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AN
INTRODUCTORY DISCOURSE

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ON THE
OBJECTS AND ADVANTAGES OF
EDUCATIONAL LECTURES,
IN CONNECTION WITH
THE LONDON INSTITUTION:

DELIVERED BY

ALFRED SMEE, ESQ., F.R.S.

ON SATURDAY, OCTOBER 14TH, 1854,

ON COMMENCING THE SEASON OF EDUCATIONAL LECTURES.



PRESENTED
by the
AUTHOR

LONDON:
PRINTED BY CHARLES SKIPPER AND EAST,
1, ST. DUNSTAN'S HILL.

1854.

INTRODUCTORY DISCOURSE

OF THE

ORDERS AND STATUTES OF

EDUCATIONAL INSTITUTIONS

IN CONNECTION WITH

THE LONDON INSTITUTION

OF THE

ARTS AND SCIENCES

BY WILLIAM DUNN, ESQ.

OF THE LONDON INSTITUTION



LONDON:

PRINTED BY CHARLES KNIGHT AND SONS

15, ST. MARTIN'S LANE

1844

AN
INTRODUCTORY DISCOURSE
ON THE
OBJECTS AND ADVANTAGES OF
EDUCATIONAL LECTURES,
IN CONNECTION WITH
THE LONDON INSTITUTION.

YOUNG LADIES AND YOUNG GENTLEMEN,

THE PROPRIETORS OF THE LONDON INSTITUTION, which was Founded by the munificence of the Merchants and Bankers of London for the Promotion of Literature and Science, have resolved to give up this Theatre to your use upon Two Afternoons in each week; in order that you may advantageously partake of the inestimable benefits of instruction from well-qualified Teachers, and perfectly enjoy the delightful pleasure which arises out of the knowledge of Natural Science.

I have been requested by my Fellow-Managers to address you this First Afternoon, *on the General Use and Value of those Scientific subjects* which will be hereafter more particularly considered by the eminent Lecturers who have been engaged to instruct you: and I must also

ask you to give me your careful attention, and to think of nothing but that which I am saying, whilst I detail what *you can learn* and what *you cannot learn* by coming here, and listening with your best attention to the different Lectures as they are delivered.

You are not all of the same age; and you will observe that these Lectures will not be attended by the Young only, but occasionally even by such as are advanced in years; and, sometimes, by those who are still in the prime of life. I shall endeavour to shew you the parts of the different subjects which will most interest and most instruct my different hearers: for, rest assured that each of us, from the time we leave the cradle till we recline in the arm-chair of extreme old age, has different powers, different capabilities, and different duties to perform. At no period of life can any neglect be allowed, without that neglect producing a corresponding injury at every subsequent period; and a loss of time and opportunity *now*, will be attended by a loss of honourable position and of happiness *hereafter*.

Now, my Young Friends, at your age you have all your senses acute in the highest degree. Nothing can escape your bright sharp eyes, if rightly used. Your ears, also, are endowed with the highest faculty of hearing, and your tender skin with feeling. In these respects you will have great advantages over the older part of the audience. Here you excel; and it is your duty to take full advantage of the acuteness of your senses. Sharp, however, as your eyes are, you will find that to appreciate *all* the beauties of Nature, you will want much additional and artificial assistance. You will first require the aid of the Microscope to help you, since for seeing the lovely down upon the butterfly's wing,

covering and protecting the wing-case, like the slates on a house, it is absolutely necessary: and you will find that when you have strained your eyes to the utmost upon a drop of water, and yet have seen nothing, the Microscope will reveal to you thousands on thousands of living beings, enjoying their life, and, even in their inconceivable minuteness, completely fulfilling the object for which the Creator of the Universe in His wisdom designed them.

By the kindness of Mr. Thornthwaite I am enabled to shew you an elegant Microscope which he has devised, for the purpose of exhibiting Microscopic-objects to a number of persons at the same time. For illuminating the specimens, he uses a spirit-lamp, which is fed by oxygen-gas from a tube instead of atmospheric-air. This intense flame renders a piece of lime incandescent; and by means of a microscope constructed like a magic lantern, a magnified representation is shewn upon a white screen. By it you are enabled to see the curious structure of the foot which is given to the spider, for arranging the threads of his web: by it a thin slice of common wood is shewn to be built up of cells aggregated together: a drop of blood is found to contain the most curious organised bodies, called corpuscles: and a section of hard bone exhibits a structure rivaling the most beautiful carpet. In every object in Nature a perfection is contained which requires the aid of the microscope to reveal; for after unaided vision has exhausted its powers of appreciation, a new world is brought to light at every increase of magnifying power.

