of loose knitted fibre, which breaks the fall just as a lot of soft wool would do. Then, being a large nut, fully stored with an abundance of meat, it offers special attractions to animals, and consequently requires special means of defence. Accordingly its shell is extravagantly thick, only one small, soft spot being left at the blunter end, through which the young plant may push its head. Once upon a time, to be sure, the cocoanut contained three kernels, and had three such soft spots or holes; but now two of them are aborted, and the two holes remain only in the form of hard scars. The Brazil nut is even a better illustration. Probably few people know that the irregular angular nuts which appear at dessert by that name are originally contained inside a single round shell where they fit tightly together, and acquire their queer, indefinite shapes by

mutual pressure. So the South American monkey has first to crack the thick, external common shell against a stone or otherwise; and if he is successful in this process, he must afterwards break the separate sharp-edged inner nuts with his teeth—a performance which is always painful and often ineffectual.

GRANT ALLEN.

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LIFE IN NATURE.

**B**UT if we think of nature on a larger scale, we remember that there is another property, or tendency of matter, cognate to chemical affinity, but affecting masses as well as atoms. Why should not *gravity* afford the conditions requisite for an organic relation of the masses of which the universe consists? We know there also exists a force opposed to gravity, which produces an arrangement of the heavenly bodies in relations different from that in which gravity tends to place them. Why should not this force constitute, in respect to them, a true analogue of the vital force? It has been suggested that the distances of the stars from each other are probably not greater in proportion than those which separate the particles of what we call solid matter and that the stellar universe might present, to senses of proportionate scope, an appearance like that which solids present to us. A group of stars may thus be regarded as constituting a substance—why not a vital substance? We certainly know it to be full of the intensest activities, and to be the seat, especially of two counteracting forces. Why should not this “substance” be moulded also, into truly, vital forms? In short, why should not the multitude of stars constitute one or more living wholes? Would they not thus present to us a strict parallel to the “living wholes” which we have long recognized to be such—unliving particles in living relations to each other? True, the earth we live on is inorganic; true, we have good reason to conclude all the orbs contained in space to be inorganic, too. This is no reason that they are not “particles”—atoms—though inorganic by themselves, in an organization of a corresponding magnitude. The atoms of which our own bodies consist, also, are inorganic by themselves.

JAMES HINTON.

## POVERTY OF THE AGE.

IT is a fundamental principle of political economy that a nation is civilized in the same degree, as its members mutually assist each other and have reciprocal interests. Anything, then, which tends to draw men together, and bring them into closer relations with each other, would be regarded as having a civilizing effect; while, on the contrary, that which separates and secludes members of a community must be considered as injurious to the march of civilization and detrimental to the true interests of humanity. With this thought a question naturally presents itself: Is the present age so eminently progressive and so conducive to true civilization as it is usually regarded? Progress, there, undoubtedly is; but does this progress unify and consolidate the human race, or does it rather tend in the opposite direction? By this progress are the members of the human family drawn closer to each other, or does it render their interests inimical, and themselves, of necessity, unfriendly to each other?

The marvellous inventions of modern days have, no doubt, greatly added to the effect of human industry, and vastly increased the wealth-producing power of the race. We would expect, then, to see the average wealth of man correspondingly increased, and the conditions of all classes improved. With so many labor-saving appliances the toil of the workman should be lightened and his remuneration increased.

The question is: Are men thus being universally benefited? Is poverty being lightened and a period of contentment and prosperity for all classes being ushered in? We fear not. The prosperity seems to be on one side, and inequality daily becoming more marked. The rich are adding to their wealth, while the poor are forced to drink still deeper the dregs of pauperism and disgrace; in many places, and perhaps generally so, the condition of the working classes is absolutely worse than it was a century ago. Morality is also degraded, for with poverty must come its usual concomitants—vice, crime, and ignorance. In our large cities, especially, the

earnings of labor are less in proportion to the price of subsistence, extreme poverty is on the increase, and, consequently, all the crime and immorality incident to such a condition

This state of affairs should be improved. It is not! Why, it is the business of political economy to explain, and suggest, if possible, a remedy.

