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V. P. JOURNAL

VOL. I.]

JANUARY, 1884.

[No. 4.

NOTES.

IN binding the December issue of the Journal, a mistake was made in a few numbers. Should these have found their way into the hands of any of our subscribers we would be very thankful if notified, so that other numbers may be supplied. The mistake was not ours; we are sorry it has occurred, and we hope that but few such mistakes have been made. A card sent at once to the Business Manager will secure you a copy of the issue.

THE human vocal apparatus—lungs, windpipe, larynx, mouth, throat and nose—has been likened to a musical instrument capable of rendering shades of expression far more delicate than any that can emanate from a musical instrument “the work of men’s hands.” It is emphatically a reed instrument, in which the lungs are the bellows, the windpipe the sound board, the larynx the reed box, the vocal cords the reeds, the throat, mouth and nose the resonance attachment. Yet the natural instrument is immensely superior to the artificial one, and it is a noticeable fact that the nearer the tones of an artificial instrument approach those of the human voice, the more perfect is that instrument considered, and the sweeter is the music produced.

WE have received a letter from Rev. T. G. Williams, of Brockville, complaining of some remarks made in our article on “Ministerial Education,” in the November issue of this

Journal. Mr. Williams seems to have mistaken our meaning in more than one respect: we had no reference whatever to strictly theological work, but our whole article, as may easily be seen, was a plea for an increased amount of literary and scientific training. Speaking of the action of the Methodist Church, he denies that the standard has been lowered in the slightest respect, in which he evidently has reference to the final theological or professional examinations. This, of course, we readily admit, as we were not aware any material change had been effected there whatever, and we only claimed then, as now, that the preliminary examination had been lowered. What we have stated in the above light we believe to be facts, and do not care to enter into an endless controversy, productive of good to none of our readers.

THE human voice should be cultivated as much as possible. There are hundreds and thousands of people in the world to-day, who, had they properly trained their voices when young, would now possess excellent ones. The inability of certain people to sing is often due more to their own neglect than to the natural incompetency of their vocal apparatus. A person cannot play skilfully on a piano until his fingers become flexible from practice, and this practice must be performed in youth, before the muscles of the arm and hand become fixed. The education of the other muscles of the body can be effected only in the same way, and those employed in voice production are not exceptions to the rule. The voice of young Marie Garcia was at first harsh and husky, but afterward it became the sweet voice of Malibran. Of course, natural physical gifts manifest themselves prior to attempt at culture, but voices naturally unmusical, if trained properly at the right time and under the guidance of a proper teacher, can be vastly improved, especially when the individual has what is termed "an ear for music."

AT a late meeting of the Natural History Society in Toronto, an interesting paper was read on "Manitoba Plants,"

and among many others the peculiarities of the *Stipa Sparta* were alluded to. It was commonly known as the wild oat, or spear grass. This grass seeded in July or early in August. It was simply an oat with a long arm. The oat was pointed at one end and barbed with numerous bristles, while the whole length of the arm showed barbed teeth—the whole being wonderfully adapted for clinging and boring. The ripe oat was jerked out of its receptacle by wind or passing animals. It falls point downwards, and presently the arm bends in the middle, at right angles. The horizontal part then gives itself about three twists, so as to make good its hold in the grass, and having done so, the perpendicular part, with the horizontal part as a lever, begins to turn round and so bore itself into the ground. Generally it was found to have turned about nine times. The revolutions observed were made in six minutes each, and the action was accelerated by warmth. The plant was most interesting from the belief of many that the oat would catch in the wool of sheep, bore its way through the skin, and cause mortification and death. Enquiry showed, however, that no serious results were to be feared, as the sheep would eat down the grass, and when once the oat has fallen its boring powers are at once exhausted.

If the other alumni of Toronto University and students of University College were to stand by and uphold the cause of their Alma Mater as does the editor of the *Toronto World*, we venture to assert that funds would not be wanting; the Government would not be besieged for new grants; the loyalty of thought would show itself in liberal, gratuitous, private donations. Editors are not rich; therefore Toronto needs funds. But the editor can supply argument, and he has endeavored to do so. Not merely have we admired the pluck and perseverance of the *World* in this question, even though differing in opinions somewhat, but in other lines, political and social, this daily has shown a dash and enterprise indicative of vigor and ability. We do not think, however, that the devoting of a column and a half of the front page to an exhibition in the

"Science of Fisticuffs" will improve the physical, mental or moral nature of its readers. We shall refer more fully to this tendency in journalism in the future. By the way, the *World*, though in a serio-comic manner, directs attention to the fact that among the writers of Ontario we number "wise men from the East." Grant, Griffin, Anglin, Collins and Roberts are from the Maritime Provinces. This is another reason for saying that Ontario is becoming the intellectual centre of the Dominion.

WILFORD'S MICROCOSM is a very ambitious monthly, published in New York, devoted to the study of modern science in its bearing upon the religious thought of the age. It has a platform or theme of universal interest, and affords much curious speculation, keen criticism and ingenious argument. No theory of modern science seems to escape its criticism; hoary age and mere personal authority seem to add but little respect to the theories of the day; sound, heat, light, cold, force, thought, existence, are by it placed upon new foundations. We do not here intend to enter into any controversy about the new theories of these annihilating scientists, but in reading the last few numbers of the Journal, two or three thoughts have suggested themselves to our minds, viz.: the promoters of the new theory of Substantialism seem to have thoroughly convinced *themselves*; they expect the fathers of theories such as wave-motion, which are among the sublimest creations of the human mind, to think less of their pet creations than do the fathers of Substantialism; they speak at times rather harshly of their rivals, not treating with due deference such men as Helmholtz and Tyndall; they hardly realize that their own theory is after all but a *theory*, a speculation, which will doubtless, even if now accepted, in time gave way before the more careful investigation and scrutiny of man in his investigation into the secrets and mysteries of the universe. Some scientists have adopted its views, but we have yet to hear of their adoption by the scientists and thinkers of our foremost colleges and

universities. A great deal of interesting, entertaining and curious theorizing is found within its pages. In the last number we noticed a new theory for the explanation of the tides. The tides are, of course, due principally to the attractive influence of the moon. The tide adjacent to the moon has been explained by the attractive influence of the moon upon the mobile ocean. Scientists have, however, met a difficulty in the opposite tide, and have suggested that the solid earth is attracted more than the water, leaving the oceans behind. Again, we have been told that the earth and moon revolve, as though firmly bound together, around a centre, and that the centrifugal force throws off the water in the form of a tide. Hall, however, has suggested another reason. He thinks that the crust of the earth is thinnest beneath the oceans, that it is pulled or bent towards the moon, that the islands, being attached to the bottom of the ocean, are thus pulled beneath the surface of the ocean, and the result is *apparently* an elevation of water, or a tide. We suggest a consideration of the above theory to our readers.

HINTS TO QUERIES.

PERIODICITY IN THOUGHT.—O. W. Holmes says: "Just as we find a mathematical rule at the bottom of many of the bodily movements, just so thought may be supposed to have its regular cycles. Such or such a thought comes around periodically, in its turn. Accidental suggestions, however, so far interfere with the regular cycles that we find them practically beyond our power of recognition. Take all this for what it is worth, but at any rate you will agree that there are certain particular thoughts that do not come up once a day, nor once a week, but that a year would hardly go round without your having them pass through your mind."

FLICKERING OF FLAMES.—A gas flame flickers more than a lamp flame, and hence is more injurious to the eyes of a reader. The cause of the flickering is twofold—external

and internal. The external cause is due to the constant disturbance of the atmosphere in which the gas is burning, currents moving in all directions and disturbing the flame, because, as a rule, the gas flame is more exposed than the lamp flame. The internal cause lies in the gas itself, which is forced out under a pressure that is constantly varying to a certain extent. The outward rush of the gas, constantly changing, and the inward rush of the air, constantly changing, are two causes for the flickering and unsteady flame. Other causes doubtless exist in the nature of the gas.

SPACE.—J. J. Murphy, in his work on Habit and Intelligence, says: "An intelligent being which should derive its knowledge of space from sight alone, could have no idea of more than two dimensions in space. The eye sees surface only; and its knowledge of space came exclusively through the eye, it would be of superficial extension alone. And further, the superficial extension thus cognised would not be that of a plane surface, but that of the interior surface of a sphere; for, as previously stated, the eye really sees all things, as it sees the stars, projected on the interior surface of a sphere. It would consequently be impossible for such a being to have any knowledge of the properties of a plane surface, or of any surface except a spherical one; and as a straight line cannot be drawn on a sphere, it could have no idea of a straight line."