As you require the Microscope to reveal the hidden treasures of Terrestrial-bodies, so the Telescope must be used to shew you the wonders of the heavens. Saturn,

to the naked eye, looks but an ordinary star ; but I have here a drawing of the glorious form which it assumes when seen by the assistance of the Telescope constructed by Mr. De La Rue, one of the Managers of this Institution.

In your intercourse with each other, you will find that you are not all equally endowed with the same powers of perception by the senses. Those who are more highly favoured, should bestow a kind consideration upon those who are less blessed. You have nothing to lose by aiding each other to knowledge, but everything to gain by promoting and exercising this social kindness.

Your period of life Philosophers may call the AISTHENIC, for now your senses are in the highest perfection. They will never grow better, though they will gradually and imperceptibly become worse ; till extreme old age may terminate " this strange eventful history," and you may be left

" Sans teeth, sans eyes, sans taste, sans everything !"

You have all seen the little child reposing upon its mother's lap, admiring its fingers, as it moves them, with delight and astonishment. This is one of the first acts of observation ; but you are no longer children, and your desire for new objects has increased with your age ; and you now excel in the power which you have to observe different objects with intelligence, and to fix their images in your minds for ever. Some of you who are yet but young, are not so quick of perception as those who are older ; yet the period of youth is the period for obtaining lasting impressions. Although you have the power of vision, you scarcely can tell how many things you may have seen, which you have never noticed. How many of you know that a bee has four wings, or that a common

fly but two? And I will dare venture to assert, that many of you have never noticed that a beetle has six legs; but yet you all have seen bees, and flies, and beetles, hundreds and hundreds of times.

The advantage of the knowledge of objects, and the proper name to be assigned to each, is very great. At these Lectures you will find that a large number of objects, embracing also a very great variety, will be shewn to you. Excellent and accurate drawings will likewise be exhibited, so that you may be led to form a correct idea of the appearance of those different objects, which are presented to your notice. I must here tell you of some instances where persons have not known objects when they have seen them, in order that you may judge for yourselves as to the use which it may be to you to come here and pay attention to these Lectures which the Proprietors have so liberally provided for you. A working-man went to the gold diggings and found a beautiful stone. He shewed it to his companions, who thought it a most valuable diamond and offered him at once £200 for it. Being determined not to make a bad bargain, he refused this sum, brought it to England, and offered it for sale; when to his horror and dismay he was told that it was really not a diamond, but only a crystal of quartz, and scarcely worth half-a-crown.

Again, a few days since an eminent merchant told me, that when in the West Indies he recognised a large parcel of Balsam of Peru, which he bought for comparatively nothing, from those who could not tell what it was, but sold it at a very high rate in England: making a very large profit from this single point of scientific information.

In making you acquainted with the knowledge of

objects, The London Institution will be of much use to you : nevertheless we have not the collections here, which exist in our National Museums ; and whilst I ask you to attend diligently these Educational Lectures I still also beg of you not to neglect frequent visits to the British Museum, to Kew Gardens, to the Zoological Society, and to the Crystal Palace ; in each of which you will see fresh objects every time you go, although your visits may be very frequently repeated ; for you will discover it to be an equally curious and interesting truth, that the oftener you go and the more attentively you look, the more you will find to observe and admire.

The power of observing increases with its exercise. One boy takes his walk, and sees nothing ; another takes the same walk, and sees many things. The observant youth has bestowed his attention upon everything around him ; but the other has passed heedlessly by the most interesting objects. In youth attention is the faculty of the mind which ought to be the most carefully cultivated and practised ; and I hope that no one will come to these Lectures who will not *try* to attend, and in fact who will not try diligently to attend to all which is passing.

I am well aware that the youngest of you may sometimes find it difficult to fix your attention. The best plan, however, is to bring with you a pencil and a note-book and put down the principal points which the Lecturer mentions. This will help you to keep your attention from wandering ; until by habit you easily acquire that faculty. Whenever your thoughts wander remember the word "ATTENTION." Let "Attention" be your watchword ; and then the Lectures which you are about to hear will be a source of pleasure *now*, and perhaps of profit for all future time,

The Managers of the London Institution will spare no expense and no trouble to render these Lectures interesting and instructive to you. The more you desire the more are they prepared to give you, as it was the only wish of the great merchants who founded this noble Institution, that it should like the sun send forth its light upon all who desire to partake of its genial influence.

It is, however, not only the observation of simple objects which is important, but the *changes* which each object undergoes must be carefully noted. We see the egg of an insect hatched into a caterpillar; the caterpillar grow till it spins its web, and turns into a chrysalis; and the chrysalis finally lose its case and become the beautiful butterfly. This forms a palpable series of changes, the order of which your memory is not likely to alter; but changes continually occur in all bodies, and these changes you must be very careful to note in the order in which they occur.