Many theories have been advanced, but none of them, perhaps, is wholly satisfactory or entirely covers the case in point.

Such a one we find in the Malthusian theory of population. This theory was, to say the least, stated by Mr. Malthus in a manner very repugnant to human sensibilities, and almost disrespectfully of the Divine Creator of things, but it has, nevertheless, gained much popularity and almost universal credence for many years. One reason for this, probably, was that it was a very convenient way of shifting the responsibility of the sad state of affairs from man to a higher Being. He argued that the human race naturally tends to increase faster in proportion than the means of subsistence, and in the struggle for life many must necessarily fall. He made some astounding, and yet absurd, calculations, from which he proved that mankind increases in a geometrical ratio, while the means of sustaining life, with the very best methods of cultivation, can only increase in an arithmetical one. This, of course, carried out, would show that there could not be food enough, and that many must die of poverty and distress, owing to the lack of nature to supply their wants. Any rational observer, however, must conclude that the earth is capable of supporting many more than its present population.

It seems derogatory to our ideas of Deity to suppose that He would place men on earth to live a life worse than death itself, and where life could not possibly be sustained.

Tennyson very pertinently puts the query:—

“Are God and nature then at strife,  
That nature lends such evil dreams?  
So careful of the type she seems—  
So careless of the single life.”

We see rather, on the contrary, that the wealthiest nations are those most densely populated, and wealth is only food or its equivalent stored up.

We do not see the greatest amount of wealth in the most-productive countries, but where the greatest amount of labor is exerted. Not in Mexico, but in Maryland; not in Brazil, but Britain.

There is room and food for many more on the earth than its present population, and famine is now no more attributable to this cause in densely-populated China or Ireland than in Brazil with but few inhabitants.

Another cause assigned for prevailing poverty is the relation existing between labor and capital, by which the wages of labor are shown to be dependent on the amount of capital invested in employment. This doctrine is generally assumed, and its principles often laid down as a kind of cold comfort to suffering humanity, who must look for the origin of their evils to an inevitable sequence of events—a law as inflexible as those of the material universe. Grave doubts are still entertained as to the truth of this doctrine, notwithstanding the weight of authority by which it is supported.

The laws of rent many claim to be the most productive source of the wide-spread poverty of the age. It is just a question whether one man should have the right to make another pay for the privilege of living—for his title to standing-room on this our globe.

Rent will always absorb the whole margin of profit, after deducting a certain amount for risk incurred and capital invested. In this way it very materially increases the inequalities already existing among men, and some would ascribe to it all the evils of our day.

Not rent alone, but everything which tends to increase the inequalities now in existence is a great cause of the growing poverty of our age.

Something is radically wrong, but the difficulty is to get at either a cause or a cure. It is a human fault, and not Divine, that men are every day left to languish and die in a

land filled with plenty. Every man, if willing to work, is justly entitled to enough, and more than enough, to keep body and soul together. We do not at all believe in the natural equality of men, for if a man has more than ordinary industry or ability he should receive its proper reward; but no one should be legislated into opulence or aggrandized by the efforts of a toiling community and with no effort whatever on his part. We cannot disguise the fact that things are far different from what they should be—that those suffer who should not, while the undeserving and idle are beyond the reach of care. Where is the remedy for such a state of affairs? Difficulties are on every side. The standard of truth and justice has again and again been trampled down, sometimes in blood. This has been, and may be again, but the fact still remains that this is the problem of the day, and its satisfactory solution is anxiously looked for by every friend of the poor and oppressed.

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#### FOURTH DIMENSION OF SPACE.

