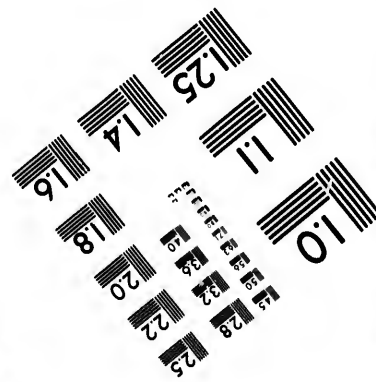
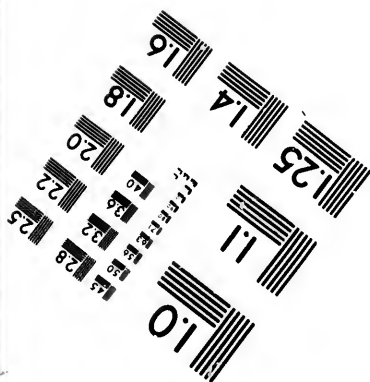
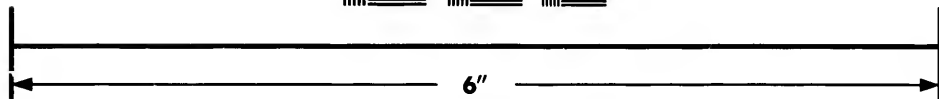
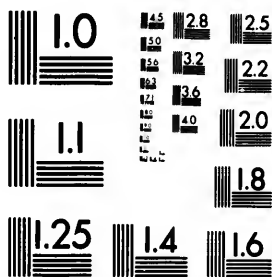


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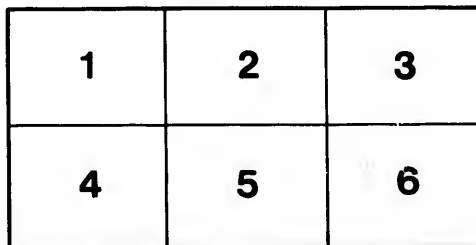
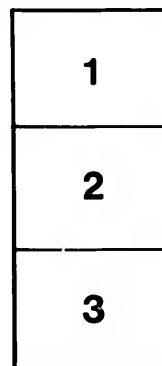
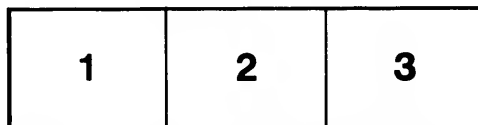
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OPPOSING FORCES VS. INACTION.

Read before the Hamilton Association, February 6th, 1896.

BY H. B. SMALL, OTTAWA.

To relieve the tension of the perpetual struggle which modern requirements have forced upon mankind, we require something upon which we may fall back—something that will tend to calm the excitement of the whirl of everyday life.

Idleness or inaction will not soothe the mind, or quiet the nerves, but a change of action or of thought will, and there is nothing perhaps that will better meet the case than the pleasure to be derived from books and reading. We hardly appreciate our good fortune in belonging to the 19th century, for, one hundred years ago many of the most delightful books of to-day were unwritten, and we possess infinite opportunities of obtaining what our less fortunate ancestors would have revelled in. Sir John Lubbock, not long ago remarked that he was sometimes disposed to think that the great readers of the next generation will be not our lawyers and doctors, our business men and our manufacturers, but the laborer and mechanic. The former work mainly with their head; the brain becomes exhausted, and much of their leisure time must be devoted to air and exercise. The laborer and mechanic, on the contrary, have in their working hours taken sufficient bodily exercise and can therefore give any leisure to reading and study. To further this the schools of to-day afford an excellent education, and access to the best books is now easy to those who desire. The school education now equals the college education of fifty years ago. Jeremy Collier, an old writer, well said of books: "They are a guide in youth and an entertainment for age. They help us to forget the crossness of men and things, compose our cares and passions and lay our disappointments asleep. Some relate the events of past ages, while others reveal the secrets of nature. Some teach how to live, others how to die.

"They open the various avenues of all the Arts and Sciences ; they are never troublesome, but answer every question. In return for all their services, they only ask a convenient chamber in some corner, where they may repose in peace, and are more pleased with the tranquility of retirement than with the tumults of society."

