

Suggestions on medical education : introductory lecture to the course of 1859-60, in the Medical College of Georgia / by Joseph Jones.

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SUGGESTIONS ON MEDICAL EDUCATION.

Introductory Lecture

TO THE

COURSE OF 1859-60,

IN THE

MEDICAL COLLEGE OF GEORGIA,

BY

JOSEPH JONES, M. D.

PROFESSOR OF MEDICAL CHEMISTRY AND PHARMACY IN THE MEDICAL COLLEGE OF
GEORGIA.

PUBLISHED BY THE CLASS.

AUGUSTA, GA.:

PRINTED AT THE CONSTITUTIONALIST BOOK AND JOB OFFICE.

1860.

SELECTIONS OF AMERICAN EDUCATION.

Intercollegiate Medicine

IN THE

AMERICAN MEDICAL ASSOCIATION, AND THE
AMERICAN ASSOCIATION OF COLLEGE PHYSICIANS,
AND THE AMERICAN ASSOCIATION OF COLLEGE SURGEONS,
AND THE AMERICAN ASSOCIATION OF COLLEGE DENTISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE NURSES,
AND THE AMERICAN ASSOCIATION OF COLLEGE PHARMACEUTISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE OPTICIANS,
AND THE AMERICAN ASSOCIATION OF COLLEGE PODIATRISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE RADIATION PHYSICISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE RESPIRATORY PHYSICISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE GASTROENTEROLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE NEPHROLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE ENDOCRINOLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE IMMUNOLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE ONCOLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE NEUROLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE PSYCHIATRISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE PSYCHOLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE ANTHROPOLOGISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE LINGUISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE HISTORIANS,
AND THE AMERICAN ASSOCIATION OF COLLEGE GEOGRAPHERS,
AND THE AMERICAN ASSOCIATION OF COLLEGE POLITICAL SCIENTISTS,
AND THE AMERICAN ASSOCIATION OF COLLEGE ECONOMISTS,
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AND THE AMERICAN ASSOCIATION OF COLLEGE SOCIOLOGISTS,

MEDICAL COLLEGE OF GEORGIA

JOSEPH JONES, M.D.

PUBLISHED BY THE PRESS

ATLANTA, GA.

CORRESPONDENCE.

At a general meeting of the Class of the Medical College of Georgia, on the 7th of December, for publishing Prof. JONES' Address, Mr. A. L. JOHNSON, of Florida, was called to the Chair, and the following Committee were appointed to carry out the wishes of the Class:—E. TOLAND, S. Carolina; G. A. WITT, E. A. DAVIS, and T. B. AKRIDGE, Georgia, and W. S. CANNON, S. Carolina.

MEDICAL COLLEGE OF GEORGIA,
AUGUSTA, DECEMBER 9TH, 1859.

DEAR SIR: At a meeting of the Class, the undersigned have been appointed a committee to solicit for publication, a copy of your Introductory Address, delivered at the commencement of the present session.

Hoping that you will comply with the request of those we represent,
We remain yours, with high respect,

E. TOLAND, G. A. WITT, E. A. DAVIS, T. B. AKRIDGE, W. S. CANNON,	}	COMMITTEE.
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To JOSEPH JONES, M. D.,
Professor of Medical Chemistry and Pharmacy.

AUGUSTA, DECEMBER 12TH, 1859.

GENTLEMEN: The Introductory Address, of which you request a copy for publication, was prepared for the use of the Medical Class, and is at their disposal.

Accept for yourselves my thanks for the courteous manner in which you have conveyed to me the desires of the Class, and convey to the Class the assurance of my earnest good wishes.

Sincerely your friend,

JOSEPH JONES.

To MESSRS. E. TOLAND, G. A. WITT, E. A. DAVIS, T. B. AKRIDGE, W. S. CANNON.

CORRESPONDENCE

It has been my pleasure to receive from you a copy of the
report of the Committee on the Medical Education of the
United States, and I am glad to hear that it has been
well received. The report is a valuable contribution to
the study of the subject, and I hope it will be of
service to the medical profession and the public.

I am sure that the report will be of great interest
to you, and I hope it will be of service to the
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ADDRESS.

GENTLEMEN:—

It has fallen to my lot to address to you some words of welcome, encouragement and advice. It is impossible to look round upon this assemblage, to recognize the old familiar faces, to remark the many new faces—it is impossible to look round upon the faces of these fair ones who have honored us with their presence, without the wish to say something worthy of the occasion. While I feel that I am personally but little fitted for the task entrusted to me, I am, on the other hand, strengthened by the knowledge that it is a duty which I have to perform towards you, and towards my colleagues; and that the desire of doing good, will stand with you in the place of oratorical display.

To those of you, gentlemen, who have sat before upon these benches, and who have so often encouraged us in our daily labors by your attentive and intelligent countenances, we would extend a hearty welcome. To those of you who sit for the first time upon these benches, we would say that you are received here into the society of men, who desire conscientiously to feel and discharge their responsibilities as teachers of medicine; who will sympathize with your labors and aspirations; who will endeavor, not only to impart the standard course of medical instruction, but also to endow your minds with just conceptions of the importance, dignity and extent of the science of medicine, in its relations with all other sciences.

As teachers of medicine, we have undertaken a solemn and responsible work.—It is our duty to impart that knowledge which will enable you to stand between life and death; and if we fail in the discharge of the responsible duties of teachers, the constitutions which are ruined, the lives which are lost through your ignorance and neglect, will justly in the final day of reckoning, be required at our hands.

Gentlemen, when you consider the importance and elevated character of the science of Medicine—its object, the preservation of the health and lives, and the healing of the diseases and the amelioration of the physical and mental sufferings of our fellow human beings—its extent, embracing a knowledge of all science, whether relating to matter or mind, it is evident that you occupy a solemn and responsible position as students of Medicine. In view of the solemn relations which exist between us as instructors and students, in view of the extent and importance of the science of Medicine, it will be our earnest endeavor to improve every occasion for the establishment and advancement in your minds of the knowledge of the component branches of Medical science in their relations with each other, and all the other branches of science.

Upon the present occasion we desire to consider, as far as the brief space of time at our command will allow, a subject of great importance to you as Students, and to us as Instructors—the PRINCIPLES OF MEDICAL EDUCATION.