I HAVE just come to speak of four-dimensional space. What meaning do we attach to it? or can we attach any meaning to it? It may be at once admitted that we cannot conceive of a fourth dimension of space; that space as we conceive of it, and the physical space of our experience, are alike three-dimensional; we can imagine rational beings living in a one-dimensional space (a line), or in a two-dimensional space (a surface), and conceiving of space accordingly, and to whom, therefore, a two-dimensional space, or (as the case may be) a three-dimensional space, would be as inconceivable as a four-dimensional space to us. And very curious speculative questions arise. Suppose the one-dimensional space a straight line, and that it afterwards becomes a curved line, would there be any indication of the change? Or, if originally a curved line, would there be anything to suggest to them that it was not a right line? Probably not, for a one-dimensional geometry hardly exists. But let the space be

two-dimensional, and imagine it originally a plane, and afterwards bent (converted, that is, into some form of developable surface), or converted into a curved surface. In the former case there should be an indication of the change, for the geometry originally applicable to the space of their experience (our own Euclidian geometry) would cease to be applicable; but the change could not be apprehended by them as a bending or deformation of the plane, for this would imply the notion of a three-dimensional space in which this bending or deformation could take place. In the latter case their geometry would be that appropriate to the developable or curved surface which is their space, viz.; this would be their Euclidian geometry. Would they ever have arrived at our own more simple system? But take the case when the two-dimensional space is a plane, and imagine the being of such a space familiar with our own Euclidian plane geometry; if, a third dimension being still inconceivable by them, they were by their geometry or otherwise led to the notion of it, there would be nothing to prevent them from forming a science—such as our own science—of three-dimensional geometry.

DR. ARTHUR CAYLEY.

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A HEAVY BRAIN.—Dr. Halderman, of Columbus, records in the *Cincinnati Lancet and Clinic*, the case of a mulatto, named Washington Napper, aged 45, whose brain was found to weigh 68¾ ounces, nearly 5 ounces more than the brain of the famous Cuvier. Gambetta's brain weighed only 38½ ounces.

THE rapid advance made in this country towards providing for the higher education of women is evinced by the fact that three of our cities, Montreal, Kingston, and Toronto have provision made now by which women may proceed regularly to the degree of M.D. At the convocation of Victoria University, 1883, this degree was granted for the first time in Canada to a lady, who has since been made one of the teaching staff of the Women's Medical College in Toronto.

**A**MERICAN science is a thing of the future, and not of the present or past; and the proper course of one in my position is to consider what must be done to create a science of physics in this country, rather than to call telegraphs, electric lights, and such convenience by the name of science. I do not wish to underrate the value of all these things: the progress of the world depends on them, and he is to be honored who cultivates them successfully. So also the cook, who invents a new and palatable dish for the table, benefits the world to a certain degree; and yet we do not dignify him by the name of a chemist. And yet it is not an uncommon thing, especially in American newspapers, to have the *applications* of science confounded with pure science; and some obscure American who steals the ideas of some great mind of the past and enriches himself by the application of the same to domestic uses, is often lauded above the great originator of the idea, who might have worked out hundreds of such applications had his mind possessed the necessary element of vulgarity. I have often been asked which was the more important to the world, pure or applied science. To have the applications of a science, the science itself must exist. Should we stop its progress and attend only to its applications, we should soon degenerate into a people like the Chinese, who have made no progress for generations, because they have been satisfied with the applications of science, and have never sought for reasons in what they have done. The reasons constitute pure science.

To a civilized nation of the present day the applications of science are a necessity; and our country has hitherto succeeded in this line only for the reason that there are certain countries in the world where pure science has been and is cultivated, and where the study of nature is considered a noble pursuit. But such countries are rare, and those who wish to pursue pure science in our own country must be prepared to face public opinion in a manner which requires much moral courage. They must be prepared to be looked down upon by every successful inventor whose shallow mind



imagines that the only pursuit of mankind is wealth, and that he who obtains most has best succeeded in this world. Everybody can comprehend a million of money; but how few can comprehend any advance in scientific theory; especially in its more abstruse portions! And this, I believe, is one of the causes of the small number of persons who have ever devoted themselves to work of the higher order in any human pursuit. Man is a gregarious animal, and depends very much for his happiness on the sympathy of those around him; and it is rare to find one with the courage to pursue his own ideals in spite of his surroundings. In times past men were more isolated than at present, and each came in contact with a fewer number of people. Hence that time constitutes the period when the great sculptures, paintings, and poems were produced. Each man's mind was comparatively free to follow its own ideals, and the results were the great and unique works of the ancient masters. To-day, the railroad and the telegraph, the books and newspapers, have united each individual man with the rest of the world: instead of his mind being an individual, a thing apart by itself, and unique, it has become so influenced by the outer world, and so dependent upon it, that it has lost its originality to a great extent.