Many readers miss much of the pleasure of reading, by forcing themselves to dwell too long on one subject continuously. If two, or three, different subjects are kept on hand (one of them of an amusing character) by changing as soon as a sense of weariness supervenes, each can be again taken up with renewed zest ; but the wider the field the more important it is that the reader should benefit by the very best works in each class. Not that he should confine himself to them, but he should commence with them, and they will naturally lead on to others. Lord Brougham used to say—"It is well to read everything of something, and something of every-thing."

In this way only can we ascertain the bent of our own tastes, and a young man's desultory reading will perhaps be one of the most useful means for finding what his life's career should be. By his own discursive reading he can learn what work for his peculiar abilities is open for him in the world, and he will judge easily what line of study he should first pursue. Then, following out this clue, he can proceed to fulfil the requirements of education and the inclination of his own mental disposition. The main practical question of the selection and proper use of books rests not on what is good in general, or in special literature, but what is best fitted for each individual. The foundation of success in life is physical and mental, nervous and moral aptitude, and from this condition future capabilities may be to some extent foreseen. These capabilities are the indicators of the course of reading required, and by them a youth's career should be selected and decided on. It is not in the means or the reach of all of us to travel, but the next best thing to it, when it cannot be indulged in, is the reading descriptions of voyages and travels, and some of them are so graphic, and so ably depict scenes and places, that if the reader in after days chances to visit them, his ideas are prepared for what he sees, and he readily recognizes, almost like an old frequented spot, some at

least of the scenes which the description has already pencilled in his mind.

The fewer well selected books a youth has to begin with the safer he is against loss of time. The most important question at that period of life is not what *shall* I read, but what *need* I read. His care should be to read as *little* and think as *much* as possible : thus he will find what he immediately requires to know, and so make the need the object of his next acquirement in his books. This method tends to education, develops mental power, and makes a cultivated man. A man does not want to be a mere animated book-case, but he wants to have within himself the condensed matter of the book-case. A hurried careless method of reading is one of the chief dangers a student should guard against, and the habit of casting a book aside as soon as read, without pondering over its contents, recalling the argument and refreshing the memory where it failed, is apt to render worthless all the previous effort. Whateley said that writing an analysis or table of contents, or notes, is very important for the study of any one subject. A fact or subject sought out fixes itself more firmly in the memory than most of those passed in the ordinary course of reading. The ever increasing mass of periodical literature tends more and more to the habit of a snatchy mode of perusal, but to a certain extent this has its advantage. A busy man who has not time to turn aside from his own work to the thorough investigation of the topic of the hour may sometimes, in the pages of a magazine, find the case tersely stated by distinguished advocates on both sides, and he may thus discern the main positions of assailant and assailed. A good review of a new work is occasionally afforded by periodical literature. But, to have any real value a review should be read only after the work to which it relates. Distinct from the discriminating reader and progressive student, there is a very large class who are mere devotees of books of any kind, reading, however, chiefly the lighter literature of the day. These become feeble minded, intellectually dissipated and incapable of serious study. This class exists chiefly amongst women, girls and boys, and they become so absorbed in light reading that many of them are ignorant even of the existence of works of standard merit. Men are not so much given to this, but that may be accounted for by their more continuous use of the newspaper, which is to their taste what cheap literature is to the others.

I do not, however, by any means wish to condemn the entire use of this style of reading, for, if I remember right, Gladstone calms his nerves and quiets his brain by reading for half an hour nightly, before retiring, a portion of some new publication which a student or a reviewer would be apt to class as trash. It is the change which refreshes the mind. Literature exists to please, to lighten the burden of men's lives, to make them for a short time forget their sorrows and their sins, their disappointed hopes, their grim futures, and those men of letters are the best loved who have best performed literature's truest office. The truth or falsehood of a novel is immaterial, but to soothe sorrow, to bring tears to the eyes or smiles to the cheeks of humanity is no mean ministry.

"Oh for a book and a shady nook, where I may read all at
my ease of the new and the old,
For a jolly good book, whereon to look, is better to me than
gold."