We need no labored argument to establish the pre-eminent importance of education, and of the discussion of the principles of Education. Who will deny that the stability of our government, the preservation of our civil and religious liberties, of our national honor and independence, and the maintenance and advancement of our position amongst the nations of the earth, by the advancement of science, the developement of our resources, and the diffusion of knowledge, have depended, and will always depend, upon the moral and intellectual education of the people? Who will deny that the intellectual, moral and political developement, progress and degradation of every nation, past or present, demonstrates the importance of a correct system of education? The physical perfection, the strength and valor of the Spartan race, were due to the system of culture inaugurated by Lycurgus, the fundamental principle of which was, that all children belong immediately to the State. The intellectual superiority of the Athenians was due, not so much to differences of race, soil, geographical position, or of surrounding circumstances, as to the extent and freedom of their system of education, and to the example, teachings, and writings of such men as Solon, Socrates, Plato, and Aristotle.

The great fundamental principles of education were more generally understood, and more ardently practiced, by the Athenians than by the moderns, with all their boasted progress; and to this day, the splendid achievements of the great sculptors, orators, and philosophers of Athens, stand unequalled. Who amongst the ancients or moderns formed, by his unaided powers, the highest conception of the Divine Omniscience, justice, and foresight, and of the dignity and immortality of the soul? Who amongst the ancients or moderns battled most ardently against corruption, error, superstition, and sophistry? Was it not Socrates, the Athenian, who, after his splendid exertions in the pursuit of truth, and in the cause of education, (exertions which resulted in the development and education of such men as Xenophon, Plato, and Æschines,) would accept no reward but that of a pure mind? Where do we find, in ancient or modern times, a purer and nobler life, a healthier body and soul, than that of Plato, the Athenian, the pupil of Socrates, whose works remain to this day the great models of Athenian genius, elegance, and urbanity; and whose philosophy has been the admiration of all ages? Whose intellect towers head and shoulders above all moderns and ancients? Is it not the intellect of Aristotle, the pupil of Plato, who stands second to none of the distinguished sages of the past or present, in brilliancy of genius, strength of intellect, and philosophic depth and acumen?

What preserves inviolate the arbitrary divisions of society, and the tyrannical religious and civil usages of the Hindoos, notwithstanding the bloody conquests and tyrannical rule of British arms? Why have the Hindoos, for two thousand years, followed the same beaten track, without advancement or retrogression, either in arts, religion, politics, or society? The education of the people is arbitrary, rigid, and stereotyped, and, as a necessary consequence, the religious, political, and intellectual belief, and the whole constitution of society is arbitrary and stereotyped.

The comparison of the condition of Europe, before and after the establishment of universities of science and learning, the mental activity of England, France, Germany, and Prussia, demonstrate in the clearest and most unequivocal manner, the importance of well devised systems of education. The English universities, Oxford and Cambridge, before the collegiate system had undermined and supplanted the university system, comprised the strength and bloom of the nation, picked from all ranks and orders, and whilst every pulsation of the nation's life was felt in great power at the universities, the national science and learning, on the other hand, received its most vigorous impulses, from these centers of ecclesiastic, political, and scientific learning. So intimate was the connexion of Oxford, in her palmyest days, with all parts of the "little world," of which she was the center, that popular opinion looked upon the University Riots as presages of civil war, and the sanction of the University was solicited for Royal Acts.* Within the walls of Cambridge, in the seventeenth century, were found two men, Bently and Newton, who, in the promotion of classical criticism and science, were the leaders, not alone of England, but of all Europe; and to this day Cambridge, rendered illustrious by the great fame of Newton and excited by the memory of his great achievements, stands pre-eminent above all the institutions of the world for the attention which she devotes to the studies of mathematics and physics.

The history of the past and present should teach us that, in no country in the world is a correct system of education, in all the departments of knowledge, more important than in the United States.

* "The power of the Universities of Oxford and Cambridge has during many ages been great, but it was at its height during the latter part of the seventeenth century. None of the neighboring countries could boast of such splendid seats of learning. The schools of Edinburg and Glasgow, of Leyden and Utrecht, of Louvain and Lepsic, of Padua and Bologna, seemed mean to scholars who had been educated in the magnificent foundations of Wykeham and Wolsey, of Henry the VI and Henry the VIII. Literature and science were, in the academical system of England, surrounded with pomp, armed with magistracy, and closely allied with all the most august institutions of the State. To be the chancellor of an University, was a distinction eagerly sought by the magnates of a realm. To represent an University in Parliament was a favorite object of the ambition of statesmen. Nobles and even princes were proud to receive from an University the privilege of wearing the doctoral scarlet. The curious were attracted to the Universities by ancient buildings rich with the tracery of the middle ages, by modern buildings which exhibited the highest skill of Jones and Wren, by noble halls and chapels, by museums, by botanical gardens, and by the only great public libraries which the kingdom then contained. The state which Oxford especially displayed on solemn occasions, rivalled that of sovereign princes. When her Chancellor, the venerable Duke of Ormond, seated in his embroidered mantle on his throne under the painted ceiling of the Sheldonian Theatre, surrounded by hundreds of graduates robed according to their rank, while the noblest youths of England were solemnly presented to him as candidates for academical honors, he made an appearance scarcely less regal than that which his master made in the Banqueting House of Whitehall. At the Universities had been formed the minds of almost all the eminent clergymen, lawyers, physicians, wits, poets, and orators of the land, and of a large proportion of the nobility and of the opulent gentry. It is also to be observed that the connection between the scholar and the school did not terminate with his residence. He often continued through life, a member of the academical body, and to vote as such at all important elections. He therefore regarded his old haunts by the Cam and the Isis, with even more than the affection which educated men ordinarily feel for the place of their education. There was no corner of England in which both Universities had not grateful and zealous sons. Any attack on the honor or interests of either Cambridge or Oxford, was certain to excite the resentment of a powerful, active, and intelligent class, scattered over every county, from Northumberland to Cornwall.

The resident graduates, as a body, were perhaps not superior positively to the resident graduates of our time; but they occupied a far higher position as compared with the rest of the community. For Cambridge and Oxford were then the only two provincial towns in the kingdom in which could be found a large number of men whose understandings had been highly cultivated.

Even the capitol felt great respect for the authority of the Universities, not only in questions of divinity, of natural philosophy, and of classical antiquity, but also on points in which capitals generally claim the right of deciding in the last resort. From Will's Coffee-house, and from the pit of the theatre royal in Drury Lane, an appeal lay to the two great national seats of taste and learning. Plays which had been enthusiastically applauded in London were not thought out of danger till they had undergone the more severe judgment of audiences familiar with Sophocles and Terence."