As far as the average man is concerned, the change is for the better. The average life of man is far pleasanter, and his mental condition better, than before. But we miss the vigor imparted by the mountains. We are tired of mediocrity, the curse of our country. We are tired of seeing our artists reduced to hirelings, and imploring Congress to protect them against foreign competition. We are tired of seeing our countrymen take their science from abroad, and boast that they here convert it into wealth. We are tired of seeing our professors degrading their chairs by the pursuit of applied science instead of pure science; or sitting inactive while the whole world is open to investigation; lingering by the way-side while the problem of the universe remains unsolved.

For generations there have been some few students of science who have esteemed the study of nature the most noble

of pursuits. Some have been wealthy, and some poor; but they have all had one thing in common—the love of nature and its laws. To these few men the world owes all the progress due to applied science, and yet very few ever received any payment in this world for their labors.

We now weigh and measure electricity and electric currents with as much ease as ordinary matter, yet have we made any approach to an explanation of the phenomenon of electricity? Light is an undulatory motion, and yet do we know what it is that undulates? Heat is motion, yet do we know what it is that moves? Ordinary matter is a common substance, and yet who shall fathom the mystery of its internal constitution?

How shall we, then, honor the few, the very few, who, in spite of all difficulties, have kept their eyes fixed on the goal, and have steadily worked for pure science, giving to the world a most precious donation, which has borne fruit in our greater knowledge of the universe and in the applications to our physical life which have enriched thousands and benefited each one of us? There are also those who have every facility for the pursuit of science, who have an ample salary and every appliance for work, yet who devote themselves to commercial work, to testifying in courts of law, and to any other work to increase their present large income. Such men would be respectable if they gave up the name of professor, and took that of consulting chemists or physicists. And such men are needed in the community. But for a man to occupy the professor's chair in a prominent college, and, by his energy and ability in the commercial applications of his science, stand before the local community in a prominent manner, and become the newspaper exponent of his science, is a disgrace both to him and his college. It is the deathblow to science in that region. Call him by his proper name, and he becomes at once a useful member of the community. Put in his place a man who shall by precept and example cultivate his science, and how different is the result! Young men, looking forward into the world for something to do, see before them this high

and noble life, and they see that there is something more honorable than the accumulation of wealth. They are thus led to devote their lives to similar pursuits, and they honor the professor who has drawn them to something higher than they might otherwise have aspired to.

I do not wish to be misunderstood in this matter. It is no disgrace to make money by an invention, or otherwise, or to do commercial scientific work under some circumstances. But let pure science be the aim of those in the chairs of professors, and so prominently the aim that there can be no mistake. If our aim in life is wealth, let us honestly engage in commercial pursuits and compete with others for its possession. But if we choose a life which we consider higher, let us live up to it, taking wealth or poverty as it may chance to come to us, but letting neither turn us aside from our pursuit.

The work of teaching may absorb the energies of many; and indeed this is the excuse given by most for not doing any scientific work. But there is an old saying that where there is a will there is a way. Few professors do as much teaching or lecturing as the German professors, who are also noted for their elaborate papers in the scientific journals. A university should not only have great men on its faculty, but have numerous minor professors and assistants of all kinds, and should encourage the highest work, if for no other reason than to encourage the student to his highest efforts. But, assuming that the professor has high ideals, wealth such as only a large and high university can command is necessary to allow him the fullest development.

In the year 1880 the private bequests to all schools and colleges amounted to about 5,500,000 dollars. We must make the need of research and of pure science felt in the country. We must live such lives of pure devotion to our science, that all shall see that we ask for money, not that we may live lives of indolent ease at the expense of charity, but that we may work for that which has advanced and will advance the world more than any other subject, both intellectually and

physically. We must live such lives as to neutralize the influence of those who, in high places, have degraded their profession, or have given themselves over to ease, and do nothing for the science which they represent. Let us do what we can with the present means at our disposal. There is not one of us who is situated in the position best adapted to bring out all his powers, and to allow him to do most for his science. All have their difficulties, and I do not think that circumstances will ever radically change a man. If a man has the instinct of research in him, it will always show itself in some form.