WHICH EXPRESSES THE EMOTIONS OR FEELINGS BETTER, THE EYE OR THE MOUTH?—The feelings are not expressed by the eye so much as by what surrounds it; no change, caused by any emotion, takes place in the eye. In a countenance with an angry expression, the brows are drawn so as to overshadow the eye, while deep perpendicular lines are found immediately above the nose. When a smile is the chief feature of the face, the corners of the mouth are more or less raised, and the cheeks in such a position that the light strikes them near the eye. A sad countenance is characterized by the lowering of the corners of the mouth and consequent

extension of the cheek. An interesting experiment, illustrating the important part played by the mouth in the expression of joy or sorrow, is as follows. Draw a face in which the mouth is in a smiling position. Now remove the mouth, and substitute another with lowered corners, indicating sorrow. The change on the *whole countenance* will immediately be noticed, which change was produced by merely altering the mouth. The above applies to the general conscious expression of feeling. The effective expression of the will and feelings in the mouth and chin are recognized by those who are careful to remove the beard from the immediate neighborhood of the mouth. The eye, however, is situated nearer to the brain; it is a more delicate organ than the mouth, its muscles are not so easily controllable, and hence the finer, more delicate feelings, which we cannot hide or conceal, may be revealed in the expression of the eye, while the much used muscles of the mouth may be held in subjection.

THE YEAR OF CALAMITIES.

UPON the year just gone fate seemed to have set its mark: it has been a year full of horrifying accidents and immense catastrophes. Month vied with month, week with week, and day with day, in adding to the long list of victims; and now, at the beginning of the year '84, reviewing the history of the past twelve months, the universal opinion is that it has been "The year of calamities." History recounts to us years of fire, of wars, of plague and of famine, but the year '83 seems to have been especially a year of calamities. We have passed through it, and, while thankful for it, let us consider some of the causes of these calamitous results. One great reason is the growing thirst of newspaper men for startling news, items of mystery, columns of catastrophes, scenes of bloodshed, thrilling accounts of dangers and deaths. In this the wonderful advances of science give increasing assistance; news which formerly was local now is universal, the

actions of the whole world are criticised, and the ambitious reporter and news-scavenger, with the assistance of telegraph and telephone, scour the earth and seem to take delight in collecting startling news. Making allowance for this, however, we think that there has been an appalling increase in crime and calamities, which needs further explanation. Bridges have broken down owing to faulty construction and inexperienced engineers. Fires have buried hundreds of victims beneath smoldering ruins, because incompetent architects and miserly builders have begrudged the means and space for necessary escapes. Coffin-ships have at last found resting places for their freight of living beings, because hard-hearted owners and foolhardy captains have thought more of a few dollars than of many lives, and careless officials, living upon unearned salaries, have assisted in the deplorable work. Panic has followed panic among nervous and excitable crowds owing to the thoughtlessness of fools from whom the public generally should be protected. We might enumerate the victims of passion resulting from the non-enforcement of the laws in reference to deadly weapons and drink. Looking back over the preceding events, we must conclude that a great deal of the misery and sorrow of the past year is owing to avarice, the incompetence of men entrusted with important work, the negligence of others commanded to inspect and enforce the laws. Indeed, we think we can trace it back further, and can say that the cause of it all is the greed of money. Incompetent men are engaged because their services are cheap, lazy officials are appointed because of the degeneracy of our political system, and our political system is degenerating because the ambition of a great many of our statesmen is to obtain offices yielding much money for little work. Until our politics are purified thoroughly, and the custom of rewarding political hucksters, tramps and dead beats, overthrown, until men are appointed to offices of trust and responsibility from fitness and competency irrespective of political leanings, we may expect to hear of bridges broken down, vessels foundered, trains wrecked, buildings collapsed. There is an-

other kind of calamity over which man has, as yet, no control—the destruction resulting from earthquakes, which by some are supposed to occur periodically. Certain persons who claim to have carefully investigated this subject, state that earthquakes are increasing in number and intensity, and that the maximum will be reached about the close of the century. If so, we may console ourselves with the hope that by that time science will be advanced sufficiently to foretell these events, and avert to some extent the terrible results of this internal irresistible force.

THE BITTER CRY OF OUTCAST LONDON, AND ITS LESSONS
FOR CANADA.

THE most magnificent city in the world has suddenly discovered, after twenty centuries of building, that thousands of its inhabitants are sheltered in less comfort than the moth in its cell or the wolf in its den. "The bitter cry of outcast London" will yet become the bitter cry of outcast Canada unless we learn from the experience of older nations. At the present rate of increase there will be in one hundred years from three to four hundred million of the human family in the United States and Canada. The tendency of the age is toward the formation of large cities. At the commencement of this century only one-twenty-fifth of the population of North America was found in large towns. One-fifth of the people live in cities to-day. We shall have large cities. Unless guarded against while our cities are small, all the evils of London will be repeated here. Festering heaps of humanity will poison the air; the poor and criminal will be crowded together in dens that will consume them like graves; and night by night will rise up, from the corners of our streets, the cry of the homeless: "I was a stranger, and ye took me not in."

Idleness is one great cause of the misery and vice found in the large cities of the Old World. If the inhabitants of the slums of London had remunerative employment and the will to work, we should not have been startled by the bitter cry.

Let Canada begin in her youth to train all her sons and daughters to industry, and the evils of outcast London will find no place here. This training cannot be accomplished without giving the Government power such as it does not now possess. It has now the power to punish criminals; it should have the right of interference before criminality is ripe. We now get the Government to watch disease; we should also give it power to guard health. We wait until idleness produces crime, then we seize the criminal and compel him to labor in a penitentiary. The Government should have power to seize the idler before he becomes a criminal. First all excuse should be taken from the idler by the establishment of training schools and workshops, where youth may be taught, and where men desirous of employment should always be able to find it at a fixed rate of wages. Public works, such as harbor-making, road-making, swamp-draining, waste land reclaiming, should be carried on, where men objecting to work should be set to it under compulsion of the strictest nature, the Government being responsible for the payment of due wages. Let Canada adopt such measures, and whatever form wretchedness may take in the large cities of the future, it will not shape itself into over-crowding, hunger and nakedness.

Such measures will prevent poverty, not crime. Crime can be hindered only by taking away the will to commit sin. This cannot be done by legislation. No government can make men virtuous; but a strong and paternal government, by aiding the willing and compelling the idle into occupation, will pave the way for Christian effort. The effectual safeguard is the co-operation of a wise and strong government with Christian effort, begun while a city is small and growing with its growth and strengthening with its strength. The average Christian considers it his chief business to save his own soul. In one sense, and within certain limits, this is true; but it is not the whole truth. The Christian life is a warfare. Now a soldier will do but little credit to the cause he fights for if he goes into battle considering only how he shall save his own life. The business of Christian men is to save the world, and the

measure of the power of any man to save the world is the measure of his power to save the community in which he lives. No new machinery is needed, but a wise and vigorous use of the appliances which are found in every evangelical church. Take the Methodist Church, for example. Its membership is divided into classes which meet weekly for the free and familiar expression of religious experience and thought. Each leader should be a director of work as well as of religious thought and feeling; and each member should give a weekly report not only of what he has felt but of what he has done. Suppose that each leader were to address his class in such words as these: "Good friends, you have all described yourselves to-day as sinful dust and ashes. Good roads are sometimes made with cinders. It would be a great proof of your sincerity if you would mend the roads of this world a little by turning yourselves into serviceable dust and ashes. Zacchæus gave half his goods to feed the poor: I do not demand from you this proof of conversion, but I ask thought and effort. Alms are comparatively useless without loving thought and work, and therefore it is written, not, blessed is he that feedeth the poor, but 'blessed is he that considereth the poor.' Here is a map of a certain district in this city which I have made with great care. Every family in that district is registered. You, my sister of the sunny countenance, have told us that you possess the joy and peace of the kingdom of God. The kingdom of God is indeed joy, but not joy that separates you as by any strange favor from your fellow-creatures, exempts you from their toil, or indulges you in time of their distress. Take your broad-shouldered class-mate as an escort. Go to Gin lane: visit Bill Sykes and Nancy, who are fighting and knocking one another's teeth out in their garret, and report the result next week here.

"And you, my brother of the sorrowful figure, have spoken of your trials. I know they have been sore; but the Captain of our Salvation was made perfect through suffering, and we cannot become strong without trouble, nor sympathetic without sorrow. Sorrow is God's ordaining hand laid upon your head,

and setting you apart to minister to the weary and heavy laden. Do you visit sick Duncan McMisery and his ten motherless children, and report the result next week to me.

“You, my sister, possess vivid imagination, poetic power, and tender sensibility, and you have dwelt with excited and thrilling emotion upon the sufferings of your Lord. You should know that your business is not to lament the sufferings of Christ, but to prevent those of His people. Learn the deep meaning of the last words He spoke to those women who ministered to Him of their substance: ‘Daughters of Jerusalem, weep not for me, but weep for yourselves and your children.’ Measure with your fitful thoughts the agony of unnurtured, untaught children, cradled in dens of infection and black despair—children who look into a coming life so bitter that it would make the curse of the 137th Psalm true upon our cities though we were to read it thus: ‘Happy shall thy children be, if one taketh and dasheth them against the stones.’ You would fain have wept by His feet or stood by His cross. These you have with you always, Him ye have not always. Visit some of these cellars in Pestilence street, and as you go, repeat our Saviour’s words: ‘Inasmuch as ye have done it unto one of the least of these, ye have done it unto me.’”

If Christians of all denominations were to engage in such systematic missionary work, no person, however humble, would be permitted to suffer from unknown want or live in unrecognized crime.

REV. JAMES ALLEN, M.A.

WHAT AMERICANS READ.