In Chemistry the transmutations of matter under various circumstances are of the most extraordinary character. The beautiful pigment called Prussian-Blue is but a change of offensive animal-matter, potash and iron. Some of our scents and flavours also, as the oil of Pine-apple and the oil of the delicious Ripstone Pippin, are the products of chemical changes from fusel oil, a most offensive product in the distillation of spirit. In acquiring a knowledge of these changes, the Educational Lectures at the London Institution will be of great service to you. We have a Laboratory with all necessary materials, and every form of apparatus is at our command, which may be required to illustrate the different subjects. A Lecture would frequently cost a large sum of money, were not the apparatus at hand, or could it

not be easily borrowed. It is for this reason that ordinary schools cannot undertake the teaching of these subjects; and were I to tell you of the labour and expense required for some of the lectures which have been delivered within these walls, you would be especially thankful for the privilege, which you possess of being enabled to attend these demonstrations.

The knowledge which here will be brought before you, will be of the utmost value in future life. Each fact may be regarded as an unit of knowledge; and those who acquire the most will have a great advantage over their fellows. I shew you a piece of Gossan, a peculiar sort of stone which guides the miner to the detection of copper ore, and large fortunes have been made by a knowledge of the peculiarities of the stone. This is a simple mineralogical fact, but I might illustrate similar facts in every department of science.

It is not, however, a mere question of utility, but there is the highest gratification also to be found in a careful observance of Nature, and the study of Nature's laws. A touching anecdote was told me by Mr. Spence, the distinguished Author of the work on Entomology, which I commend to the notice of you all. At the Model-prison a person was confined in a dismal cell, with windows which did not allow him ever to see the sky. When he took exercise he paced a few square yards in the same spot day by day. His only amusement under this terrible sentence was minutely to notice every little weed which grew upon it. He saw these sprout from seed, increase in growth, bud, flower, and seed again. Now, when I tell you that the plants so observed were simply the shepherd's purse, the groundsel, and a few more weeds, you will see how great is *your* advantage, when you

consider the multitude of plants which clothe the earth, the countless swarms of insects which fly in the air, the fish, the birds, the animals, the changes of the seasons, and even the works of men's hands which are open to your observation in freedom. In fact everything which is contained upon the earth and even in the firmament of heaven, the sun, the moon, the planets, the comets, the stars, the nebulæ, will afford you objects for observation, study, and delight, if you will only regard them with intelligence and attention. There is in fact no end to the acquisition of Natural knowledge: for if you could know all which others have discovered, it would be but as a drop of water to the ocean. The study of Nature, and Nature's laws, forms an inexhaustible source of pleasure; and the longest life will not suffice to exhaust a fountain which can never be dried up.

I regret to state that I have heard persons declare, that they have been present at nearly every Lecture delivered by the eminent men who have honoured this Institution by their discourses during a period of many years, without deriving any advantage from them. Let such a fearful statement weigh heavily on your minds; for if you come to our Lectures as those persons have done, without paying a proper attention to the subjects explained, you will, like them, derive no benefit. Others who have attended to the Lectures, have acknowledged that they owe their present position and power to a careful attention to the great truths which have been taught within these walls. It is, therefore, better for you to hear a few Lectures attentively, than hundreds with that carelessness and inattention which allow no permanent effect to be produced upon the mind.

If we carefully consider the evils arising from an

absence of knowledge, we shall soon perceive what lamentable consequences must be the result. Two or three years ago, many persons were poisoned by Belladonna-berries sold about the streets; and I remember a man to have been bitten by a viper as he carried the creature about, supposing it to have been only a harmless snake. This year we read that in Italy, during the visitation of the dreadful scourge which passed over the earth, the people believed that the doctors were the cause of it; and drove them from the city when they most needed their aid. At another place they supposed the doctors had poisoned the water, and compelled them to drink to prove their innocence. Curiously enough also, five hundred years ago by a similar lamentable ignorance, a fatal epidemic of the period, called the Black Death, was ascribed to poison cast into the wells by the Jews; and hundreds of poor wretches were cruelly tormented and barbarously put to death, for a malady which was entirely owing to a visitation of God.

Do not think to put off the time for attention to surrounding objects to "a more convenient season," and wait till you are older before you begin to observe. If you do so, you are not only losing precious time, which never can return, but your faculties of appreciation will rather diminish than increase. Although the faculties of observation last as long as the senses last, yet in advancing years new objects do not make such vivid impressions as they do in early life. The faculty of deriving simple ideas from Nature I have called from reasons which I need not explain, the SYNDRAMIC-FACULTY; a faculty which increases from childhood to adolescence, and decreases from puberty to old age. It is your time now to observe, and if you neglect it deficiency of

information and inferiority to those around you must inevitably be your lot.