I do not believe anybody can be thorough in any department of science, without wishing to advance it. In the study of what is known, in the reading of the scientific journals, and the discussion therein contained of the current scientific questions, one would obtain an impulse to work, even though it did not before exist. And the same spirit which prompted him to seek what was already known, would make him wish to know the unknown. And I may say that I never met a case of thorough knowledge in my own science, except in the case of well-known investigators. I have met men who talked well, and I have sometimes asked myself why they did not do something; but further knowledge of their character has shown me the superficiality of their knowledge.

What would astronomy have done without the endowments of observatories? By their means, that science has become the most perfect of all branches of physics, as it should be from its simplicity. There is no doubt, in my mind, that similar institutions for other branches of physics, or, better, to include the whole of physics, would be equally successful. A large and perfectly equipped physical laboratory, with its large revenues, its corps of professors and assistants, and its machine-shop for the construction of new apparatus, would be able to advance our science quite as much as endowed observatories have astronomy. But such a laboratory should not be founded rashly. The value will depend entirely on the physicist at his head, who has to devise the plan, and to

start it into practical working. Such a man would be always rare, and could not always be obtained. After one had been successfully started, others could follow ; for imitation requires little brains.

As stated before, men are influenced by the sympathy of those with whom they come in contact. It is impossible to immediately change public opinion in our favor ; and, indeed, we must always seek to lead it, and not be guided by it. We must create a public opinion in our favor, but it need not at first be the general public. We must be contented to stand aside, and see the honors of the world for a time given to our inferiors ; and must be better contented with the approval of our own consciences, and of the very few who are capable of judging our work, than of the whole world beside. Let us look to the other physicists, not in our own town, not in our own country, but in the whole world, for the words of praise which are to encourage us, or the words of blame which are to stimulate us to renewed effort. For what to us is the praise of the ignorant ? Let us join together in the bonds of our scientific societies, and encourage each other, as we are now doing, in the pursuit of our favorite study ; knowing that the world will sometime recognize our services, and knowing, also, that we constitute the most important element in human progress.

We call this a free country, and yet it is the only one where there is a direct tax upon the pursuit of science. The low state of pure science in our country may possibly be attributed to the youth of the country ; but a direct tax to prevent the growth of our country in that subject cannot be looked upon as other than a deep disgrace. I refer to the duty upon foreign books and periodicals. One would think that books in foreign languages might be admitted free ; but to please the half-dozen or so workmen who reprint German books, not scientific, our free intercourse with that country is cut off.

The time is almost past, even in our own country, when third-rate men can find a place as teachers because they are

unfit for everything else. We wish to see brains and learning, combined with energy and immense working power, in the professor's chair; but, above all, we wish to see that high and chivalrous spirit which causes one to pursue his idea in spite of all difficulties, to work at the problems of nature with the approval of his own conscience and not of men before him.

The whole universe is before us to study. The greatest labors of the greatest minds have only given us a few pearls; and yet the limitless ocean, with its hidden depth filled with diamonds and precious stones, is before us. The problem of the universe is yet unsolved, and the mystery involved in one single atom yet eludes us. The field of research only opens wider and wider as we advance, and our minds are lost in wonder and astonishment at the grandeur and beauty unfolded before us. Shall we help in this grand work, or not? Shall our country do its share, or shall it still live in the almshouse of the world?—*Selections from Prof. Rowland's Address.*

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#### HAEKEL IN INDIA.