Before leaving this subject—reading—I wish to impress upon every reader, and especially the young and those with a prospect of many years before them, the great utility of keeping a scrap book for clippings and extracts. Items that appear from day to day may prove exceedingly valuable in the future, and the only time to secure these is whilst they are before you. Anyone who has tried to locate a paragraph or an article he thinks he saw at some indefinite time can testify to the difficulty there is in finding it again. There is not a fact or a fugitive paragraph that you see in your paper, which will not come up again at some future time. But, in keeping a scrap-book never fail to index it, and to keep up the index, or its usefulness is gone. Of course every one can be his own judge as to the subjects, but a literary man will be astonished at the end of a year at what a mass of information he has stored up for future use. State in it also the source from which the scrap is obtained, as well as the date of publication. Speaking from personal experience, when I was a boy at school, I obtained at a London book stall, an odd volume of Robert Southey's "Commonplace Book," as the reprint of his scrap book was called, and its utility was so apparent to me after perusal, that I followed out his plans, and the benefits I have gained from my scrap books at various times are incalculable. I have recently

read an account of a similar plan on a more extended scale, now adopted in the Brooklyn Library, and which is assuming such proportions that the space assigned to it is called the "Reference Department," and all its subjects are classified.

Drawing is another opponent to inaction, a recreation too lightly regarded, but which is really a most important adjunct, not only to the pleasures of the leisure hour, but which may be turned to advantage in after life. From an industrial point of view there is hardly any trade or occupation in which drawing is not of daily and hourly utility. For technical purposes it is constantly in requisition, by architects, engineers, military and naval men, designers, and others, and its usefulness to geographers, astronomers, artists, and scientific men generally, is justly acknowledged. Hitherto drawing has been the property of the few, and its acquirement in schools has been classed with comportment and calisthenics. Through its power of representing the phenomena of Nature as they appear to the eye, it appeals in the most direct way to every human being. It enables the artist to stir the emotions of all those who can appreciate beauty in form, whatever may be their nationality. Those who aspire to take a leading and active part in the doings of this and the next generation must look to the requirements of the future, since the world's drama is being played on conditions which rapidly change. They will need the fullest developments of the resources of the body, of the senses, of the mind. Without a knowledge of drawing this complete efficiency cannot be attained. Drawing is an admirable training for both eye and hand, and although artists, like poets, are born, not made, yet everyone can learn to draw elevations, plans, and sections. It is astonishing how many go through the world without the aid of that marvellous descriptive power which drawing affords. The capacities of youth are a mine of wealth, and it is galling to think in after years that we neglected to work a vein of precious metal until all chance of working it successfully has passed away, and nothing is more depressing than to point to one's wasted hours, and the lost opportunities of by-gone life.

Making collections of various objects is a most interesting recreation—whether the specimens be shells, or stones, or plants, or perhaps, stamps, or coins, it matters not, each whilst tending to amuse at the same time instructs. The collection of stamps has often been

ridiculed, but there is much knowledge obtained in such a pursuit. The geographical distribution of countries with a certain amount of their history very quickly impresses itself on the mind of the collector, much in the same way as the numismatist gathers from his ancient coins and medals, a memory of great actions, chronology and heathen mythology, whilst from those of more modern times he becomes cognisant of many points of history, which without these reminders he might never have given heed to. To collect objects of interest in our daily walks, no matter whether leaves or stones, or fungi, or anything whatever, will start a train of thought and lead off the mind with a pleasant strain of reasoning that very quickly dispels the tension in which weightier matters had kept the brain. Kingsley based one of his finest popular lectures on a stone that he picked up by the wayside on his way to the lecture hall, it affording him all the subject matter he needed for the evening. It is astonishing how quickly the idea of arrangement follows collection, and what pleasure is gained in showing to others specimens collected by oneself. Then comes in the idea of rivalry with other collectors, and of supremacy where the struggle alluded to already evinces itself. But it is a pleasant and an honorable struggle and one to be urged on all who wish to make life pleasant, and to step off once in a way from the beaten path of hard brain toil and the dry details of a business life.

Botany, probably because of the names or terms used in it, is regarded by many as a dry and difficult study. But without a knowledge of it, however much you may admire flowers or trees, they are like a beautiful woman in a crowd—a stranger to you. With a knowledge of it they become at once friends—you know something of them. You go out into the fields, or the forests, or along the riverside, and the familiar families of plant life all have an interest in your eyes.

Again, take Natural History. Its study equals in the pleasure it affords the sportsman's pleasure in the chase, and whilst his sport is confined to the comparatively few species of game left in its natural state, the naturalist has open to him the insect world, birds and infusoria—a countless number, the pursuit and study of which are equally as fascinating as the hunters' trophies of his gun.