It is, however, not only necessary to obtain Facts, but the Facts must by thought and reflection be brought before the mind, and so combined and arranged together, that they may constitute Principles. In this way we derive our ideas of force and power, and obtain a notion of Heat, Light, and Electricity; and all the various qualities and properties of Matter.

Thus if I throw a piece of potassium into water, it combines with the oxygen, one element of the water, and forms potash: or I may remove one element by a piece of zinc, or a piece of iron. When we find from a vast number of facts that we can join simple bodies together, separate compound bodies into their elements, and convert two bodies into a third, we then obtain one idea of Chemical-affinity.

It is not my province to shew how we obtain the ideas of all the Physical Forces, or the relations of one to another: that will be the duty of your different teachers. This part of the subject is confessedly difficult, and will require your fullest attention and reflection. As youthful persons, however, you can have but a faint glimmer of those great and glorious principles which hereafter you will more fully perceive.

This high mental faculty is termed the NOËMIC FACULTY, which is almost entirely absent in early childhood, then increases to manhood, and declines again with advancing years. For the exercise of it, you must well employ your time whilst young in the collection of observations for reflection. Without Facts you can have no thought, without thought you can have no Principles; and it is upon the correctness of your

principles that your success in after-life will most materially depend.

We have remarkable instances of the power of a knowledge of Principles over the mind of those who are ignorant. Sir Harry Smith, when he conquered the Africans, desired to shew them his superior power. He ordered a baggage-waggon to be placed at a distance, to which he had connected wires communicating with a battery. When the Africans had assembled, he told them at his command the waggon would blow up. They marvelled. He spoke the word, they saw nothing. The circuit was secretly completed, and the waggon was shivered to atoms. Some voyagers, taking advantage of an eclipse, the occurrence of which was predicted by calculation, have stated that they so frightened the Indians, that they obtained from them whatever was desired : and though I entirely and utterly disapprove of this mode of proceeding, it nevertheless equally illustrates the power which is conferred by an intimate knowledge of the great principles of science.

By thought and reflection we are likewise enabled to form right judgments in general ; and when two assertions, apparently different, are brought before our minds, we can select that which is the true one. Last year the merchants of London were startled by the large amount of gold stated to exist in certain English rocks. Some of my friends were interested in a particular mine, which by the mechanical process yielded large quantities of gold ; but by chemical processes, only such an amount of the metal was found, as was insufficient to cover the expenses of extraction. After much careful thought, therefore, we judged it most prudent to trust to the chemical processes, but many persons trusted

to the mechanical processes and lost thereby various sums of money; and in one case I heard that a single individual lost as much as £4,000 by this error of judgment.

With all our care we shall not always judge rightly, or, judging rightly, we shall come to wrong conclusions, because we shall sometimes act upon *wrong facts*. We should therefore have much compassion upon those who are proved to have formed erroneous judgments; although true *facts and principles*, will always in the long run prevent mankind from believing the plausible statements of quacks, pretenders, and schemers. We cannot judge rightly by our own unaided reason, for without a proper set of Facts and Principles no judgment can be made; and we only deceive ourselves if we call our thought a judgment without proper data. Nevertheless, the tendency of man to judge with insufficient data is so great, that more than half the errors of mankind may be traced to this source alone.

Before you are called into action, also, your mind must be stored with Facts and Principles properly to guide your designs. The child knows but little, and does scarcely anything; the boy has more facts, and therefore effects more; but the man is in the plenitude of his power till age weakens him, and lessens his capability. The faculty of Action is called the DYNAMIC FACULTY; and to judge of what you may be called upon to do, consider what has been done since the period when I was but a youth. Since that time the Railway-system has been devised; and then consider the tunnels, the cuttings, the embankments, the bridges, and the many elaborate contrivances necessary to be devised before this great revolution in locomotion could be effected. During

the same period, also, the Electric-Telegraph has been invented; and now intelligence is conveyed so rapidly that events are daily transmitted over extensive regions of the globe, and frequently a knowledge of events is received at one part of the globe at an earlier period by the clock than that at which they actually happen.

Again the application of Electro-Metallurgy to the Arts, has led to great improvements, and most extensive alterations in our processes. Moreover, in the course of the same period, the Thames Tunnel has been constructed under the River Thames; and also the Britannia Bridge, which crosses over an arm of the sea. The formation of a Palace of Iron and Glass, is another example of an extraordinary effort of human intellect. It is impossible for you to tell what may be effected in a similar number of future years; and if you desire to take part in the rapid course of human improvement, your mind must have been stored beforehand with those units of knowledge which I have already described.