WE should perhaps have headed this, “What Americans write,” since the publication of a book does not always guarantee that it is read. However, the publication list will give us a very fair estimate of the demand, as books are written to sell, to supply a demand more generally than to create a demand: the desire for and appreciation of a certain line of

reading exists before being supplied. We give here a list of the publications for the years 1881, 1882, and hope soon to have the figures for 1883. During the same two years England produced 5,406 and 5,124 volumes.

	1881.	1882.
Fiction	587	767
Theology and Religion	341	326
Juvenile Books	334	278
Law	76	261
Education—Language	157	221
Medical Science—Hygiene	190	188
Description, Travel, etc.	164	185
Biography	212	184
Poetry and Drama	169	182
Literary History and Miscellany	128	155
History	108	118
Social and Political Science	86	112
Physical and Mathematical Science	89	106
Fine Art Illustrated Works	57	91
Useful Arts	78	87
Books of Reference	71	86
Humor and Satire	35	35
Sports, etc.	21	23
Mental and Moral Philosophy	27	21
Music Books	23	21
Domestic and Rural Economy	38	20
	2,991	3,472

Fiction is in greater demand than ever. It would seem that the bustling, enterprising, go-ahead American does not develop his love for Mental and Moral Philosophy, Biography and Theology—there is not enough money in them, we suppose. Law shows a very great increase. The profession must be growing in intellect and number, or possibly the surplus of the profession are thus trying to earn an honest living. A careful perusal of the above table will suggest many ideas to the reader. It might do as the foundation of a chapter in American history.

GREEN SUNS AND RED SUNSETS.

FOR two or three months scientific and other journals have been full of accounts of green or blue suns and alarmingly red sunsets. Though no longer looked on as dread portents of wars, plagues and disasters, the striking colors and the universality of the phenomena have naturally aroused great interest. Two theories are advanced to account for the facts: but both suppose the presence of excessively fine dust in the upper layers of the air.

Some think this dust is cosmic or meteoric in origin. The earth passed through a dust cloud in space toward the end of last September, and caught up part of it in its skirts. This theory, then, ascribes to these particles in the upper air the same source as the grey slime found by Nordenskjöld on the everlasting ice of Central Greenland.

Another and seemingly better founded theory refers the dust to the terrible Javan volcanic eruption of last August. According to this view, which is advocated by Lockyer, that outburst hurled vast amounts of dust so high into the air that it could be swept round the globe by the upper air currents. Such an uppouring of volcanic dust is not unparalleled in history. Just a century ago a terrible eruption of Skáptar Jokul in Iceland clogged the air for months with dust and dimmed the sun with a preternatural smoke over all Europe as far as the Alps. In this case, however, the smoke or dust could not cross the Alps, and was evidently borne chiefly by the lower strata of the atmosphere; while the Krakatoa eruption invaded the upper ones. Here a difficulty arises: the atmosphere diminishes very rapidly in density as one ascends, and it is hard to see how these tenuous upper currents could support even minute particles of shattered pumice for four whole months, and meantime distribute them over three-quarters of the globe. That such is the case seems undoubted, for volcanic dust was brought down by rain on the 13th December, in Holland, and by snow in Spain, and no important eruption has occurred since that of Krakatoa. Mr. Preece, in *Nature*,

gives a very probable explanation of the continued floating of matter so much heavier than air. He supposes the particles to be strongly electrified, and in the same way (negative) as the earth, and hence to be repelled as far as possible from its surface. It is well known that volcanic eruptions are regularly accompanied by violent electric disturbance.

It seems pretty clearly proved, then, that the world owes its splendid after-sunset displays to Java's misfortune.

The question may be asked how dust, whether cosmic or volcanic, can dye the sun green and the westerly sky red. That infallible "thunderer," the London *Times*, tells us of "blue and red molecules" which "remain suspended in the upper air, and produce the singular reflected light that has been lately the wonder of the world." In things scientific, as well as colonial, the *Times* has a singular talent for blundering as well as thundering. That these suspended particles are in themselves blue or red is no more true than that the dust swept from the streets or the smoke from a factory chimney is colored blue or red. Any very fine particles, such as dust or smoke, when suspended in a transparent medium, may become perfectly glorified by the action of light. Who has not seen the bright warm tints of a smoke wreath lighted by the setting sun? The soft blue of our cloudless skies is caused by the reflection of innumerable floating particles in the air. Otherwise the blank void of space would be black as night, and the stars would shine every hour of the twenty-four. All that is required to account for the green suns and red glow after sunset is a veil of particles that shall arrest and reflect the red rays of light and allow the rest to pass. Just before the sun sinks below the horizon all the red light is filtered out by the thickened layer of dust, while the other colors of shorter wave length struggle through. If we abstract red from the colors uniting to make white light, the sum of the colors left produces green—hence the green suns observed in India. After the sun has set the red light is reflected from the dust stratum high up in the atmosphere, and gives us that strange red after-glow.

WHAT ARE WE DOING IN SCIENCE ?

ONTARIO has recently become aware that she possesses various universities, a fact of which she formerly seemed more or less oblivious. There is no doubt that these institutions have been advancing rapidly of late years, each, spurring the others on to do higher and better work. Just now, however, the average Canadian is surprised to find these apparently prosperous universities crying out for more money to increase their staffs of professors and add to their facilities for work. Hereupon our average Canadian throws down his paper in disgust, and asks why under the heavens they can't be content? Have we not been subscribing for them and endowing them for the last quarter of a century? What have they done with all the money they have received? What further equipment can they possibly need?

Let us ask ourselves frankly what facilities a young man has in our colleges for getting a respectable knowledge of science. If he wants to study botany in any thorough way he must have access to good herbaria, a well kept botanical garden, and a laboratory for microscopic work. In what Canadian city will he find any one of these requisites?

Or suppose that he is anxious to study biology and zoology after modern methods, and especially to follow the recent fascinating discoveries in regard to disease germs and microscopic life in general: where shall he find a physiological or biological institute, or a zoological garden, on even a moderate scale? Certainly nowhere in Canada. Then there is a wide field open for Canadians in mineralogy. Scandinavian mineralogists have discovered many new and interesting minerals in rocks closely resembling our Laurentian. Where shall our young men find the literature, apparatus, or training necessary for such discoveries?

But you say all these subjects belong only to natural history, and are of no great importance practically. The fact that so many Canadians think these subjects of no importance is the most disheartening feature of all to an educated man.

In any case, say you, physics and chemistry are well provided for. Not so fast. Where can a Canadian get a training in organic analysis—one of the most fertile regions for brilliant discoveries? Artificial indigo and the aniline dyes are some of the prizes of modern organic chemistry. He will find neither laboratories nor instruction in any of our universities; and, indeed, scarcely on the American continent.

It is not a whit better in physics. In no realm of science are such astonishing and valuable advances being made as in electricity. What college in Canada has a course in that subject, with apparatus and instruments for precise measurements, such as are necessary to understand electric lighting or the storage of electricity?

Now, the subjects mentioned are some of those in which the world of science is especially active and successful; yet our universities give their students no opportunity even to follow up what is being done elsewhere, much less to do original work in these directions. In science we are simply behind the age, though in our ignorance and self-conceit we think ourselves intelligent, wide awake and fully abreast of our times. Other countries, sometimes looked down on by us as slow going, are steadily adding to the world's store of scientific knowledge, and in that way are preparing new comforts and blessings for all men. We are willing to borrow or steal the benefits arising from scientific research in other lands, while we do nothing to pay back the debt we owe the world. If Canada is to take an honorable place among the nations, she must show that she is capable of something higher than politics, self-laudation and money getting. Only those deserve to inherit the earth who show their fitness by unlocking its secrets and mastering its potent forces by power of will and intellect. Heaven preserve us from self-complacent contentment and a sordid mediocrity.

“Rarely they rise by virtue's aid, who lie
Plunged in the depths of helpless poverty.”

HEAT IN ITS RELATION TO LIGHT.

HEAT and light are among the most common phenomena, and on that account are most likely to escape our observation; nevertheless, the discussion of either of these two great physical effects will be found to be one of exceedingly great interest, and we hope that in this very limited consideration of heat in its relation to light we will be profited as well as interested.

The present almost universally accepted theories of light and heat are of very recent origin, yet in the minds of some seem too prodigious to be approved; but until we can disprove them, or until we can bring forward something more reasonable and more sensible, we are compelled to accept them, especially since they account so beautifully and scientifically for so many phenomena. Mere opposition, as such, founded upon nothing save inability of appreciation, will never injure or overthrow any theory or hypothesis. The theory that has been generally upheld until very recent years was the corpuscular—the theory that considered heat and light to be material substances, which caused phenomena in every body by their presence or by their absence. Investigation and careful consideration, however, have gradually overthrown this theory, and in its place has risen up one of the grandest and most wonderful theories that man has ever formulated. If true, it displays to us the marvelous and almost incomprehensible wisdom of the Creator; while, if not true, it displays the great speculating and theorizing power of man.