Take Geology, where the untrained eye sees nothing but dirt and mud, science will reveal wonderful possibilities. The mud is a

mixture of sand and clay, and dirt; separate it and see what a history its component parts have; strain out the water, and its study alone is a history. Ruskin well describes this when in speaking of a street gutter he says, "At your own will you may see in it either "the refuse of the street or the image of the sky."

Take electricity. No branch of science rivals in interest that of electric force, and at no time in the history of research has any branch of science made so great or so rapid progress during the years since 1881. With its now acknowledged usefulness for lighting comes its introduction for the production of power, and many trades requiring the application of a motor for driving light machinery will have an ever ready source of it at their command in their own quarters. Its power for lighting mines and at the same time affording motive power in them is now being utilized in the mining districts of the west. Late English papers describe its application for lighting purposes at the new St. Catharines lighthouse at the southern extremity of the Isle of Wight, to the extent of 700,000 candle illuminating power, replacing the former oil light at the same point of 730 candle power, thus being 1000 times more brilliant. The *Spectator* calls it the "legitimate descendant of the beacon on the hill-top, developed "through the different stages of the tallow candle and the flat and "concentric wick oil lamp." The same page says, "We wonder "to-day at such achievement, but perhaps our descendants will "illuminate the more frequented sea routes as we light our streets, "with buoys bearing powerful electric lights upon them, the light "gendered by the action of the tides, and will marvel that we could "have been content to let our great ships blunder on the rocks or "fall foul of one another for lack of so simple a precaution." For driving street cars electricity is demonstrated already. For a motive power in steamships, experiments are now going on to develop it, and the result when attained will be of incalculable advantage, as the space hitherto occupied by coal will become available for cargo. Electricity again is applied to surgery and is used in the fine arts; there is no saying what it may not yet be made to do, and the old remark holds good, that "Magnetism is in its infancy, and electricity "is as yet unborn."

Take again Astronomy. Within the last quarter of a century a remarkable advance has marked the methods and aims of astronomy.

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A younger and more vigorous science has sprung up, walking with hurried or halting footsteps along paths far removed from the staid courses of its predecessor. The new science concerns itself with the nature of the heavenly bodies, the old one regarded exclusively their movements. This younger science enquires what sun, moon, stars and nebulae are made of, what stores of heat they possess, what changes are in progress, what vicissitudes they have undergone, or are likely to undergo. The elder study attained its object when the theory of celestial motions showed no discrepancy with fact, when the courses of the heavens came directly up to time, and their observed places agreed to a finitesimal point with their predicted places. Very different modes of observation must now be employed to further such different objects; in fact the invention of novel modes of investigation has had a prime share in bringing about the change in question, and investigations carried out at higher altitudes than have hitherto been more than temporarily available are now going on in permanent observatories. The great Lick Observatory, of California, founded through the princely generosity of one man, whose name will live in the annals of liberality forever, James Lick, will soon add to the marvels of knowledge most astounding facts, if we are to give credence to what the observers have already unofficially announced. Located on one of the peaks of the coast range, 4440 feet above the sea, the atmosphere in summer is cloudless, and even during the winter there are many nights favorable for observation. Out of sixty nights tested, prior to the site being fixed upon as to the quality of telescopic vision there, Professor Newcomb found forty-two as nearly perfect as possible, seven of a medium quality, and only eleven cloudy or misty, and his season of observation extended over the first half of October. With the ordinary telescope he then used he discovered forty-two new double stars, many of them not having been seen before clearly enough for the discernment of their composite character. But the present needs of science are by no means filled by an altitude of of 4000 and odd feet. Already observing stations are recommended at four times that altitude, and the ambition of the coming astronomer will be satisfied only when he reaches that altitude where he can no longer find wherewith to inflate his lungs. Such are the growing exigences of celestial observation. Europe has not remained behind America in this significant movement. An observatory was

nominally completed on Mount Etna in 1882, from which Professor Langelier distinguished nine stars forming the pleiades, whilst from ordinary levels only six can be seen with the naked eye, and glimpses of a seventh and an eighth with telescopic aid. Nature seldom volunteers information; usually it has to be extracted from her by skilful cross-examination. No opportunities of seeing will avail those who know not how to look, and the elevated sites now chosen for the exquisite instruments constructed by modern opticians, give abundant promise of increased astronomical knowledge.