As youths you are neither expected, nor are you competent, to carry out any great work; but certain things you can do for yourselves, and you can thus bring your knowledge into play within reasonable limits. You do not require expensive materials for many processes. A few little glasses and a retort, will enable you to make analyses, and even to manufacture many substances. In these employments you will find great amusement in the long evenings of winter, as well as in the dreary wet weather which sometimes occurs in the Christmas holidays.

At this Institution during these holidays in the present year, Mr. Malone has arranged to receive a limited number of young persons and to give them Laboratory

instruction; and those who take advantage of his teaching, will thus be enabled to conduct many chemical-processes for themselves in the Laboratory of this building.

Accurate original research often requires costly apparatus; but to carry out that which is known, the simplest contrivances will suffice. I am tempted here to shew you a little Electrical apparatus which I once set up on the spur of the moment. We had a beautiful garden in one of the London suburbs, and we received information that whilst the family were at dinner a systematic robbery of the fruit was carried on. After pondering over the matter, I got some wire, and connected it at one end with a battery and at the other with a cup of mercury: and with another wire I connected again the mercury to the other pole of the battery, inclosing in the circuit a magnet, the keeper of which was attached to the alarum of a Dutch clock. I then stretched a delicate piece of thread across the garden, tying one end to the copper-wire and the other to the trunk of a tree. All being ready I went into dinner, and the alarum speedily rang. The thief had moved the thread and pulled the wire out of the mercury. I ran out and caught the boy who declared that he would never come again if we only would let him go this once. All such little devices you may contrive, and they have a good influence in encouraging the habit of spontaneous invention.

Chemical and Mechanical occupations are more especially for the young Gentlemen, but the young Ladies may have their share of occupation. They will find that their Botanical studies may be much improved by studying the growth of plants. Those who live in the country, may cultivate their flowers with more ease; but even

those who live in the middle of London are not altogether precluded from this pursuit by the difficulties of their situation. Many plants may be grown under glass in great perfection, as Ward has taught us. Here is a specimen of the rarest English Ferns (called the Tunbridge Fern) which grows and fructifies in Finsbury Circus as well as in any part of Great Britain. I myself love to see plants grow in this manner, and I have generally Lilacs in blossom at Christmas: and with a little trouble and protection you also may have many choice plants even in the centre of London. To such of you as may at once like to commence the cultivation of plants by this process, I have brought some Lycopodium, which I will distribute after the Lecture; and which you can readily grow under glass.

To cultivate plants with success, it is quite necessary that you should attend to certain circumstances. As horticultural weapons you must employ and regulate the heat and cold, the light and darkness, and the damp and dryness of the soil and atmosphere. By properly managing these natural powers, success will attend your efforts, and you will be delighted to see the fronds of Ferns unfurl themselves, and many a choice flower will gladden your eyes with delight and fill the room with odoriferous perfume. However much the sun may be obscured from your room, still some forms of vegetable-life will be put forth; and though by comparison the rose or lily may superlatively excel chickweed or groundsel, yet there is no plant, however insignificant, however common, which has not its own peculiar beauties and charms; and which would not be esteemed as a marvel of design, if others more beautiful were absent from the comparison.

In the study of Natural-history young people may

bring many objects of the greatest interest under their notice. Here is a pet Toad which has lived under my roof many years. It was the smallest toad I ever saw, when I caught him in the woods where the Crystal Palace now stands. He has done me much good service, by eating the insects which damaged my plants; and you see that he has now grown to reasonable proportions. It is a matter of much interest to see this creature feed. When he perceives an insect like a cockroach, he sits perfectly motionless, till by directing both eyes upon the creature, it exactly ascertains the distance, when in an instant it darts out its head with an inconceivable rapidity and swallows its prey. Now every creature, if attentively examined, will be found to have its peculiar mode of feeding; and really a large volume might be written on this subject alone full of the most curious information.

Look at these beautiful Guernsey-Lizards, which astonish us by their rapid and graceful movements, and which we have opportunities of observing by keeping them in my glazed Plant-cases. Even fish may be brought within the range of this kind of observation. Here is a very great favourite of my family, a little fish from the Thames, called a Pope, who has banished his natural shyness. The moment he sees us he comes up to the top of the water to receive his accustomed food. By watching animated-beings, we find that everything possessing life has its own proper interest; for everything is beautiful. Even that which at first appears ugly and deformed, on a more intimate acquaintance is found to be perfectly adapted to its end, and endowed with the highest interest.