TO adequately describe the diverse manners and customs of Bombay's heterogeneous population passes the power of my pen. The Hindus, who form the largest section, are of rather diminutive stature, delicate build, and dark brown color. The Hindu children are most charming; their little naked forms are to be seen everywhere. Even the adult males of the lower classes wear only a narrow scarf around the loins; consequently the artist or sculptor might here with advantage study the structure of the human form, the youths of sixteen to twenty years offering specially fine models. Indeed, one might justly call these shapely lads the "fairer sex;" their features are often refined and noble, and distinguished by a dreamy expression that is very attractive. There are also some neat figures among the women, whose simple flowing garments give them an exceedingly graceful appearance, but a really handsome feminine face is rare. The girls marry very

young—at ten or fifteen years of age; they fade quickly and become extremely ugly old women. In addition to their natural homeliness they disfigure their faces by wearing in the left nostril a silver hoop adorned with precious stones, and many of these nose-rings are so large that the mouth and chin are covered by them. The women all chew betel, which stains the lips and teeth a vivid yellow. The forehead is striped with various colors to indicate the cast of the wearer, the arms are tattooed, and both sexes wear silver bangles and rings around the ankles and toes. In this garb the Hindu, although he is descended from the same race—the Aryan—as that of our European forefathers, appears a genuine “savage.” Caste distinctions and the Brahminical faith prevail among them to this day; the Hindu still burns the bodies of his dead, and, when riding along the shore of Back Bay, you may see in the immediate vicinity of the railway station the huge ovens in which by the simplest process the dead bodies are transformed to ashes—a more convenient and less costly method of cremation than is at present practised in Gotha. According to the census in 1872 more than three-fifths of the inhabitants of Bombay are orthodox Hindus under Brahminical domination: 140,000—more than one-fourth the whole number—are Mussulmans, and only 15,000—scarcely one forty-fifth—are Buddhists. A few thousand Jews, Chinese, Africans, and a mixture of all nationalities make up the total. Accordingly you may imagine the heterogeneous character of the throng in the streets of Bombay, and guess what an infinite variety of types, forms, customs, and manners are here mingled together. Perhaps in no other city on the globe are more languages heard than in Bombay—especially in the European quarter, where every known tongue has its representative. One of the most important components of the population of Bombay—as well as in all Indian cities—is the Parsee, or Guebre. They number about 50,000—only one-twelfth of the whole number—but their enterprise and industry have won for them such influence that they play a prominent part in all the affairs of the city. They are descended from those ancient

Persians who, after the conquest of Persia by the Mahomedans in the seventh century, refused to accept the faith of their conquerors, and clung tenaciously to the doctrines of Zoroaster. After their expulsion from Persia the Parsees fled to the island of Ormuz, from whence they scattered over India. They marry only among themselves, consequently the purity of their race is preserved. Aside from their peculiar dress, they may, at a first glance, easily be distinguished from all the other races. The men are tall and stately—most of them corpulent; they have yellowish complexions, and are on the whole a handsomer and more robust people than the effeminate Hindus. They wear a peculiar long white cotton gown, wide trousers of the same material, and a tall meure-shaped hat. Their features express energy and sagacity; they are frugal and sober, and, like the Jews in Europe, thoroughly understand how to accumulate large fortunes. Many of the wealthiest residents of Bombay are Parsees. As hotel-keepers, ship-builders, mechanic, and technician, the Parsee has won for himself an enviable reputation. They are justly celebrated for their domestic virtues. The dress of the Parsee farmer consists of a single long simply-fashioned garment of some bright color: green, red, yellow, etc. The wealthier Parsee children are frequently seen driving about the streets clad in the most gorgeous raiment of gold and silver embroidered stuffs. Many of them live in beautiful villas, surrounded by all the luxuries, and, no doubt, arouse the jealous envy of many an impecunious Christian from Europe.

A number of Parsees have founded useful and beneficial institutions; several have been knighted for services rendered the British Government. The public spirit and enterprise of the Parsee, evidences his freedom from priestly domination. His faith—the doctrine of Zoroaster—which is one of the noblest natural religions, is founded on a belief in creative and sustaining powers. Chief among these are the sun and his likeness, fire. Multitudes of these sun or fire-worshippers may be seen on the seashore at sunrise and sunset, devoutly attesting their reverence for the approaching or departing god of



day. I confess I never looked with more sympathetic reverence on the devotions of any people than upon these pious sun-worshippers.

Are not we naturalists, who believe that the light and heat of the sun are the primary source of all organic life on our earth, really sun-worshippers?