The History of England, by Thomas Babington Macaulay. Harper & B others, New York, 1852. Vol. II., p. 210, 212.

See also. The English Universities, by V. A. Huber. Translated by F. W. Newman, London, 1843, Vol. I., p. 66, 69, 71, 82, 85. Vol. II., p. 7, 12, 329. Vol. III., p. 660, 666.

"History and Antiquities of the University of Oxford," &c., by A. Wood, 5 vols. 4 to; 1786, 90.

The nations of Europe are developing the true doctrines of government and liberty slowly, but not the less surely. Whilst truth does not change from age to age, the search of man after truth changes from age to age; and that nation which has thrown off the shackles of ignorance and superstition, which has gained her liberties through blood and fire, with the edge of the sword, and at the cannon's mouth, will have learned the truth, and gained her liberties, and perfected her experience, by such fearful experiments, that she will be far more firmly seated in the possession of the true principles of government than nations which have passed through no such process of development. The country which has gained her freedom after the throes of anarchy and rebellion, which has shaken off the fetters of superstition, injustice and ignorance, and, indeed, passed through a fiery education, is in a very different state from a country which has been free from her birth, and in whom legislation has just commenced. The laws of the nation which has experimented, and been experimented with, are the permanent expressions of the results of her experiments; whilst the laws of the nation which has neither experimented nor been experimented with, are the results of abstract reason, and not of personal experience, and it has yet to be demonstrated that they are as permanent as the laws of experience. The United States sprang, almost without development, into a full grown nation; and whilst her constitution and laws embody the wisdom and experience of the past and present, whilst her government is the model and admiration of the world, still it is morally certain that without a correct system of education, even the principles of civil and religious liberty, for which our ancestors left their homes and firesides in the old world, and for which they fought and bled upon these western shores, will be forgotten. Already the corruption in politics, the increase of crime and lawlessness, the reckless disregard of the constitution and the most solemn civil compacts, the great power of wealth in politics and in social life, the unblushing trumpeting of private interests, in violation of every sentiment of patriotism, the brazen, unrebuked front of civil, religious and educational humbugs, demonstrate that the people are forgetting the great principles of justice, truth and equality, which inspired the lives and governed the actions of their ancestors. If the governments of the most enlightened nations of antiquity, whose models of art and monuments of philosophy are the admiration of the world, and among whose great men are enrolled the names of Socrates, Plato, and Aristotle, had only an ephemeral life, where are the grounds for asserting the longer continuance of our government, whose appreciation of mental pursuits are far less, and whose greatest men are but imperfect students of the greatest men of Greece?

The failure of the philosophical and political systems of the greatest men of antiquity; the failure of a philosophy so pure and rational as that of Socrates, enforced by the ablest and most eloquent writers of antiquity, is proof positive that man needs for his guidance a revelation purer, higher, nobler, and more comprehensive than that of Socrates; greater purer and higher than that worked out by the united labors of all intellects, past and present. The stability of this government will

depend upon the care and diligence with which its citizens study and practice the great intellectual, moral, civil, and religious truths revealed by the dealings of Providence, in the rise, developement, progress and decline of all nations; and by the teachings of the book of Nature and of Divine Revelation,—the stability of this government and the advancement of knowledge will depend upon the religious, political, and professional education of the people. Control the education of a people, and you control the belief of that people; and when you control the religious and political belief of a people, you control its principles of moral, religious, and political advancement. Every despot in Europe knows the power of education and belief, and maintains his throne by controlling the fountains of learning and education, and by suppressing the freedom of the press. Why did the most powerful monarch in Europe stop in the full tide of glory, after the brilliant victories of Magenta and Solferino, and abandon a contest which was hailed everywhere, by true patriots, as the snapping asunder of the bonds of superstition and of religious and political tyranny, from the richest and most renowned country in Europe? Was it not because he found that he was defending and propagating, by his arms, those sentiments of freedom and equality in politics and in religion, which, if once established in Italy, would threaten his own tyrannical rule?

You are, then, interested in the discussion of the principles of education, not only as students of difficult and useful sciences, but also as citizens of a powerful and free nation, which has a high political, religious, and scientific destiny to fulfil amongst the nations of the earth. Upon the present occasion, in the limited space of time at my command, I can do nothing more than throw out a few suggestions, which may excite, but will never satisfy this intelligent audience.

The word EDUCATION signifies drawing out, developement; and the true principles of education should be based upon the knowledge of the constitution, properties, powers, and relations of the subjects capable of developement. The education of man, should be founded upon the knowledge of his physical, physiological, mental, and moral constitution; and upon a knowledge of his relations to the universe, to his fellow men, and to his Creator. To understand the true nature of education we must understand—

1st, The structure, developement, and relations of the material part of man.

2d, The structure and relations of the intellect.

3d, The structure and relations of the moral nature.

4th, The relations of the material, intellectual, and moral natures to each other, to the exterior universe, and to the Creator.

The ends of education are three-fold:

1st, The developement and perfection of the individual, physically, intellectually, and morally, for time and for eternity, as an individual.

2d, The developement and perfection of the individual, physically, intellectually, and morally, with reference to his relations to his fellow men.

3d, The developement and perfection of the individual, physically, intellectually, morally, and socially, with reference to his relations to his Creator, in time and in eternity.

It is evident, therefore, that the true destination of education is indicated by the noblest wants and loftiest faculties of man: and that every system of education is defective which does not comprehend man in all the varied relations of his physical, intellectual, and moral natures. In view of the mighty objects of education, it may be said with truth that "Man cannot propose a higher or holier object for his study, than education, and all that pertains to education."

According to a fine expression of Kants', "there is in every man, a divinity, the ideal of a perfect man, conforming to the type according to which God fashioned him; just as in a block of Parian marble, an image of a Hercules or of an Apollo would be found, if a divine artist had traced there, by means of the natural veins of the statue, the contours and forms of the future statue. This statue it is the aim of education to free from the rubbish that conceals it,—it is the object of our entire life to evolve its forms; this inherent ideal of divinity, it is the duty of education to reveal to our consciousness, and to enable us to realize it, by aiding the developement of all those germs and dispositions placed within us by God, when he made man according to his own image, dispositions which constitute our rational nature—the true nature of the human race."

The true method of developing the physical, mental and moral constitution and faculties of man, cannot be determined by any process of abstract reasoning; it must be discovered by experiment and observation. A true theory of education can be obtained only by the study of all history, past and present; for it has taken all the past to make the present; it has required every event of the past, every work of art, every experiment, every discovery in science, in politics, in morals, and in religion, to bring our race to its present state of developement.