The Young Ladies and Young Gentlemen who this

day attend in our Theatre, have all of them their own different and particular objects to attain; and should therefore make their knowledge subservient to a different end. You are all of you the sons and daughters of persons holding a good position in society. As for the youths, some of you will be blessed with independence, and live upon the fruits of your own estates. To you Botany will be invaluable, for enabling you rightly to manage your woods and fields. Mineralogy and Geology will also be extremely useful, to guide you to the knowledge of the qualities of various soils and of the mineral products of the land. Others of you may be destined to be merchants, and send your ships over every quarter of the globe. To all of you a knowledge of the Sciences will be an invaluable acquisition. Some again will become Engineers; others will be Manufacturers; and some will enter into the Medical, Legal, or Clerical professions: but in every path of life which any of you are likely to follow, the subjects which will be taught at these Lectures will certainly come into every-day use.

The duties of the young Ladies will hereafter be not less important, though, perhaps, less stirring than those of the young Gentlemen. Your knowledge of Chemistry will enable you to conduct your households with economy. In the sick-room, the knowledge of the Laws of Life will enable you to comfort the afflicted; and your knowledge of Nature and Nature's works, will render each of you a fitting mistress for your respective households, suitable teachers of children, and worthy companions for the intellectual man.

In your study of Nature you cannot but be deeply impressed with the beauty of the objects which you must observe. You will find the most marvellous design in the

construction of every animal and of every plant ; with an adaptation to its end which will lead you at once to exclaim—"How Marvellous are THY Works! in Wisdom hast THOU made them ALL!"—"How could man have formed any organic body? or even the matter of which it is made? There must be a Higher Power to rule and govern the universe!" When you have observed but few facts, your attention will be called to an Infinite Power but a few times. Every day, however, that you become older, this intention will be forced more and more upon your minds. From youth to old age, the admiration of Nature's works will increase ; and lead you more and more to the contemplation of that which is infinite. When you see the bird year by year build its nest in the same manner ; when you see the feeble bird impelled by some unerring principle migrate in spring to cooler climates, and return in autumn to some more genial spot, in obedience to its instinct ;—you will exclaim more and more fervidly every time you are witnesses of this fact, with our great naturalist Gilbert White,

"The God of Nature is their secret Guide."

This high and glorious faculty which we possess of contemplating the Infinite, is called the PNEUMA NOËMIC FACULTY ; which is present in the child, is witnessed in the boy, is more strongly marked in the man, and is paramount with the aged.

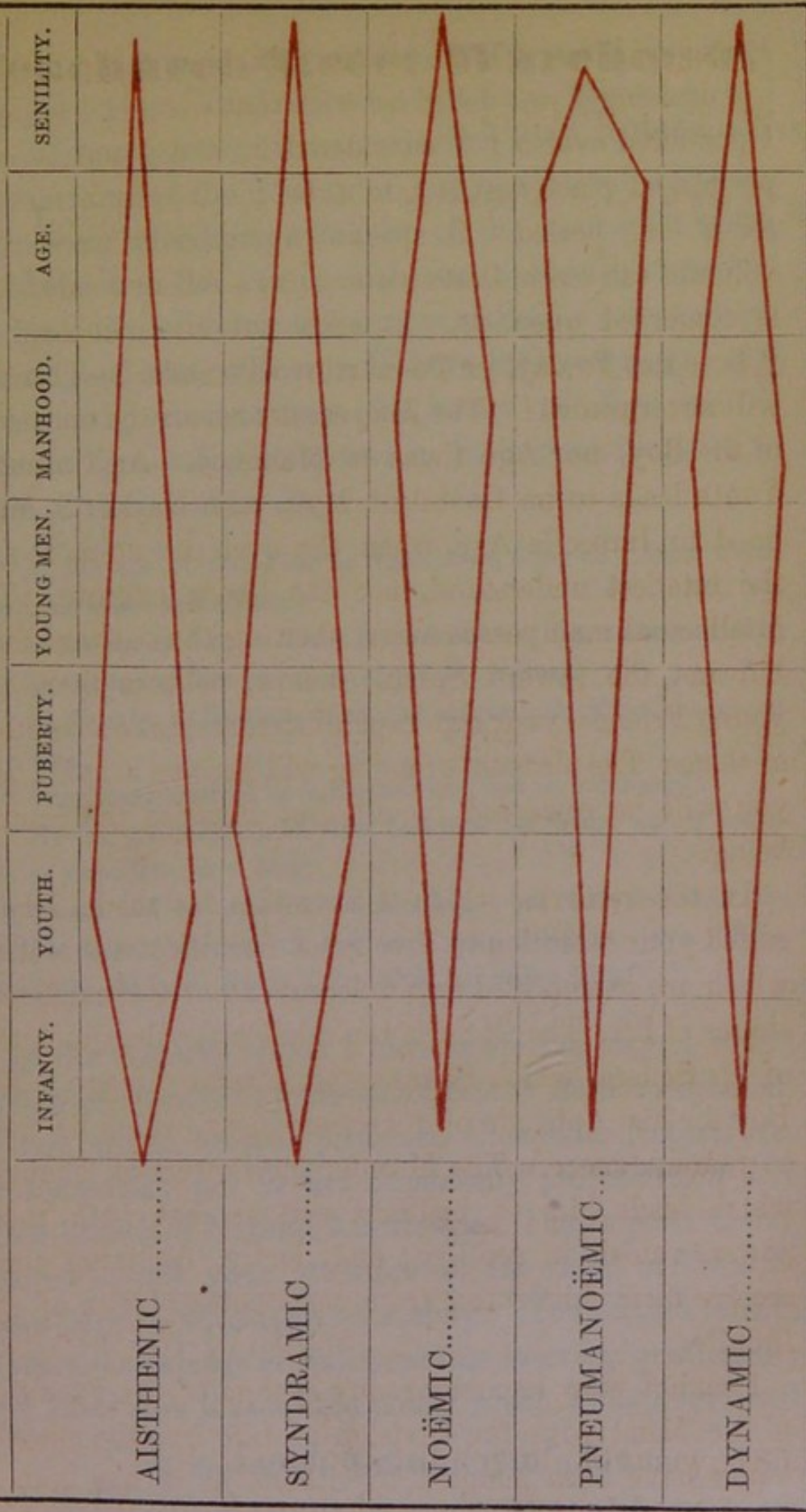
I have constructed a Diagram for illustrating the Powers of Man at all his different ages. In fact the Diagram is a skeleton of my Lecture. It shews on the one hand how each Faculty of the Mind is developed, arrives at maturity, and vanishes ; and on the other hand it indicates all the Powers which Man possesses at each