The aim and standpoint of this article is to prove that heat and light are identical, that they are effects due to the same physical agent. We presuppose some acquaintance with the phenomena of light, and it is upon the theory of light that the theory of heat is founded; while, as we shall afterwards show, it is upon the phenomena of heat that the phenomena of light are really based. Light is now considered a mode of motion, and, for its transmission through space, scientists have formed a most incomprehensible and seemingly absurd hypothesis,

viz., that of the universal elastic ether, a substance so rare that we cannot appreciate it, yet so elastic, or solid, as to readily transmit the slightest vibrations. But because we have no senses capable of perceiving it we cannot deny its existence, necessity at present demands its existence. The undulations or vibrations of this ether striking upon the retina of the eye give to us the sensation of light, and, according to our conclusions, these same vibrations transmitted otherwise to the brain give us the sensation of heat. But we ask, Are we incapable of perceiving it? How are we capable of perceiving any substance at all? How is it that we are capable of knowing that there is any such thing as matter at all? Certainly, because of its properties or phenomena, and these properties or phenomena all result from motion of different kinds, and it is according to the kind of motion as translated by the brain that we differentiate phenomena. Everything quiescent is, as far as we are able to observe, non-existent. You touch a hot stove, and you at once say it is hot. Why? Because the motions of the molecules of iron composing the stove, are transmitted through the hand, nerves, etc., to the brain. You now withdraw your hand and hold it away from the stove, and you still perceive that the stove is hot. Why? Because the motions of the molecules of iron are now transmitted to your hand, not directly, but indirectly, through the ether, *i. e.*, the molecules of the stove set the molecules of the ether in vibration, and the molecules of the ether set the molecules of the hand in vibration. Thus, in opposition to those who say that we cannot perceive the ether, we contend that in the case of radiation of heat we feel the ether, and must be just as sensible of its existence as we are of the stove when we feel it, since the phenomena are similar. There appear to me to be marks of design in the fact that we cannot always perceive the ether, for were we capable of continually feeling it in this way, the world would not be habitable. Furthermore we cannot *directly* see any substance, except through the ether; it is the ether we see, not the substance; and thus in the material world the universal elastic ether is

the first form of matter sensible to us, and it is on this account, viz., on account of its nearness, that we overlook it. However, we have not time longer to tarry, though we would willingly do so. This is a digression, yet not unwarranted. Sound is produced by the backward and forward movement of the particles of the air, producing rarefactions and condensations, which, transmitted through the ear, give us the sensation of sound. Thus, by a wise and designing law, the human ear is restricted to this earth in its perceptions, while the eye is bounded in its perceptions only by the infinitude of space. Heat or light waves are differently constituted from sound waves. If we take a tightly stretched horizontal string and strike it from above, we will cause the molecules of the string to vibrate up and down, while the direction of the motion of the wave is along the string. If, however, we strike it from the side, the wave will again move along the string, while the molecules will vibrate horizontally or at right angles to their former motion. Try, in your imagination, to combine these two motions together, and you will have somewhat the conception of motion of waves of light. This is proven by the fact of polarization of light, by which a ray of light may be divided into two rays, in which the waves are, of course, moving in the same direction, but the molecules in the one case are moving in a direction at right angles to the direction of motion of the molecules in the other half of the ray. They will be represented in the mind by the instance of the string just mentioned. From this we may conclude that the waves of the ether in the phenomena of light are what might be called *swellings* and *contractions*. A difference in size of these swellings will affect the eye, and hence upon the size of these swellings or the length of the wave will depend the color of the ray, the violet wave length being shortest, about 500,000 to the inch, and the red wave length being about 30,000 to the inch, heat rays being still longer. We have not time here to enter upon a discussion of optics and its laws, but must proceed a good deal upon the supposition of a previous knowledge of these laws. A law of optics states that the

amount or intensity of light falling on a given surface varies inversely as the square of the distance from the source of light. What is the corresponding law of heat? The amount of heat falling on a given area varies inversely as the square of the distance of the area from the source of heat. In this respect we see that heat and light obey the same laws. For delicately detecting the presence of radiant heat, an instrument called a Thermopile is made use of, which converts the heat into electricity. The quantity or force of this electricity is measured by an instrument called a Galvanometer, and thus by the combination of these two instruments we are able to make very accurate measurements, even to the one-fiftieth of a degree.

The law of reflection in optics is that the angles of incidence and reflection shall be equal, and this law is also found to hold in reference to heat. Thus, if a ray of heat strike a bright surface, say at an angle of 60° , a large portion of it will be reflected in the opposite direction at an angle of 60° , as may easily be demonstrated by means of a thermometer. By experiment it is further shown that metals which reflect light most copiously are also the best reflectors of obscure heat.

Light, in passing through certain lenses, is refracted or bent out of its original path. Heat, in passing through lenses of the same shape, is refracted according to the same laws as light. Lenses made from rock salt are the most valuable in the case of heat, since rock salt is the only substance which allows heat to readily pass through it; it is what is scientifically termed *diathermanous*, a term corresponding to transparent in reference to light.

In passing through different substances different rays of light are absorbed; thus, for instance, in passing through a red screen all of the blue rays are absorbed and the red are allowed to pass through, and these rays, it is found, will readily pass through a second or third screen of the same material and color as the first. And thus in regard, also, to heat in passing through substances some is absorbed, but that which is allowed to pass will readily pass through a substance

similar to the first. We might compare the phenomena to sifting a mixture of different kinds of grain; that which passes through the first sieve will very readily pass through a second sieve similar to the first.

Thus we see that in the phenomena of reflection, refraction, absorption, heat and light seem to obey the same laws and to be very closely connected. Whatever seeming dissimilarity there may be, is to be attributed to the fact that the most delicate instruments we possess for measuring heat are less sensitive than the human eye is for light, and so we are entitled to say that so far the analogy between heat and light is as complete as we are capable of showing, and that there must be some very close connection, if not an identity, between the two sets of phenomena. But we are not yet satisfied; we have only had our curiosity aroused; and we feel that we are just on the margin of some grand and intensely interesting subject; and so, led on by the insatiable thirst for truth, we apply ourselves more carefully to phenomena, and call to our assistance one of the grandest discoveries ever made.

A PLEA FOR THE STUDY OF CLASSICS.

II.

UNDOUBTEDLY the chief pedestal on which repose the claims of the Latin and Greek languages to be still studied, is the intrinsic excellence and the educational value of their literature. The golden era of the Attic muse ripened such luxuriant fruit as has never been surpassed in any succeeding era, rivalled only in that second intellectual summer which came when Elizabeth was queen in England. In every department these ancient writers were masters. Their magic wand turned all to gold. In poetry and in eloquence, in deepest philosophy and in wisest history, they have left us treasures and models. Even the substantial value of the matter which this literature embodies is great. Their scientific theories, it

is true, have been found incorrect, and their scientific information has been incorporated in the more complete treatises and systems of the moderns. But as long as the history of man shall remain a subject of investigation and of interest, so long shall the history which the Greeks and Romans wrote retain their substantial value: they are indeed *κρίματα εἰς αἰεί*. And the ancient philosophy is still the basis of ours. The philosophical student, however well read he may be in the works of the German and Scotch metaphysicians, needs still to turn to the works of Aristotle and Plato, so noble progenitors of so noble a posterity.

In all their works, the ancients have accumulated for us rich treasures of the "wisdom of life," insight into human nature, and experience in the conduct of affairs. A great literature embraces the whole range of human thought and action, and acquaintance with the various departments of such a literature clothes a man with the invaluable advantage of a broad, practical view of life nationally, intellectually and morally. It discloses to him the hidden springs of feeling and action; it gives him a clue to the mazy labyrinths of passion; it leads him now by the rural stream, and now along the lousy street of the city; it points to yonder field, and teaches him how battles are fought and won; it introduces him to the council chamber where statesmen sit, and it bids him stop and enter the peasant's cot, and it reminds him that

"Pallida Mors aequo pulsat pede pauperum tabernas,
Regumque turres."

What more likely to fit a man for practical life than a generous sympathy with the deeds and emotions of the heroes of the Iliad; a grasp of the practical logic of Aristotle and Plato; an intimacy with the political economy of Demosthenes and the masterly statesmanship which inspires the speeches of Pericles in Thucydides; the historical acumen and farsightedness of Thucydides and Tacitus; the critical stories of Quintilian; the wit and common sense of Horace; and all those sage maxims and sententious truths which sparkle here and

there through the ancient authors in prose and verse? The study of such writings is a course of instruction in the science of public and private life.

In speaking of the value of the matter of ancient literature, it must not be forgotten that the New Testament was penned in the Greek characters. "The Book" above all books, the book for all the world, is written in the words of the world's most perfect and beautiful language. This fact alone makes it imperative that some, and desirable that many men should be familiarly acquainted with the original Greek. It is necessary, moreover, in order that those who profess to read the Greek Testament should read it intelligently and critically, that it should not be the only Greek book with which they are acquainted. This is especially important in points of verbal or textual criticism, for "the one paramount and indispensable condition for the determination of the genuine reading is a familiar acquaintance with the spirit of the languages in which the sacred volume is written." (Sir W. Hamilton : Discussions on Philosophy, p. 334.)