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**PERSONAL SANITARY MEASURES.**—The natural duration of sleep is eight hours out of the twenty-four, and those who can secure this lead the soundest lives. It is best taken from ten o'clock till six, and it is best obtained by cultivating it as an automatic procedure. All stimulants, all excitements, all excessive fatigues, all exhaustions prevent sleep, even if they do not permit it. The room in which sleep is taken should be the best ventilated and most equally warmed room in the house. The air of the room should be maintained at the natural standard of 60° F., and the body of the sleeper should always be kept completely warm. The bed should be soft and yielding. A regular tendency to sleep at other hours than the natural is a sure sign of error of habit or of nervous derangement.

Connected with cleanliness of clothing, as a means of health, is personal cleanliness. Perfected action of the skin, so essential to the perfect life, can only be obtained by thorough ablution of the whole body. The ablution ought, strictly, to be performed once in every twenty-four hours. It is best to train the body to the use of cold water through all seasons, so that the requirement for water of raised temperature may not become a necessity. The simplest and best bath is the ordinary sponge-bath. Plungings, splashings, showers and the like are mere pastimes. The occasional use of the hot-air or Turkish bath is an important adjunct to the means of maintaining health.—*B. W. Richardson.*

MR. D. M. STICKEY, class '86, has, for a short time, resumed teaching at Shannonville, Ont. He has a good reputation as a successful teacher and disciplinarian. He will return in '84.

MR. D. W. SNIDER, class '86, who spent the summer months in London Centenary Church, and who was presented with a purse of \$100 on leaving, has been ordered out, on short notice, for the winter, to Paris, Ont.

MR. A. G. BROWNING, of the class '85, is also away from us this year driving the stenographer's pen, gaining electrical knowledge, and imbibing geological ideas on the C. P. R. His address is Algoma Mills, Ont.

MR. GEO. J. LAIRD, B.A., '81, has received the appointment to the Chair of Chemistry in Mt. Alison University, Sackville, N. B. He is rapidly working his way to the front, and we hope and expect that a brilliant career is before him.

THE inaugural address by our Assoct.-President, Mr. Wm. Elliott, will be delivered in Faraday Hall, on the evening of Wednesday, November 21st. Subject—"What is Truth?" We hope that some of our corresponding members will be able to attend.

WEDDING BELLS.—We add our congratulations and good wishes to Rev. L. W. Crews, B.A., and lady. The event took place at Masonville, London, on Wednesday, Sept. 5th, 1883. The happy bride, who has thus rescued our member of long-standing, was Miss Kate Louisa, second daughter of Chas. W. Sifton, Esq., of London.

MR. P. T. PILKEY, B.A., '82, who has finished one year's work in mathematics and astronomy at Breslau University, Germany, has been enjoying a tramp over the Swiss Alps and through the beautiful valleys of the Tyrol. We expect, in an early number, to publish some interesting accounts of his travels and impressions abroad.

MR. M. F. LIBBY, of class '85, has secured the position of Assistant-Master in the Pembroke High School, in which, we are glad to hear, he is succeeding admirably.

### In Memoriam.



For the second time since its foundation in '74, the ranks of the Association have been invaded by death. This time one of our strongest and most promising members has been removed. Mr. Chas. W. Lasby was beloved and respected, while at college, by a large class of warm-hearted friends. He won the respect of all by his manly disposition, superior abilities and sterling honesty. He graduated, as silver medallist, in May, '81, one of the most promising members of his class, both in his mental abilities and his strong physical constitution. After studying law for a time in St. Catharines, he went to Toronto, where his studies were cut short by a serious attack of typhoid fever in the early part of the present year. He recovered, however, and, with restored health, he attended Convocation in Cobourg, May, 1883. The next that we heard was the news of his death. He caught a heavy cold, had a return of the fever, and died at Acton, July 27th, 1883.

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FORDYCE BARKER'S OPINION OF YOUNG MEN.—My own experience has been that from this class I learn the most; it is from them that I get the most useful knowledge and the most valuable suggestions. I hold it to be one of the great missions of this academy to bring out and develope, by its library and its scientific work, the young men who are to care for its interests and give the stamp of character to the academy and the medical profession of this city in the future.—*N. Y. Medical Journal.*