I could cite the various branches of study, all tending to oppose inaction, but I must pass on to a close. Science has done much to ennoble mankind in freeing it from superstition. Before its searching light the belief in witchcraft and ghosts has disappeared, and intolerance of every kind is fast on the wane. The most important secrets of nature are often hidden away in the most unexpected places. The refuse of factories has, by the application of science, yielded many articles now in daily requisition, and things which are familiar parts of our everyday life would still be unknown except for scientific research. That discoveries innumerable await the successful explorer of nature no one can doubt. Sir John Herschel said: "Since it cannot be but that innumerable and most important uses remain to be discovered among the materials and objects already known to us, as well as amongst those which the progress of science must hereafter disclose, we may conceive a well grounded expectation not only of constant increase in the physical resources of mankind, and the consequent improvement in their condition, but of continual accession to our power of penetrating into the arcana of nature, and becoming acquainted with her highest laws. And it is not only in a material point of view that science would thus benefit a nation, but it will raise and strengthen the national as surely as the individual character. The field on which the victories of science have already been won, is teeming with problems of the widest bearing on many questions of the day—social, philosophical, religious and natural. To the scientific man belongs the spirit of the great world, brooding upon things to come. In the truest sense his is the future. The inheritance of the part is ours, and in the literature of our own and other countries we may study the great generalizations of science,

"clarified by their passage through great minds, twined to shape,
 "and incorporated in the consciousness of the race by the pen of
 "poet and philosopher. Firmly centered in the present we can
 "reach out a hand both to the past and to the future, and become
 "the heirs of all the ages. But we must bear in mind that science
 "is not to be degraded to a machine for grinding general laws out
 "of large collections of facts. We must guard especially against the
 "error of assuming scientific arrogance whilst in search of evolving
 "a true scientific spirit, and of becoming overbearing whilst discuss-
 "ing with those who differ from our views."

Science is no longer looked upon as dangerous to those who follow it; faith is never weakened by its attainment. The materials of the universe by which we are surrounded are full of the evidences of a Creator; they crowd upon us from every side, wherever we turn our eyes we read them. Their evidences are inscribed on the blue dome of Heaven and on the gorgeous cloud turrets of the western sky, on the rocky cliffs which record the memories of long buried ages and on the green sods which cover the last new made grave. The material with which the Eternal writes His name, and the style of His handiwork, are evermore the same, whether He writes it in the golden characters of the mine or the metallic lustre of the hills, science recognizes its great Author's hand and admires with reverence His matchless autograph.

Science and art are constantly coupled together, but they really move in very different planes and touch different parts of human nature. When science comes in at the door, art flies out at the window, for the former appeals to the intellect, art to the emotions, and man is so constituted that when intellect is in the ascendant the emotions sink out of sight. The sympathizing spirit of art is opposed to the critical spirit of science. The artist seeks beauty, finds likenesses and discerns the ideal through the real. The votary of science seeks facts, draws distinctions, strips the real to the skin and bone. Poetry is the art of arts, but what would science do with the finest poem? The revels and play of poetic fancy would wither and shrivel under the hard realism of science. And this is why science needs to be cautiously handled and taught. It must not be roughly thrust on the student, but gradually instilled. Its teaching must be popularized, placed before the people in an easy and familiar way, devoid

of long words and classifying terms, and so explained that all may understand. The lectures before such a society as ours should be of this nature, explanatory and pleasing, yet possessing instruction, for perfect demonstrations never carry an audience with them.

Then, there is a difference again between literature and science. The former holds a certain attitude of conservatism, the latter is essentially revolutionary. In a few years hence the theories and writings of scientists of the present day, on many points, will be laid on the shelf, and like coral insects, those who built the science of to-day, will be dead from the moment that their successors have raised over them another inch of the interminable reef. They will have lived their day and done their work in paving the way and laying foundations for fresh lines of thought, for new theories of speculations, and whilst we at times feel a disposition to smile at what we are pleased to term "exploded" ideas and chimerical deductions, we must realize that what we ourselves accept as established facts will in all probability, under the kaleidoscopic revolutions of science, raise in future generations another smile at our want of penetration. The nebula we describe may turn out a star cluster, the aurora may be traced to far other causes than those we now assign to it, whilst the adaptability to navigation and other practical arts of the wild effusions of a Jules Verne may prove not in themselves a wonder, but a wonder why their adaptability lay so long unnoticed nor made use of.