This task is beset with no ordinary difficulties; its perfect accomplishment is impossible. The traveller upon the barren desert, the mariner upon the stormy ocean, are guided by the unerring polar star and by the steady needle; the storms may gather around the earth and shut out the light for a time, but the gloom and uncertainty will be only partial and temporary—the light of the star still shines above upon the clouds and will appear as soon as they are removed; and in sunshine and tempest the needle is faithful to the great law of attraction; these storms in the physical world are salutary, and preserve the purity of the atmosphere and the integrity of the relations of organized beings to inorganic matter; in the moral world, the star of truth shines out with as bright and as certain a ray as the stars of heaven, but its beams can only penetrate a pure moral atmosphere; clouds of passion, prejudice, ignorance, and superstition have in all ages enveloped the human heart, and shut out the light of reason and truth, or admitted into the depths below only sickly, distorted rays.

We will in the first place take a general view of the—

PHYSICAL CONSTITUTION AND PHYSIOLOGICAL RELATIONS OF MAN.

The progressive study of all the phenomena of the universe known to the human mind, finds the last most comprehensive, complicated,

and typical work in man, governed by all the mechanical, astronomical, physical and chemical laws of inorganic bodies, and comprehending within himself all organic nature—composed of inorganic elements, prepared and grouped into definite compounds in the vegetable kingdom, by the combined actions of the forces of matter and of the sun, under the guidance of the vital principle—endowed with a body perfect in its mechanical structure, and in the arrangement of its parts, with the size of its organs, the strength of its muscles and bones, and the vigor of its forces constructed and arranged with exact reference to the force of gravity, the size of our globe, and its relations with the sun and all other worlds in the universe; worked by forces the resultants of the chemical changes of those substances, which in the vegetable kingdom have been elevated into a state of force by the action of the sun; unable to create or annihilate any force, any more than to create or annihilate matter; endowed in common with all vegetables and animals with vital force, and arising from the same common origin, the cell, and like plants and animals passing through various stages of developement; possessing in common with all animals, and in contradistinction to vegetables, a nervous system, endowed with special sensibilities relating the various organs and apparatus to each other, in such a manner, that amidst an innumerable number of complex actions, unity and harmony result; and relating the mind with the exterior world in such a manner, that it is capable of obtaining a view of all its ever-changing relations—endowed with intellectual and moral faculties capable of receiving impressions through the nervous system, and of exciting the forces by which they are surrounded, and of directing and controlling them, so as to act upon the exterior universe—formed by the Eternal in His own image, for purposes stretching into infinite ages, and with capacities of rejoicing forever in the warm beams of God's universal and all-vivifying Love.

It is a universal law, that all the component parts of the Universe have not in themselves the entire aim or reason of their existence—every form of matter is, definitely related to every other form of matter, upon the face of the globe, and the combinations of these various relations and actions and re-actions of terrestrial masses, form the essential conditions for the manifestations of the great designs of the Creator.

As man is composed of inorganic elements and governed by all the laws, physical, chemical, and astronomical, which govern the exterior world, it follows as a necessary consequence, that the peculiar constitution and relations of the inorganic elements of the crust of our globe, must affect the physical and mental endowments of man.

The solid portion of the globe has been constructed for man, just as the body has been made for the soul. The mutual relations of the solid and fluid portions of our globe, and the distribution of the forces of the sun, have exerted no small influence upon the physical and mental developement of the human race.

The endless circulation of matter resulting from the combined actions of the forces of the sun and the forces of the matter of our globe—every earthquake which, in past or present times, has fractured and

dislocated the solid strata of the earth, elevated the bed of the ocean, or depressed the level of the continents—every volcano which has poured forth the liquid contents of the interior of the earth—every flood which has swept over the ancient continents—has contributed, more or less, to the formation of a suitable soil for the maintenance of plants and animals, and the developement of the human race.

The examination of the mutual relations of celestial and terrestrial bodies, and animated beings, demonstrates that the existence of man is absolutely dependant upon the relations of the component members of the universe—that a single alteration in the chain of phenomena would destroy the conditions necessary for the existence and manifestation of the phenomena of man—that the forces of man are all resultants of the forces of the sun and fixed stars, which keep up a never-ending circulation and change of matter upon the surface of our globe—that man cannot create or annihilate force, any more than he can create or annihilate matter—that the great law of the indestructibility of force, of action and reaction, applies to all the phenomena of man, and consequently the intellectual and moral faculties are limited to the guidance and direction of the forces with which the Creator has endowed the universe—that man comprehends within himself all phenomena, astronomical, physical, chemical, physiological and psychological, and is therefore a type of the universe—that the knowledge of the structure, phenomena, and relations of man, includes a knowledge of all science, whether relating to matter or mind.

And here we would direct your earnest attention to the facts, that the phenomena of man are complicated and restricted, and depend for their existence and manifestation, ultimately upon the general phenomena which affect all bodies; and that if we wish thoroughly to understand medical, (physiological, pathological and therapeutical) phenomena, we must analyze the component phenomena of man, and commence the study with the most general unrestricted and simple phenomena, and then rise gradually to the knowledge of the more complicated and restricted phenomena, and finally attempt to gain an eminence of thought from which we may survey the phenomena of man in their mutual relations, and in their relations with the exterior universe.

We will in the second place consider—

THE RELATIONS OF THE INTELLECTUAL AND MORAL FACULTIES.

As the material part of man has been constructed with exact reference to the exterior universe, so the intellect of man has been constructed with exact reference to the exterior universe. The material part of man has also been constructed with exact reference to the structure of the intellectual and moral natures; it stands between the exterior world and the mind, and as a portion of the exterior world, a machine governed by all the laws of exterior bodies, typical of the great mechanism of the surrounding universe, it forms a fit instrument for the manifestation of the Spirit breathed into it by the great Creator of the Universe. The whole material body of man with its complicated machinery, appears to have been constructed with

exact reference to the action of the intellectual and moral nature. Thus, the complicated apparatus of the nervous system relates the mind of man through the senses, with the exterior world; and the complicated muscular apparatus obeys the volitions of the mind through the nervous system, and accomplishes various mechanical actions, by which matter is moulded, and its forces controlled and directed according to the interior ideal creations of the intellectual faculties. The forces which work the muscular locomotive system, are developed by the chemical changes of the elements of the muscles and nutritive fluids. The office of the digestive and circulatory and respiratory systems, is to prepare materials which will readily enter into chemical change, and thus generate the forces by which under the guidance of the mind the locomotive apparatus of the body may be moved, and the barriers and obstacles in nature overcome, and the forces of matter controlled and directed, so as to accomplish definite effects.