While the practical value of the history and philosophy, the wit and the wisdom of the ancients—in short, of the matter of classical literature—is admitted, the even greater excellence of the manner is not disputed. The world rejoices in the possession of some remains of ancient art; and the highest genius of modern sculptors has owed its inspiration to the study of the grandeur of conception and perfection of skill which fixed in eternal marble the agony of Laocoon, the ideal beauty of Apollo Belvidere, and the exquisite charms of Venus de Medici. And, if the ancient writers do not shine as stars so far apart from modern competition as do the ancient sculptors, still their works in perfection of style have always been models. If modern science, philosophy and poetry have gathered richer treasures from the mines of material and mental nature, they have not placed their gems in more beautiful settings. Modern poetry, in what it has to teach, surpasses ancient poetry; for it goes deeper into the soul. But what it has to teach, ancient poetry generally throws into a more perfect symmetry

of form. Chivalry has given the modern bard a new and nobler idea of love; and Christianity has turned into bright forms of hope those sad shadows which the ancient idea of immortality cast over the present joyous life. To the ancient this life was his only good portion, and the grand or beautiful features of the glorious Grecian landscape were deified as his only objects of worship. The present was all in all to him, and the future life only an obscure and "faded dream of this sunny waking life. Under the Christian view it is just the reverse; the contemplation of the infinite has annihilated the finite; life has become the world of shadows, the night of being: the eternal day of essential existence dawns only beyond the grave." (Schlegel's Survey of the Drama.)

Under such influences the modern mind does not so much revel in a joyous sense of present and external beauty, harmony and perfection; but rather becomes conscious that

"This world is all a fleeting show,"

and seeks in the infinite and the future to catch those harmonious strains which refuse to sound forth from the snapped and jarring strings of humanity. The modern mind is more self-conscious; it sinks deeper, it rises higher, than the ancient. Poetry is the language of the heart, and modern poetry becomes pre-eminently the development of those mysterious questionings, vague longings, subtle sympathies, which fill the depths of the soul as shadows fill the recesses of dark and ruined temples. In Grecian art and poetry there is a prevalent idea of natural harmony, and this results in a unity of form and matter, the perfection of style. In modern art and poetry the idea of natural harmony has given place to that of natural disunion between the world of sense and the world of spirit, and the endeavor to harmonize them being only partially successful, results injuriously to the form. Hence the superior finish which embellishes the ancient masterpieces. And further, the works of the classical authors were written more leisurely, and polished more painstakingly, and for a more critical class of readers or hearers than are those of their

modern successors. The Greek drama was a part of the national religious worship; and the stimulus of competition, the value of the honor with which the victor was rewarded, and all the surroundings of magnificence with which the successful play was presented before the Athenian people, were such incentives as have never existed in modern times, such incentives as urged the dramatist to the boldest flights of genius and fostered the most exquisite perfection of taste.

The style of the ancients is not a thing which can be slavishly imitated. Its essence lies in the thorough adaptation of means to ends, the subjection of everything to the reign of good sense. The great classical writers do not use words for their own sake, to merely ornament their writing, an abuse which is sure to destroy the artistic unity of effect; they use words only as they vividly and exactly express thoughts. As Swift has it, they put "the right words in the right places." The arts of style are the mere scaffolding which is necessary while the house is building, but which must be taken down so soon as it is finished. With many of the moderns, the scaffolding still stands and obscures the beauties of the edifice behind it; with the ancients, the scaffolding is completely removed out of sight, and the marble walls stand forth in all their own gracefulness. The perfection of art is seen in the apparent absence of art. Another secret of the charm of their style is its pregnant brevity. It is no piling up of sentence after sentence, each adding to the meaning of the other, and the whole series developing the idea. The painstaking labor of their composition and the admirable character of their language—especially in Greek, those wonderful participles, which at the same time describe an act and paint a vivid picture—enables them to express the fullest ideas with the most masterly conciseness. There is nothing wanting, there is nothing over. No thick daubing, but a few delicate touches, and the picture is perfect—"a thing of beauty and a joy forever."

The young artist sits patiently, day after day, week after week, in the picture gallery before the paintings of Raphael

or of Titian, of Leonardo da Vinci or of Michael Angelo, and lovingly studies every line and every shade. He drinks of the divine stream and bathes his locks in the clear waters, until at length he rises no spiritless copier but himself an artist, dowered with a portion of the wealth which nature lavished on his masters. So let the young aspirant after literary success drink deeply of the Pierian spring. For "be sure that, with hardly an exception, the great things of poetry and of eloquence have been done by men who cultivated the mighty exemplars of Athenian genius with daily and nightly devotion. Among poets there is hardly an exception to this rule, unless may be so deemed Shakespeare, an exception to all rules, and Dante, familiar as a cotemporary with the works of Roman art, composed in his mother tongue, having taken, not so much for his guide as for his master, Virgil, himself almost a translator from the Greeks. But among the orators there is none among the Romans and scarce any in our own times." (Brougham's Inaugural Discourse before the University of Glasgow.)

Would a man write history? Let him read the philosophic page of Tacitus and sage Thucydides, and learn from Livy how to deck dry details with the charms of living beauty. Lord Macaulay's historical writings, though modern both in subject and in style, owe much of their attractiveness to the classical training of their author.

Would a man be an orator? Let him mark the skill with which ingenious Cicero weaves a silken spangled web about the imaginations of his hearers, and takes them captive in its meshes; let him study the more consummate art which hides all art in the resistless fulminations of Demosthenes, and which leads the dense crowd which sways around the Bema to exclaim, not: "What a grand speaker Demosthenes is," but: "Let us march against Philip!" Let him learn from such a master how to unite chaste beauty with nervous and overwhelming power, how to strike once and strike home, how to conceal not the subject behind the speaker but the speaker behind the subject.

Does a man delight in that dearest intellectual gift which Heaven has vouchsafed, the gift of expressing in harmonious words thoughts which all men think but only few can speak, the gift of poetry? Let him watch how Homer's verses roll free and full like billows of the bright Ægean, sparkling and glancing to the summer's sun, and grandly

"trampling
On the rocks and hard sea sand."

Let him hark how

"the Attic bird
Trills her thick warbled notes the summer long."

The mysterious grandeur of Æschylus, bodying forth strange and awful forms from out of the great unknown; the exquisite grace of "the Attic Bee"—prince of artists, Sophocles; the touching tenderness and pathos of Euripides; and the full free license of witty Aristophanes, will please him less only than the matchless dramas of our own Shakespeare. He will be rapt to the skies by the loud notes of Pindar's triumphal odes; he will be melted by the tender softness of Anacreon's amatory lyre. And bold Lucretius, he

"Who dropped his plummet down the broad
Deep Universe, and said, 'No God,'
Finding no bottom; who denied
Divinely the Divine, and died
Chief poet on the Tiber side;"

sweet Virgil, who wrote with such majestic beauty and yet easy grace, whether his theme were rural shades and shepherds with their flocks, or the "tale of Troy divine" and the journeys and battles of "pius Æneas;" Horace too, easiest and truest of satirists, and graceful in his Greek-taught odes; all these will be to the student fountains of the purest pleasure. They will expand his heart, cultivate his taste, and prompt him to some not all unworthy emulation of their own perfection.

Such, then, are the models which antiquity has bequeathed to us; shall we, "the heirs of all the ages," throw away part of our noble inheritance, the treasures of the olden time?

We are stifled with the close air of these busy workshop days, these days of driving trade and hotly hurried life, these days of compilation and encyclopædic knowledge; and it does us good to get a breath of the pure bracing air which breathes through works written when the world was young, when thought was fresh, when the human mind was rejoicing in its morning life and liberty. The age wants just that æsthetic cultivation, that education of the feelings and of the sense of the beautiful, which is best attained from a study of art and poetry, in order to counteract its hardening tendencies.

We shall, in conclusion, venture to grace our paper with words which, in view of the considerations here advanced, are the expression of our own feelings and hopes—words from a man himself evidently attached to natural sciences—himself acquainted with a wide range of literary knowledge, himself one of the brightest stars in one of the most splendid literary constellations of the modern sky—words from the pen of Goethe. His deliberate judgment is this: “Möge das studium der griechischen und römischen Literatur immerfort die Basis der höhern Bildung bleiben.”

FRANCIS HUSTON WALLACE, B.D.

CORRESPONDENCE.

THE UNIVERSITY QUESTION.

To the Editor of V. P. Journal.

DEAR SIR,—The university question, in half a dozen shapes, is just now the all absorbing topic among university men in the city. There is the discussion of university consolidation, which has been so well tossed by that wild flood, the public press, that little further is to be said, and indeed is now quite overshadowed by the question of State aid to Toronto. Victorian alumni here are a unit in opposing any course that can derogate from the high status that Victoria has long held, and her just claim to seniority, if not precedence, by virtue of her older charter. Yet the present discussion is

highly favored as helping on the "manifest destiny" of coming to Toronto. The feeling for this is so strong that it is well said that, with each alumnus living out of this city, Toronto is the spot chosen for Victoria next to his own *locale*. There can be no doubt that Victoria is obscured to a great extent by her distance from the provincial centre, and limits are placed thereby to the contact of her professors and students with other trained minds, and the fire of friendly or unfriendly rivalry. They have few opportunities to refer to the stores of research and learning contained in works outside of their own libraries, which are in too many cases, not too complete—not from lack of a wish to make them so, but from lack of means—for her professors have wretched pittances, and the college library is an antiquated delusion. It makes your correspondent blush with shame and glow with pride, both at the same moment, to think with what meagre means and poor appliances, yet with what untiring devotion and great success, Victoria's professors have labored. Not that he would belittle the efforts that Cobourg has put forth to assist the College, her chiefest support, or would say aught against its advantages, for he has bright memories, ranging from boyish recollections of preparatory enlightenment in the old Institute-barn, since happily consumed by fire, to the last glad day, when he walked gaily to the station with his sheepskin in his pocket. Yet Cobourg is but a town, a county town, it is true, yet a country town, and must not trammel Victoria from rising to her higher future.