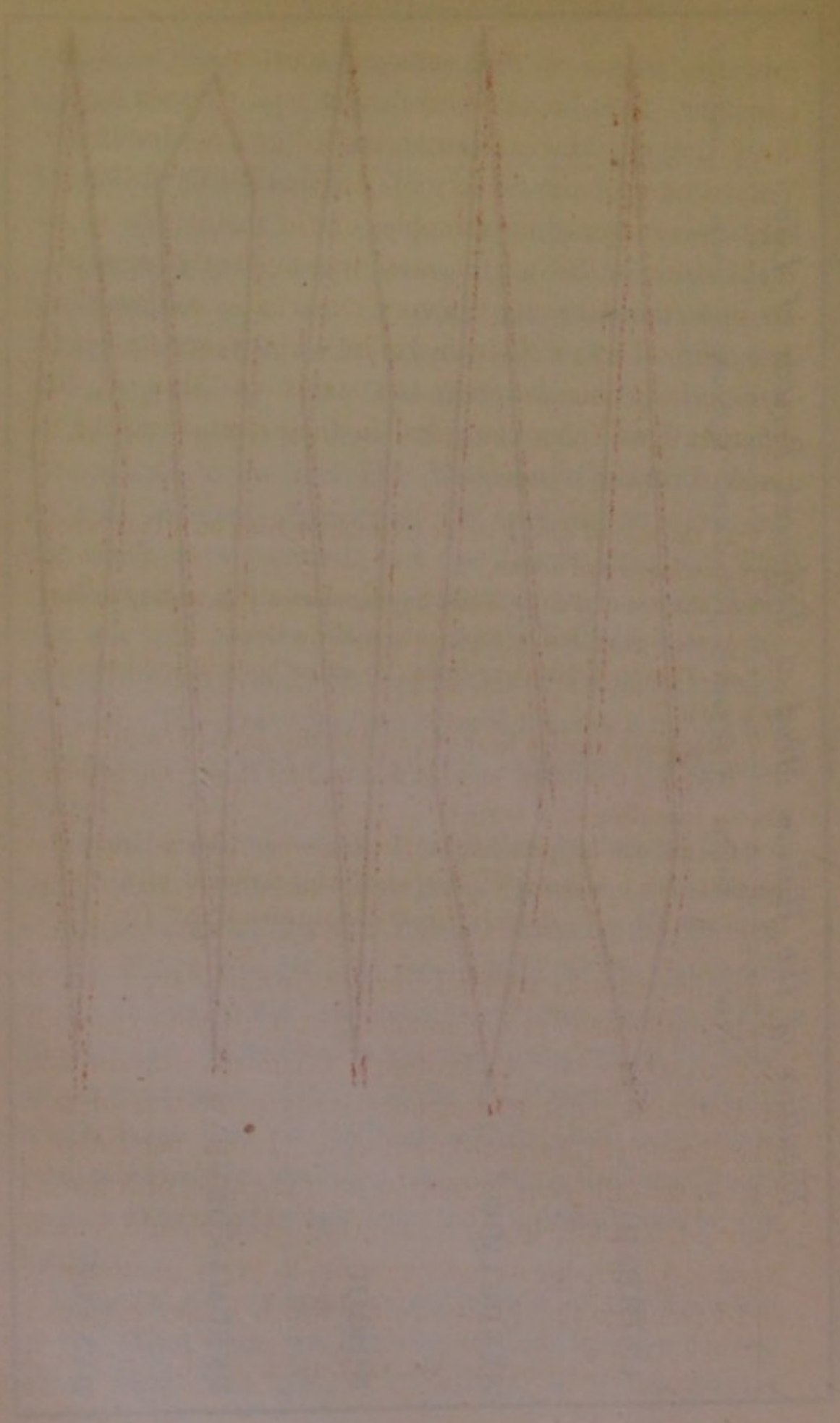
Period of Life. I must confess that when I had finished my drawing I was delighted with that which I had done. I pondered over it; I considered it, and I put it in a prominent place that it might be continually before me for a long period. It speaks emphatically more than volumes can teach, that on every day a different capability is conferred upon us. It cries out trumpet-tongued, "Lose not To-day, or To-morrow will suffer!—This day will never return!" The Man cannot repair the omissions of the Boy, nor Age those of Manhood. An Untaught Youth leads to an Unskilful Man, and Unskilful Manhood to Imbecile Age, when the eyes can no more see, the intellect understand, nor the hands execute. The intellectual man passes away, shewing the outward form but not the inward Spirit. Learn, betimes then, my young Friends, your own capabilities, and take advantage of them: The pleasure of acting will become a habit, and you will be rewarded by all that dignifies the human being.