The following classification of the faculties of the human mind, drawn up by a distinguished modern writer,* will serve our present purpose in illustrating in a concise manner the relations of the various powers, which it is the object of education to develop:

I. **THE SIMPLE COGNITIVE FACULTIES**, by which we attain the knowledge of individual objects in the concrete, as, (1.) Sense-Perception, by which we know material substances in certain modes, or in the exercise of certain qualities; and, (2.) Self-consciousness, by which we know self in certain states.

II. **THE RETENTIVE AND REPRODUCTIVE POWERS**, as, (1.) Memory, which recalls what has been before the mind, with a belief that it has been before the mind in time past; (2.) Imagination, which puts what has been before the mind in new and now-existing forms. Both of them possess an Imaging or Pictorial power. When this might fail, we have, (3.) the Symbolic power, which enables us to represent objects by signs.

Above the presentative and representative powers, we have,

III. **THE CORRELATIVE FACULTIES**, discovering such relations as that, (1.) Of whole and parts; (2.) Of sameness and difference, in respect of such qualities as space, time, quantity, and active property, and, (3.) Of cause and effect.

IV. **THE MORAL FACULTY**, determining in regard to certain mental states, that they are right or wrong.

Associated with the exercise of these powers, we have,

V. **THE EMOTIONS**, attaching us to certain objects, and withdrawing us from others.

VI. **THE WILL OR OPERATIVE POWER**, choosing or rejecting among the objects presented to the mind.

It should be added, that there are laws of association, determining the order of succession of the states produced by these various powers.

The object of education is to develop these faculties in their true

* The Method of the Divine Government **Physical and Moral**, by James McCosh, L. L. D., New York, 1856, p. 263

relations with each other, and in subserviency to the great ends of being. In the developement and exercise, the true education of the mind, it should ever be carefully remembered that whilst the great object of the exercise of the MORAL FACULTY, is the determination and separation of *good and evil*, and the exercise of the MORAL FACULTY necessarily presupposes the exercise of one or all the intellectual faculties: the great object of the exercise of the INTELLECTUAL FACULTIES is the determination and separation of *Truth and Error*, and in their developement and exercise, either in the acquisition of *Truth*, or in the *search after Truth*, the SIMPLE COGNITIVE FACULTIES, and the RETENTIVE REPRODUCTIVE POWERS, the CORRELATIVE FACULTIES and the WILL OR OPERATIVE POWER, are alone necessarily concerned.

As, therefore, in the exercise of the INTELLECTUAL FACULTIES of the mind, the MORAL FACULTY and the EMOTIONS are not necessarily concerned, every system of Education which considers the INTELLECTUAL FACULTIES alone, is defective, and will inevitably fail to accomplish the great end of education, the harmonious developement of all the faculties of the mind in relative subordination, and in reference to the great ends of being.

The method of developing, educating the intellectual faculties must be acquired by a careful study of the history of the origin and progress of science, for this is the true history of the developement, progress and mode of action of the human mind. The methods or modes of action of the human mind, in viewing the phenomena of exterior nature, and in discovering their relations and laws have been the same amongst all people, and in all ages.

Science is the interpretation by the mind, of the actualities of existence. The ideas of the mind are science or truth, only when they are correct expressions of the phenomena and laws of the universe. The great end of science, and the great proof of its truth, is the power which it confers upon man of predicting future events.

For the discovery of truth, and the establishment of science, we must have a mind endowed with special faculties, capable of analyzing and comparing its own phenomena and of inferring their fixed relations or laws; capable of receiving impressions through the nervous system and organs of sense, from exterior bodies, and of decomposing, analyzing, classifying and determining the fixed relations or laws of the exterior universe. If the faculties of the mind be altered, whilst the surrounding machinery of the material body and of the external universe remain unaltered, the discovery of the relations of the facts and phenomena of the external universe would be impossible. Thus, the love of Truth, as Truth, and for no other reason, is a fundamental principle of the human mind, the knowledge of the existence of which is derived from consciousness: it is a primary principle, whose existence must be referred immediately to the Divine Command. This is true of all the faculties of the mind; we can give no other reason for their existence and modes of action, than the will of the Creator. If the love of Truth was not a fixed disposition of the human mind, it would be impossible to receive any fact on testimony—it

would be impossible to carry forward any investigation—it would be impossible to construct any science. In like manner, if the structure and functions of the nervous apparatus, which relates the intellectual faculties with the exterior world be altered, whilst the intellectual faculties and the exterior world remain unaltered, the discovery of truth would be impossible.

It is evident therefore, that, imperfections of the senses, imperfections of the nervous apparatus, and peculiarities of mental endowments are the first sources of error in the prosecution of knowledge.

The mind has no direct communication with exterior bodies, its relations with the exterior world are through the nervous system, endowed with special sensibilities, and developed upon the exterior into the organs of sense. The organs of sense are nothing more than portions of the nervous system adapted by conformation, and the addition of peculiar apparatus, to receive and transmit impressions from exterior bodies. The mind can have no other knowledge of the exterior world, than that which is derived from the cognizance of the excited states, modifications or disturbances in the apparatus endowed with special sensibility, when acted on by the impressions of external bodies; and if all the organs of sense were absent, the mind would be shut up to itself, and would never acquire any knowledge of the various forms of matter, and of the various affections and motions of matter in the exterior world.

The phenomena or associated facts of the exterior world are innumerable: matter is never at rest, it is constantly undergoing alterations of form, appearance and constitution—perpetual change is written everywhere; even the sun with his planets are sweeping majestically through space, around a distant unknown centre; these changes of states, forms and conditions and these modifications of relations, are the subjects of sensations and perceptions, and are represented to the mind as simple ideas. The causes of the incessant activity of the component members of this world and of the universe, cannot be discovered by the unaided senses; because, the senses represent only the superficial exterior appearances and relations of bodies, and cannot penetrate beyond, and are therefore limited in their respective capacities to the reception of simple ideas, and can never give any information of the immutable laws which govern all matter; the true nature, therefore, of exterior objects, the laws which regulate the phenomena of matter, and the relations between the component members of the universe, are problems which the reasoning powers of man and not his senses can solve.