A move in a good direction was made last month, when a general meeting of the alumni of the various universities resident in Toronto was called to discuss the formation of a club to consist of university men. About thirty or forty were in attendance, consisting largely of Toronto University men, with a sprinkling from Trinity. Dr. Ross was called to the chair. Some gentlemen wished to discuss the question whether the club should consist of alumni of Toronto University alone, or of all colleges. This was ruled out of order by the chairman, on the ground that it had been already settled at a meeting of

Toronto alumni, but it is curious, as showing the feeling there is among a few—happily, only a few—of Toronto's sons, to deny the rank of real university standing to us who owe allegiance to other halls than those raised at provincial expense. The meeting was not very enthusiastic, and thought, from the small number present, it was not justified in taking any final step towards forming a club. A committee was appointed, however, consisting, so far as possible, of representatives of the various universities and professions, to suggest what form the club should take, to ascertain what number of graduates in Toronto or elsewhere would become members, and what funds could be raised. The committee has since met, but nothing of great interest done.

Of course, the most engrossing theme at present is the agitation for increased aid to Toronto. A large and enthusiastic meeting of Victorian alumni in Toronto was held last month, and resolutions unanimously passed calling upon the Government either to aid no university any further, or to aid all equally. The feeling is, that if the Toronto University authorities can show that they are making the best use possible of their income, are feeding no drones, have cut off all causeless expenditures, and are yet really in want, they must have assistance, both for their own sake and for the honor of the Province. But they must not draw large sums from the people as a whole, to be used to crush the erections and endowments of a large part of the same people. Let each university be aided by its own supporters, or let all be aided equally by the State. The complaint is not that Toronto professors are paid too much, but that Victoria professors get too little, and until the Methodist Church better sustains the efficiency of its own university, it must not exclaim when Toronto University seeks to keep up its efficiency.

Upper Canada College, however, is a tumor upon the public purse which must be attacked with the sharpest instruments and cut unsparingly, notwithstanding the cries of gentlemen that it is the nurse of their gentility, and that their fond recollections cluster about it. If it must be supported, let it

draw funds from the same source as other collegiate institutes doing equally as good work.

My letter has already straggled to too great a length, but I must not close without telling you how many complimentary remarks I have heard as to the contents and appearance of the "Journal."

ALUMNUS.

Toronto, January 9th, 1884.

EXTRACTS FROM CORRESPONDENCE.

I am now fairly well initiated in German university life, and am enjoying myself very much. The longer I stay in Halle, the better I like both the city and the university. I cannot say that my expectations have been realized in the university work. In my own special line of work I am disappointed. I called my subject "Old English Philology" for want of a better name, but with the intention to devote much more time to the literature than to the pure philology. They go together in a thorough and exhaustive study of the subject. But here the literature promises to be like the grain of wheat in a bushel of chaff; for if simple philology is not as worthless as chaff, it is as dry. I do not want to make the last statement absolute. Philology, as I studied it in America, might be called child's play to the philology here, but there was, at least, some enjoyment in it. Especially historical English grammar, as I studied it for myself in the best English authorities, and illustrated it in the literature, became for me as fascinating as a story. Perhaps my enthusiasm was increased by a discussion which I carried on, in a long correspondence, with the author of one of the text-books I used. My intention was to continue these studies, but to concentrate my energies upon the mastery of the old English language and literature. But I find the Professor of Anglo-Saxon launching out into a dreary sea of vowels and consonants, with their innumerable variations and combinations in all the North-European languages. Comparative Philology is good in its place, and Phonetics is an important subject, but "vom

neuerem Standpunkte aus" they seem to be everything. Without doubt they have done very much for the science of grammar and the science of language, and the results are perceptible in individual languages, but it seems to me easy to overestimate the importance of the latter, or rather the amount of attention this comparative grammar should receive in a general study of a particular language. Here it seems to play an important part in all languages. All the old books that do not involve this new treatment are called antiquated. In the same spirit is the excessive study of words, not their meaning, but the history of the forms in different languages. This also is well enough, if not carried too far; but what I have seen of it here eats out of a great writer all life and spirit. I have seen it to be so in Latin, and take it for granted that it is the same in Greek. It is even so in modern English. Cowper, who at present occupies the attention of the English Seminary, would turn over in his grave if he knew how his delicate poetry is being ground to pieces in the jagged mills of the dictionaries. In the same seminary infinite pains are taken to discover the approved text-reading. There was a great dispute the other day over an apostrophe. The edition used by the student who was reading differed (either in having or not having it, I cannot remember which) from the professor's, which led to an examination of the other editions in the class. The majority seemed to be against the professor; at last he said, with great gravity and his customary "Nun, meine Herren," "We shall have to consult the original folio; the important thing is, not what we think about this apostrophe, but how did the author write it!" I must here give room for an example of this over-elaborate study of English from the purely theoretical point of view. It occurred recently in an educational paper published in Breslau, in an article upon Tom Brown at Rugby (if I remember), which has been translated into German for the use of schools. The *Nation* (New York) notices it. Two editors of this book quarrel over the meaning of the expression "to knock out of time," the last editor or critic holding that it is equivalent to "to knock into eternity,"

and, therefore, "to kill." He compares the "very common phrase" "to knock one into next week."

The Professor of Modern English Literature here is Karl Elze, one of the most celebrated Shakespearean scholars in Germany. I hear his lectures, though they are not strictly in my line, because of his admirable and clear German pronunciation. I understand him better than any other lecturer—almost perfectly. I must say, too, that the lectures are interesting, though often purely from the unique views of the lecturer. The way he takes the Englishmen to task for not understanding their own literature is often rich; but, as a rule, he is fair and shrewd in his estimates.

I return to the Professor of Anglo-Saxon. Of course he will come to the A.-S. Grammar after a while, and he expects in the last *quarter* to read a few selections from the literature. In the meantime, I hear his lectures (without taking notes; what is of greatest importance I can get from a book in my room), and amuse myself at his extraordinary learning, and extraordinary pronunciation of English. This may seem very like cutting off my head for my amusement. But I have made up my mind to go next semester where I can get a little more food, or food of a different order. I think I shall be able yet to find what I want. At the present everything points to Strasburg, where is a truly great scholar in English literature as well as the English language, Ten Brink. He is the author of by far the best History of Old English Literature yet written, which I am now reading. Gering, the Professor of Anglo-Saxon, has told me that Ten Brink is the best man for me. There is another fine scholar in Berlin. I visited Leipzig (only twenty miles distant) a short time ago, and heard the men of particular interest to me. I was pleased with all of them except the one of greatest importance, and with him I was decidedly displeased. I have never seen his equal for perfect lifelessness, and the lectures I heard (one of them in literature) seemed to me *jejuné*. Gering himself, I am convinced, does not think very much of him (Wülcker), though he does not say so openly. Aside from Wülcker, Leipzig

impressed me as offering unusually rich advantages in my line of work.

In spite of the censure I have been freely expressing, I am very well pleased with the German universities so far. I hear Prof. Droysen in an interesting course of lectures on the History of the 19th Century; and Prof. Conrad once a week in Political Economy (principally for his German). I hear, in the Science of Language, one of the most celebrated men of this century—one of the makers of that science—August Pott. He is now a very old man, over eighty, white haired, but still lectures where he has lectured for fifty years. His form is erect, and he reads without glasses. He is a prodigy of learning, being acquainted with nearly all languages, from the Germans down to the "Hottentotten," or at least, having studied nearly all, in their prominent forms. He cannot speak very clearly for the want of teeth, but what I understand is interesting; he is, however, in his second childhood.

It soon becomes evident that these men are masters of their subjects, however narrow the subjects may be. Whenever anything can be accomplished by learning, they accomplish it. In learning they undoubtedly lead all other nations. I should not be equally willing to acknowledge their superiority in taste or insight. There is a wonderful amount of speculation, with no unusual amount of fruit. I have been asked several times why I came to Germany to study the English language. I should not come here to study modern English, or English literature, but I have to confess that Germany has the best scholars in old English.

Of course another great advantage here is in learning the German, and I am studying the language and literature in private, with a German student, systematically, beginning with the oldest period.

We had a great time here week before last over the Luther celebration. Two days, Saturday and Sunday, were given up to it. There was a grand sacred concert in one of the churches Friday evening. Saturday morning the professors and students marched in a body to the church for

academical services. The professors wore their cloaks of velvet and ermine, and their old-time university hats; and next to them in the procession came the corps students (who carry on the duelling), arrayed in fantastic jackets and doll caps, looking like colored plasters stuck to their heads, and with gallant chopped faces. I was at the very end of the procession, and so escaped much bad breath; for there was an immense crowd closely wedged into the narrow streets, and only a narrow lane was left, through the efforts of the policemen, for the procession. As it was, the air was disagreeable for a short distance. In the evening the city was brilliantly illuminated.