In the remarks which I have this day made, I have called your attention to Five great Faculties of the Mind which are exemplified to a different extent at the different stages of life. The Child is remarkable for the Quickness of his Senses, which decreases to extreme old age. The Boy for his Aptitude of receiving Ideas, which he loses as years advance. The Man for his Powers of Thought which leads him to brilliant actions, but both these powers vanish in senility; and, lastly, declining years receive *their* chief solace from the Contemplation of the Infinite.

I cannot stop to compare my system of the Faculties of the Mind with the Division of Life into the periods which have been adopted by others, as it has been a

Faculties of the Human Mind at Different Periods of Life.





favourite theme of Philosophical speculation for more than 2000 years. Shakespeare's immortal "Seven Ages" is a fitting monument to an unrivalled genius; but in the Transactions of the Society of Antiquaries for 1853 are many very interesting examples of the manner in which the division of the life of man was anciently regarded. Of these the following is a very remarkable composition. The original was written in Hebrew 900 years ago; and is especially curious from the states of Man at his different ages being compared in their characteristics to those of various animals.

"At the age of *One Year* he resembles a King on a Dais, whom every one kisses and adores.

"At the age of *Two or Three* he resembles a Pig, routing in dirt.

"At the age of *Ten* he capers about like a Goat.

"At *Twenty*, a Neighing-horse, he attires himself, and looks out for a wife.

"After being married he is like an Ass (that is, burthened).

"Having got children, he must find food for them; and is therefore as impudent as a Dog.

"Grown old he gets like a Monkey,—but (this is) only the ignorant man: whereas of the wise man Scripture says, 'King David was old'—(1. *Kings*, i, 2.) Old, but still a king." (*)

In the remarks which I have made this day, I would wish you clearly to understand that I do not expect all of you are to become professed Chemists, Naturalists, or Botanists; nor in fact necessarily professors of any other branch of Natural-knowledge. I have particularly desired to call your attention to the value of Natural-knowledge to all classes of society. You should esteem Natural-knowledge as indispensable to every gentleman; and I feel sure that all the points which I have reviewed

(*) *Archæologia*, Vol. xxxv, 1853, p. 171.

for your consideration should not be neglected by any one aspiring to the title of an Educated Englishman.

I doubt not that there are very few of you, who would not greatly prefer these Lectures to your ordinary school-exercises. You must not, however, neglect the tediousness of books for the pleasures of Lectures. Follow the study of Languages, Arithmetic, and of Mathematics at school as the most valuable aids to the understanding of Natural-Knowledge; and prosecute Natural-Science as a guide for the conduct of your own affairs. The study of Nature confers on you pleasure, honour, power, the means of procuring wealth, of benefitting your fellow-creatures, and leads you to the contemplation of the Source of All Good.

THE LONDON INSTITUTION has given you great opportunities of instruction, and if my Discourse should determine any of you rightly to take advantage of the benefits now offered, the words of my heartfelt appeal to study Nature with earnestness and attention, will be engraven on your minds to the latest day of your lives; and you will rejoice that you have been this day present at THE LONDON INSTITUTION.