After the observation of the facts and phenomena of the exterior world, the intellectual faculties, by their powers of analysis, synthesis, causation, and judgment, separate each fact from dissimilar facts, and arrange the simple ideas into species, genera and orders; thus, acquiring a knowledge of new phenomena and associations of facts inaccessible to the external senses. By decomposing phenomena into their component facts, by analysis and comparison of these facts, the intellectual faculties, form abstract ideas, which sum up the principles and laws of associated facts. The perfection of every science will, therefore,

depend upon the dilligence and care, with which its cultivators study the simple properties and relations of bodies, and analyze and decompose and compare the more complicated phenomena. In the language of Bacon, "Man as the minister and interpreter of nature, does, and understands, as much as his observations upon the order of nature permit him, and neither knows nor is capable of more."

The neglect of this the only true method of acquiring a knowledge of the laws governing inorganic and organic bodies, has been the cause of the failures of the ancient systems of philosophy. Upon the imperfect knowledge of a few ill observed facts and phenomena, the ancients reared immense superstructures, whose bases were points and their summits infinity.

The history of the origin and progress of human knowledge at all times and in all places, demonstrates that in the pursuit of knowledge, and in the direct study of nature, facts alone do not constitute science, and reasoning alone does not constitute science. We must have for the construction of science, the exercise of the senses, furnishing the primary ideas, facts, and phenomena of the exterior world; and then the exercise of the reasoning powers determining in virtue of their constitution, and relations through the senses to the exterior world, the fixed relations or laws of these facts and phenomena.

To the formation of science two things are requisite; observation of things without, and an inward examination, decomposition, analysis, and comparison of the results of observation.

It has been well said, "that true knowledge is the interpretation of nature; and therefore it requires both the interpreting mind, and nature for its subject; both the document and the ingenuity to read it aright. Thus invention, acuteness, and connexion of thought, are necessary on the one hand for the progress of philosophical knowledge; and on the other hand, the precise and steady application of these faculties to facts well known and clearly perceived."

The great end, therefore, of all human knowledge and investigation is to determine the fixed relations or laws of the universe; so that the precise condition of things at any future time may be predicted with absolute certainty; and so that the human mind may appreciate its relations with the universe, and with the great Creator of the Universe.

It is evident from these principles, that education should commence with the exercise and discipline of the senses. The intellectual faculties should be taught, carefully to observe and note the properties and relations and forces of surrounding bodies, and to arrange and classify the phenomena.

In the first exercises of the senses and intellectual faculties, we should imitate in a manner, the action of the human mind in the first dawn of science, when it first began to observe phenomena, and accumulate facts; and the method in which at the present time it originates and developes new sciences. Man commenced the construction of science, by viewing general classes of phenomena; the chronological commencement of science therefore, is with a complex mass, whilst the logical developement is with the individual elements. Thus, Astronomy which is conversant with the sublimest and most

striking phenomena in nature, had the earliest origin; its first cultivators were shepherds who confined their attention to noting the most obvious phenomena of the motions and eclipses of the sun and moon, and the rising and setting of the stars. These, the first builders of Astronomy, slowly accumulated materials for the formation of science, and in due time the reasoning faculties compared the individual facts with each other, separated the dissimilar and combined the similar, and thus arrived at a knowledge of the fixed relations or laws which sum up and express the whole detail of associated facts.

It is evident from the mode in which the mind obtains its ideas and constructs science, that science is the result of patient and hard labor. The first knowledge acquired by the ancients consisted of isolated facts: gradually facts were accumulated, complex phenomena observed, decomposed, and their component elements arranged and compared, and the errors of the senses corrected, and it was not until after many ages, that the great fundamental laws of Astronomy and physics were established.

In the work of education it should ever be remembered, that the rise and progress of the science and philosophy of the whole human race, is similar to that in each individual mind.

We are now prepared to examine in the third place, the—

CHARACTER ORDER AND RELATIVE VALUE OF THE DIFFERENT DEPARTMENTS OF KNOWLEDGE IN THE WORK OF EDUCATION.

In the developement of knowledge, we must have signs and sounds, to denote the properties and actions and relations of matter exciting changes in the organs of sense, and sensation in the nervous system. We must have signs and sounds to denote the objects of thought. Without signs and sounds, there could be no communication of ideas between intelligences, because they are the permanent representatives of our ideas. It is evident therefore that LANGUAGE, was the necessary result of the action of the mind, and advanced in perfection and power, and compass, just as the human mind and science were developed.

Hence the STUDY OF LANGUAGE SHOULD BE THE STARTING POINT OF ALL EDUCATION.

In this utilitarian age, the philosophical study of language, unfortunately is too often neglected, and treated with contempt, as a waste of time. Nothing can be more erroneous. Language presents a stereotyped expression of the mode of action and developement of the mind. The ancient languages of Greece and Rome, present a pleasant field, upon which all minds in all nations, may meet and converse with the mighty dead. Ancient languages resemble geological strata, rich in the accumulated remains of ages—each word is a fossil, which gives evidence of former organization, and life, of ancient convulsions and mighty revolutions.

In the study of languages every word has a history of its own, and must also be studied in its relations with other words, and with analogous words in other languages; every sentence has its own construction and relations to previous sentences, and conveys a definite idea,

which is related to preceeding and subsequent ideas : the impossibility therefore, of rendering the meaning of every sentence absolutely, and the consequent exercise of selecting the nearest and best of the two or more approximated renderings, cultivates in an eminent degree precision and judgement.

It is impossible to reason accurately, and describe accurately ; it is impossible to make an analysis of the reasoning process in general, without a knowledge of the etymologies and mutual relations of words and terms.

In the work of education, the ancient languages, should never be exchanged for the modern languages. The modern languages are degenerated and composite : it is well known that Latin enters into the vocabulary of the Germanic tongues, and is the ground-work and frame-work of Italian, French, Spanish and kindred languages ; consequently the study of the Latin language forms the best preparation for the acquisition of the modern languages. The relations of the ancient to the modern languages have been thus aptly illustrated by the distinguished professor of Humanity in the University of Edinburgh.* “Indeed, when one considers these venerable forms of speech in connexion with the history of Europe, from the times in which they were spoken to the present day, one is tempted to compare them to splendid edifices reared by the genius of antiquity, fairly proportioned, and presenting an outline of squared and polished blocks of the finest marble ; but which, at a period when time had begun to impair without destroying their beauty, an earthquake and tempest suddenly coming on, shook from their foundations, and shivered into fragments. Out of these fragments, with whatever materials came in our way, we moderns, when the storm had subsided, built ourselves habitations, convenient enough in point of accomodation, and destined to lodge many a gifted tenant, but nevertheless devoid of the grace, and decoration, and exquisite symetry of the original structure. And if a few specimens of this architecture have, escaped the wreck of ages, and survive in all their primitive chasteness and elegant simplicity, shall we not teach our youth to visit them, to admire their fair proportions, to study their cunning workmanship, and to imitate whatever is imitable of their perfection.”