The German love of music is very noteworthy, and musical accomplishments are much more common here than in America, especially among the men. One of the interesting novelties I have found in Halle is the corps, made up of young boys and a few young men, who go about the streets, all in high hats, generally, I think, on Sunday mornings, and give serenades, of which the whole public in the neighborhood get the benefit. When I have heard them the music was charming. I have heard the great violinist, Wilhelmj, here in Halle, and I heard one of Wagner's strange and powerful operas in Breslau. I expect to hear some fine music in Dresden.

Halle, Germany, Nov. 20, 1883.

A. W. B.

THE LUTHER CELEBRATION AMONG GERMAN STUDENTS.

In one of the largest concert halls of the city (Breslau) the Protestant students of the university assembled for the purpose of celebrating the birth of the great reformer. The walls were tastefully decorated with the Prussian, Silesian and academic colors, while among the spectators in the galleries was a fair percentage of ladies who had come to see, though debarred from joining in the festivities. In the long hall below were arranged parallel rows of tables, at which were seated the students, each with his glass of beer, and evidently determined, judging from the noise and the flow of spirits, to do his duty towards honoring Martin Luther. The

meeting was presided over by ten chairmen, who presented rather a martial appearance in their white gauntlets, with large red and white sashes over their shoulders, swords at their sides, and upon their heads black caps ornamented in Fiji fashion, with waving variegated plumes. When it was time to commence, these dignitaries took their positions at the heads of the tables and called the meeting to order. One of them told us that we knew why we were there, but nevertheless proceeded to make it quite clear to us. Then, led by a fine orchestra, all joined heartily in singing one of the grand old German songs. And now followed incessantly beer, alternately songs and addresses. Most of the latter were delivered by professors from the different faculties, and were animated, instructive and full of good advice. They treated chiefly of the influence of Luther upon the intellectual life of Germany, and, though we cannot do them justice, we venture to give a few of the leading thoughts.

When Luther the monk became professor at Wittenberg, the German universities, as indeed those of the rest of Europe, were not in the most flourishing condition. Medicine and astronomy were then kindred sciences, and pills and potions were administered with less regard to the patient than to the position of the moon in the zodiac. In philosophy, Aristotle ruled with a supremacy as little likely to be opposed as that of the Pope in the Church. Latin was the sole language of erudition. It was announced by a professor in Köln that a new language called the Greek had lately been discovered, in which was written a book called the "New Testament," a work heretical in its teachings, in that all who read and believed it would certainly become Jews. But Luther, still on friendly terms with Rome, and no doubt without realizing the significance of his act, forsook the old methods. In his lectures on theology, instead of giving the maxims and precepts of the fathers, and involving himself and his pupils in the labyrinths of fruitless disputations, he based his remarks upon the Scriptures, and urged, by example and advice, their study in the original. After his break with Rome he did all

in his power to reform the then existing system of education in his country. He recommended compulsory education and the establishment of high schools, in which students could prepare for the university instead of entering mere boys and without a proper standing. Such were his suggestions, and to their subsequent practical development is largely due the present efficiency of the common schools and gymnasia of Germany to-day. Great as are the benefits which have flowed from these reforms, that for which we are most deeply indebted to the great, good man is, that, in breaking the bonds of popery and declaring the right and privilege of man to religious freedom, he broke with the same stroke the shackles which had for so many centuries bound the intellectual liberty of Europe. However history may analyse the various influences which were unitedly at work in promoting this emancipation of mind and conscience, Luther was the first man to step boldly to the front and call on Christendom to awake from her sleep of ignorance and superstition. To him we owe the setting free of that spirit of fearless inquiry which to-day permeates all science, and which has for its object the solution of the problem of the universe. In the free enjoyment of those blessings which cost him so hard a struggle, we, as students, would do well to follow Luther: in courage, for he was brave; in labor, for he was diligent; and in life, for he was a good man.

Thus the evening passed pleasantly away. They sang much, and every song was followed by a toast to the singers. They spoke often, and every speech was washed down by a health to the speaker. They drank to the health of their king, their university, their professors, the ladies, their much-loved Fatherland, and in honor of pious Martin Luther. The jolliest were the theologues, and the reverend professors of theology themselves were not found wanting. The whole world has celebrated the great reformer's birthday, but none more heartily, and less consistently than the students of his Fatherland.

P. T. PILKEY.

Breslau University, Dec., 1883.

IN THE TAIL OF A COMET.

This is an age of conjectural philosophy. In fact, conjecture runs wild with many scientists, and especially with star-gazers. A few observations of strange facts are enough to stir the souls and imaginations of a horde of *clever men!* We Canadians have noticed a peculiar glow of redness, morning and evening, for some time past. We have seen and carefully noted this fact. Some have rushed before the world to explain. One great astronomer makes all clear by informing the astonished world that by some means the earth has got mixed up with the tail of a comet. Poor old earth! Just think of it! In the tail of a comet! If this be true, then Haeckel will shout with joy. He will expect to see another carboniferous era, when spontaneous generation can distinguish itself once more. But to the question. "We are in the tale of a comet." Hence the lurid glow morning and evening. So says a "Prof." of an American observatory. What bothers my mind is, how did the tail of a comet get around our earth, and mixed up with the atmosphere, without being detected? If the tail is here, where is the comet? Is the comet to *come* or *go*? Is it so "huge" a comet that the dim mistiness of its thinly attenuated tail colors our natural light before the comet itself comes in sight? Or did the tail get disjointed, or rather disconnected, and fly off at a tangent? If so, then this is a fresh case of evolution, and we learn that monkeys are not alone in casting aside their caudal appendage. Henceforward we can affirm that monkeys, polly-wogs and comets, evolve in harmony with the atheist's great god, Nature.

T. X.

SKETCHES IN ALGOMA.

Leaving Collingwood by the steamer *Atlantic*, our acquaintance with part of the future residents of Algoma began, for on the lower deck were to be found Italians, Swedes French and Germans, together with a sprinkling of Irish—all going to work on the railroad as navvies. In one part of the

boat might be seen, or rather heard, the voluble Italian jabbering away to a crowd of his countrymen, and a little distance off the slow grunting of the German, the quick, clear-cut sentences of the French, or the distinctive "Be Jabers" of the Irish, all united in making "confusion worse confounded."

While studying these different nationalities one evening my interest was checked, my enthusiasm waned, for the reason that an Italian, by no means the cleanest of a dirty race, had, in despair of a better couch, fitted up my trunk as a bed, and, while his legs hung over the end, was snoring away, dreaming it may be of sunny Italy or of his future home, regardless of my feelings at thus seeing my property invaded.

But, while descanting on the passengers, I have forgotten to say anything about the beauties and advantages of the trip, which are many and varied. If it had not been written about by so many tourists, I could describe at length the picturesque islands, chief of which is the great Manitoulin, inhabited by a people as rich as truthful; also the many beautiful harbors, such as Killarney, over and around which an odor suggestive of dead fish hangs, and the many other attractions of this lake voyage, of which there are every year an increasing number of admirers.

But every journey, no matter how pleasant, must have an end; and so it happened that one June morning we reached Algoma Mills, the business centre of Algoma. Before describing this place and district, we will try and sketch some of its peculiar inhabitants, among whom are members of nearly every European nation, except possibly the Turkish. Of the foreigners, the Italians are by far the most numerous and amusing, to one who has seldom before seen a crowd of real live ones. Imagine yourself standing on the dock on the arrival of a boat, and seeing a gang of twenty or thirty of these people stepping off, each carrying the inevitable umbrella, a bundle of old clothes over his shoulder, and, as a rule, a knife and some kind of musical instrument. They come up in their dirt and rags, and after a rest, proceed on a serenading exhibition, or perhaps to have a dance. This latter performance

is interesting, but whether a form of the English dance or not I am unprepared to say. They stand in a circle, one of them squeezing music, sounding like the screech of the bagpipes, out of a kind of inflated bladder, while two others step into the centre. One of these carries, concealed in the hollow of his hand, a small instrument with which he keeps up an incessant crackling noise, and to this and the other music the two dance. Now they are off; the excitement increases; they run against each other occasionally, varying with a genuine hug, but all the while keeping the best of time. This goes on till one is tired, when another steps in, and so on *ad lib*.

The other foreigners here are not so distinctive, soon learning the language, and assimilating themselves to the ways of the country. As to their aptness for acquiring the language, the Germans are first, followed by the French, while the poor Italians are here a long time before they can utter their first English word, "John," by which they hail every white man, intense satisfaction being depicted on their countenances when they are answered.

Besides the foreigners resident here there are other classes quite as distinct and marked. The North-Shoreman and Manitouliner are the original inhabitants, and for cunning and general dishonesty are noted, excelling even the Indians, who as a rule are not deficient in these respects.