Languages can only be learned thoroughly and scientifically by comparing them with each other ; hence learning Latin and Greek, the student learns English also in a far more thorough manner, and at the same time acquires in many respects a more perfect and powerful instrument of thought and expression.

The critical study of languages not only developes and strengthens the memory and reasoning faculties ; but it also in a manner that can be accomplished by no other study, and in fact not by all studies combined, refines the taste, enriches and purifies the imagination, and stores the mind with useful information in history and philosophy—the sublimest poetry, the deepest, most powerful and learned works in politics, morals, law, medicine, philosophy and theology were written in dead languages, and in most cases remain still in the dead

* Contributions to the Cause of Education by James Pillans, Esq., London, 1856, p. 292.

languages—the works of Aristotle and Plato will remain to the end of time, the text-books of the statesman, metaphysician and philosopher; the works of the greatest physician that ever lived were written, and have been preserved in Greek—all the medieval records of medicine, and all the terms of the *materia medica* are found in Latin, and this is the language in which at this very day the physician writes his prescriptions—and whilst the Roman law is absolutely indispensable to the perfection and accomplishment of every lawyer, as the most comprehensive and self-connected of all the systems of jurisprudence; its study is absolutely necessary to the Latin philologist and antiquarian, for the most successful cultivators of ancient literature have been cultivators of Roman law—and it is well known that the knowledge of the dead languages is even more important and essential to the theologian than to the lawyer, physician, statesman or philosopher, for the interpretation of the sacred books, the most important function of the theologian supposes a profound knowledge of not only the languages but also of the spirit and history of the languages of antiquity.

As therefore the study of languages develops all the faculties of the mind, the reason, judgement, memory, imagination, and the taste, it is unquestionably the best basis of all education, general or professional, legal, medical and theological.

The study of languages is the best basis of general and professional education, but it is not the only basis or means of harmoniously evolving the faculties and capacities of the mind in their relative subordination to the great ends of being. The grand phenomena manifested by the immense masses of matter, moving in the great ocean of space, the innumerable forms of matter, solid, fluid and gaseous, composing the atmosphere and crust of our globe, are related to man, and have at all times excited his wonder, and exercised his loftiest faculties in the search after their hidden causes; man's power over the forces and properties of matter, and his social elevation and power depend upon his knowledge of the properties, forces, relations and laws of the component parts of the universe; the highest faculties of the greatest men, of Pythagoras, Aristotle, Archimedes, Gallileo, Copernicus, Euler, Newton and Laplace, have found their most glorious field of action, and have been developed and ennobled, and have achieved those great triumphs which have elevated dignified, and ennobled the human race, in the search by observation and experiment after the knowledge of the fixed relations and laws of the phenomena of the universe: when, therefore, we assert that THE STUDY OF SCIENCE is an effective means of developing harmoniously the powers of mind, and at the same time of endowing the mind with that knowledge, by which it can alone direct and control the forces of nature for the advancement of the physical, social and intellectual good of the human race, we do nothing more than echo the sentiments of the illustrious founders of science.

In the pursuit of science, either as a means of developing the faculties of the mind, or as a means of controlling the powers of nature, we should follow the *historical development* and logical classification of the various departments of science.

Those sciences have attained to perfection first, which treat of the most general and simple phenomena, which form the foundation of complex restricted phenomena; *the philosophic system of education should therefore as has been clearly demonstrated by a learned French writer* commence with the study of the most general and universal sciences.*

Thus, LOGIC, the science of the laws of thought, which govern every act of the mind, objective and subjective, inductive and deductive, was developed by Aristotle, when astronomy, mechanics and physics were nothing more than accumulations of isolated facts, and chemistry and physiology were without a name.

Logic is the most general and abstract of all sciences, because the mind reasons in a fixed manner concerning all phenomena, and because the phenomena of the universe simple or complex, are related to each other in a fixed manner, and are governed by fixed laws, and because the human mind has been constructed with exact reference, and in exact correspondence to the exterior universe. Logic therefore may be studied immediately after the study of languages, independently of all sciences; for whilst all sciences are constructed logically, and are therefore dependent upon Logic, on the other hand, Logic is necessarily connected with the philosophic study of language alone, for whenever the mind acts, upon any subject, it acts according to certain laws, and under certain conditions.

THE MATHEMATICAL SCIENCES stand next to LOGIC, because they are related to every branch of human knowledge, and are indebted to none, and enable the human mind to deduce the greatest number of results from the smallest data—and because they are the great instruments of exact inquiry relative to number, quantity, space, time, and force, and consequently the great instrument of establishing the fixed relations of the component members of the universe, which exist in space and time, and are related by fixed laws. Without mathematics, there could be no science of mechanics, astronomy or physics, because abstract and concrete mathematics form not only the most powerful instrument in the investigation and determination of the fixed relations of the component members of the universe, but they also constitute the great mass of astronomical and terrestrial physics—without mathematics man would never have been able to overcome the obstacles and barriers of nature, and control and direct the forces of matter, and predict the course of future events, because without mathematics, mechanics, astronomy, the measurements of time, and systematic navigation, which laid the foundation of the civilization of the world, would never have existed—without mathematics the most splendid generalizations of the most splendid minds, of Gallileo, of Newton and of Laplace, would have been impossible, and the comprehension of the Unity and harmony, of the order of nature, and of the

* The principles of the classification, and of the mutual relations of the departments of science, have been most clearly and forcibly discussed by Auguste Comte, in his *Positive Philosophy*.

Notwithstanding the objections that may be raised to the details of this system of classification; and however dangerous and erroneous his religious sentiments, still we are compelled to admit that he has accomplished much for the cause of education and knowledge, by pointing out in a clearer and more philosophical manner than any other writer the principles of classification, and the mutual relations of the departments of science.

infinite power of the Creator, as manifested in the vastness of his Universe, would have been impossible.

These facts demonstrate not only the importance of mathematics but also the true position which they should occupy in the scale of sciences, and in the true system of education: the study of mathematics is indispensably preliminary to the study of all sciences, and should therefore in conjunction with languages form the point of departure of all education general or professional.