Another class not indigenous to this district alone might be seen about the date of our last provincial election—speculators searching for timber limits they never owned or had any prospect of owning; sportsmen in search of game of a *peculiar kind*; civil engineers and lawyers, anxious about disputed boundary lines or titles; agents for cheap magazines, all outwardly "innocents abroad," but each in reality anxious to secure the votes of this free-minded and enlightened constituency for his respective party, regardless of cost or any other consideration.

Much might be said about the geographical features of the above district; its high hills, beautiful lakes and grand scenery; of its mineral and other resources, as yet undeveloped and

partly unknown; and even I might venture to prophesy as to the future greatness of this important part of the British Empire, but refrain, leaving all this to other and more imaginative minds, while I retire to dream of Italians, black flies and the benefits of civilization, till the breakfast bell wakens me to the realities of another day in the backwoods.

G. A. B.

BRAIN WORK AND FOOD.

BRAIN and nerve tissue are of comparatively high organization, and the part they play in the economy of the organism is one of primary activity. They constitute the centres of its energy. They generate its force. They do not live simply for themselves, but for the whole body, and they require—to speak popularly—a specially nutritious form of food rich in nitrogen.

* * * * *

We do not hypothecate any special "tension" as the cause of the need for higher and better food for brain work. We say that an organism which is doing brain work as well as muscular work, requires higher and better food than an organism in which the brain is comparatively idle, and only the lower centres and the muscles do much work. Undoubtedly the effect of brain work is to strengthen the brain, and to render it less likely to become abnormal in its structure, or disorderly in its activity, than if it were idle. Such exercise as the brain receives in education properly so called—that is, development of the faculties—stimulates nutrition, and in so doing increases the need for food. Excessive activity with anxiety is not good at all, and ought to have no place in the educational process. Worry is fatal to good work, and to worry the growing brain of a child with work is to maim and cripple its organization, doing irreparable because structural mischief, the effects of which must be lifelong. "Tension" in work is not a proof of strength, but of weakness. A well developed and healthy grown brain works without tension of

any kind. The knit brow, straining eyes, and fixed attention of the scholar are not tokens of power, but of effort. The true athlete does not strain and pant when he puts forth his strength. The intellectual man with a strong mind does his brain work easily. Tension is friction, and the moment the toil of a *growing* brain becomes laborious, it should cease. We are, unfortunately, so accustomed to see brain work done with effort, that we have come to associate effort with work, and to regard "tension" as something tolerable if not natural. As a matter of fact, no man should ever knit his brow as he thinks, or in any way evince effort as he works. The best brain work is done easily, with a calm spirit, an equable temper, and in jaunty mood. All else is the toil of a weak or ill-developed brain, straining to accomplish a task, which is, relatively, too great for it.—*London Lancet*.

IS THE OLD FAITH DYING ?

IT is often said, specifically, that men of affairs, as a class, have lost their interest in the churches, and an attempt was lately made to test the truth of this assertion. In an eastern city, with a population of a little less than forty thousand, the president and cashier of one of the national banks were requested to furnish a list of the fifty strongest firms in the city, with the name of the head of each firm. The gentlemen furnishing the list had no knowledge whatever of the use that was to be made of it. In classifying fifty-four names thus given, it was found that there were seven whose relation to the churches was unknown to the gentlemen who had obtained the list; six who were not identified with any of them; and forty-one who were all regular attendants upon the churches, and generous supporters of their work—the great majority of them communicants. In a western city of a little more than sixty thousand inhabitants, a similar list of fifty-two names was obtained in the same way; and the analysis showed three whose ecclesiastical standing was

unknown; one Jew; six not connected with churches; and forty-two regular church-goers, of whom thirty-one were communicants. These lists were both made up by well-informed and sagacious business men; the cities represented by them are not conspicuously religious communities; and the composition of them gives small color to the notion that the business men of our cities are estranged from the churches. It is astonishing that such a notion should ever have gained currency, in the face of the palpable fact that so much money is contributed every year for the support of the churches, and the prosecution of their charitable and missionary enterprises.

* * * * *

It is true that a comparatively small number of very respectable persons have withdrawn from all connection with the churches, and have shut their minds, in a temper the reverse of scientific, against all ideas and influences which proceed from this source. But for this they would be made aware of two facts of which they now seem oblivious; first, that many of the churches are quietly and cautiously adjusting their current teaching to the growing light of the age, so that there is much less repugnance between their doctrines and modern science than is often imagined; second, that they are learning to enter, by a truer sympathy and a more intelligent ministry, into the real life of men, and thus to maintain and strengthen their hold upon the masses of the people. * * The one grand fact on which defenders of Christianity should rest their case is presented in these words of Canon Fremantle: "The spirit of Christ is supreme over the whole range of the secular life—education, trade, literature, art, science and politics—and is seen to be practically vindicating this supremacy."—*The Century*.

"He who is taken unprepared,
Finds death an evil to be feared,
Who dies to others too much known,
A stranger to himself alone."

IN the German Empire, with a population of 45,000,000, there are 21 universities. These universities are very different from anything which goes by the name in this country. Among its other arrangements devoted to the study and teaching of all branches of learning and science, each university has five institutes or establishments devoted to the prosecution of researches in biological science. These are respectively the physiological, the zoological, the anatomical, the pathological, and the botanical. In one of these universities of average size each of the institutes named consists of a spacious building containing many rooms fitted as workshops, provided with instruments, a museum, and, in the last instance with an experimental garden. All this is provided and maintained by the State. It is the business of the professor, in conjunction with his assistants and the advanced students, who are admitted to work in the laboratories free of charge, to carry on investigations, to create new knowledge in the several domains of physiology, zoology, anatomy, pathology, and botany. It is for this that the professor receives his stipend, and it is on his success in this field of labour that his promotion to a more important or better paid post in another university depends. In addition to, and irrespective of, this part of his duties, each professor is charged with the delivery of courses of lectures and of elementary instruction to the general students of the university, and for this he is allowed to charge a certain fee to each student, which he receives himself. The total of such fees may, in the case of a largely-attended university and a popular subject, form a very important addition to the professorial income; but it is distinctly to be understood that such payment by fees is only an addition to the professor's income, quite independent of his stipend and of his regular occupation in the laboratory; it is paid from a separate source and for a separate object. There are thus in the German Empire more than 100 such institutes devoted to the prosecution of biological discovery, carried on at an annual cost to the State of about £80,000, equal to about

£160,000 in England, providing posts of graduated value for 300 investigators, some of small value, sufficient to carry the young student through the earlier portion of his career, while he is being trained and acting as the assistant of more experienced men, others forming the sufficient but not too valuable prizes which are the rewards of continuous and successful labour. In addition to these university institutes, there are in Germany such special laboratories of research, with duly salaried staff of investigators, as the Imperial Sanitary Institute of Berlin, and the large museums of Berlin, Bremen, and other large towns, corresponding to our own British Museum of Natural History. There are, in addition to the universities in Germany, a number of other educational institutions, at least equal in number, which are known as polytechnic schools, technical colleges, and agricultural colleges. These furnish posts of emolument to a limited number of biological students, who give courses of instruction to their pupils, but they have not the same arrangements for research as the universities, and are closely similar to those colleges which have been founded of late years in the provincial towns of England, such as Bristol, Nottingham, and Leeds. The latter are sometimes quoted by sanguine persons, who are satisfied with the neglected condition of scientific training and research in this country, as really sufficient and adequate representatives of the German universities. As a matter of fact, the excellent English colleges in question do not present anything at all comparable to the arrangements of a German university, and are, in respect of the amount of money which is expended upon them, the number of their teaching staff and the efficiency of their laboratories, inferior not merely to the smallest German university, but inferior to many of the technical schools of that country. The Collège de France is divided into a literary and a scientific faculty. Each faculty consists of some twenty professors. Each professor in the scientific faculty is provided with a laboratory and assistants (as many as four assistants in some cases), and with a considerable allowance for the expenses of the instruments and

materials required in research. The personal stipend of each professor is £400, which has been increased by an additional £100 a year, in some cases, from the Government Department charged with the promotion of higher studies.

PROF. LANKESTER.

HEALTH APHORISMS.

Dr. Frank H. Hamilton has formulated the following solid chunks of wisdom :

The lives of most men are in their own hands, and, as a rule, the just verdict after death would be *felo de se*.

Mould and decaying vegetables in a cellar weave shrouds for the upper chambers.

A change of air is less valuable than a change of scene. The air is changed every time the direction of the wind is changed.

Calisthenics may be very genteel, and romping very ungenteel, but one is the shadow and the other the substance of healthful exercise.

Blessed be he who invented sleep, but thrice blessed the man who will invent a cure for thinking.

Milk drawn from a woman who sits indoors and drinks whiskey and beer, is certainly as unwholesome as milk drawn from a distillery-fed cow.

Dirt, debauchery, disease and death, are successive links in the same chain.—*Medical Age*.

“There seems a sameness among things ; for mind
And matter speak, in causes, of one God.
The inward and the outward worlds are like ;
The pure and gross but differ in degree.
Tears, feelings, bright embodied form, are not
More pure than dew drops, nature’s tears, which she
Sheds in her own breast for the fair which die.
The sun insists on gladness ; but at night,
When he is gone, poor nature loves to weep.”

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