The mathematical sciences should be studied in the order of their complexity, historical developement, and logical classification.

Thus, the study of abstract mathematics should precede the study of concrete mathematics; because, as an extensive and immense application of the principles of logic to number and quantity, they are purely instrumental, logical and rational, and form the necessary and absolute foundation of concrete mathematics, which notwithstanding the simplicity of the phenomena are founded upon observation of the exterior world.

Mathematics are to be studied rather in their relations to the physical sciences, and necessary arts of civilized life, than for themselves as a means of developing the mental faculties: for whilst they are of advantage in correcting the habit of mental distraction, and in cultivating the habit of continuous attention; the exclusive and extensive study of mathematics especially of the abstract division, so far from developing the powers of the mind most needed in the business of life, and in the discussion of the highest and most intricate truths, has a manifest tendency to debilitate the imagination, invention and reasoning faculties, and induce scepticism in morals, philosophy and religion.*

To obtain the ends of education, concrete mathematics are more valuable than the abstract, because they exercise the powers of observation to a much greater extent, and the procedures are more open to the light, and are attended with greater consciousness and understanding.

The application of the principles of abstract and concrete mathematics, to the most general phenomena of the universe known to the human mind, resulted in the establishment of the fixed relations of number, form, quantity and arrangement and motions of those members of the universe whose phenomena came within the range of mans observation—resulted in the developement of the science of Astronomy. The simplicity, and at the same time the universality of the phenomena of astronomy; the necessity of the long drawn and complex reasonings of abstract and concrete mathematics, of the principles of the calculus in its widest extent, of geometry, synthetic and analytic, and of mechanics, in solving the problems of astronomy; and the appearance of new phenomena and relations different from those of logic and mathematics, demonstrate that astronomy is more complex than mathematics—demonstrate that the laws of astronomical pheno-

* For a masterly discussion of the value of Mathematics as an exercise of mind, see "Discussions on Philosophy and Literature, Education and University Reform," by Sir William Hamilton. New York, Harper and Brothers, 1836, pp. 257-324.

mena, could never have been determined without the aid of mathematics—demonstrated that in the logical classification and philosophical system of education, astronomy should stand next to mathematics.

In the survey of terrestrial bodies and phenomena which logically follows the study of astronomical phenomena, all bodies and phenomena are divided into two great classes, INORGANIC AND ORGANIZED.

INORGANIC BODIES, enter into the structure of organized bodies, form the necessary conditions for their existence and the manifestation of their phenomena, and at the same time are wholly independent of organized animate bodies, are less complex in structure, and the laws of their existence are more universal; the study of inorganic bodies, should therefore precede, and form the basis of the study of organized bodies. The sciences of inorganic bodies should also be studied with strict reference to their historical developement, and the position which they occupy in the scale of logical classification: thus physics which teaches the laws of the general phenomena of bodies and of the general motions or affections of matter which are unattended by any permanent change of the individual molecules, as heat, light and electricity, and which affect all bodies in similar manners, should precede chemistry which teaches the laws of the compositions and decompositions which result from the mutual actions of dissimilar molecules, and which in every instance present something specific.

Whilst INORGANIC BODIES are homogeneous in structure, and would remain forever at rest and unchanged, physically and chemically unless acted upon by extraneous forces, *organized animate beings* on the other hand, although composed of inorganic elements and governed by all the laws of inorganic bodies, are not homogeneous in structure (all vegetables from the simple cell, to the most highly developed, and all animals, from the simple cell animalcule, to the complicated organism of man, are composed of cells, variously developed and grouped, so as to form organs and apparatus, capable of accomplishing definite results, when moved by the physical and chemical forces, resulting from the changes of inorganic matter); and living bodies even the simplest forms of vegetables and animals, manifest new phenomena, (the developement of a form from a formless mass, and the preservation of that form amidst unceasing chemical and physical changes; nutrition, secretion and generation, due to the combined actions of the physical and chemical forces guided by the vital principle); and the higher forms of animated beings present another set of phenomena dependent upon the existence of the nervous system and intellectual faculties; and in men we have another set of phenomena dependent upon the constitution and relations of the intellectual and moral faculties: it is evident therefore, not only that the phenomena of living beings, plants and animals, are more complicated and less general than those of inorganic inanimate bodies, but also that the study of organized beings should commence with the most simply constructed, the conditions of whose existence are less complicated, and proceed step by step, first through the vegetable kingdom and then through the animal kingdom up to the most complicated and restricted.

The study of the mechanical, astronomical, physical, and chemical

phenomena of the globe; the study of the mechanical, physical and chemical structure and relations of all vegetables and animals; the study of the relations of the physical and chemical forces to each other, and the vital principles, form the necessary introduction to the study of the phenomena of man: the elements of whose physical structures are derived from the exterior world through the vegetable kingdom and undergo perpetual changes, like those carried on amongst the elements of the surrounding universe, under the action of the great forces, heat and gravitation, which work unceasingly throughout all nature—whose structures pass through successive stages of development, analogous to the progressing stages of développement manifested in a permanent form in the lower animals, and are worked by mechanical and physical forces—and whose intellect directs and controls the force of matter.

The complete knowledge of the relations of the intellectual and moral constitution of man alone, requires the knowledge ² to the relations of the moral and intellectual faculties of man, to the material structures by which they are surrounded—requires the knowledge of the nature, origin and développement of all science—requires the knowledge of the constitution, phenomena and progress of the moral and intellectual faculties as revealed in all history scientific, civil, and religious, past and present.

We have thus, gentlemen, presented to you, a general view of the relations of the grand divisions of science, and you are now possessed of the true principles of the logical classification and philosophical study of the departments of medical science.

1. In the true, philosophical pursuit of medical science, you should first study the physical and chemical relations of the elements of man, with each other, and with those of all plants, animals, and inorganic bodies, and thus commence the study of medicine, as we would do every other science, with the most general and least complex phenomena.

ASTRONOMY, PHYSICS, AND CHEMISTRY, therefore, are the first and fundamental branches of medical science.

2. You should study the organs and tissues and systems of organs and apparatus of the human body, in their general and minute structure, and in their relations with each other, and with the structures of vegetables and animals.

ANATOMY, COMPARATIVE AND SPECIAL, forms the second grand division of medical science.

3. You should study the anatomical structures and elements, and apparatus in their relations with the physical, vital and nervous forces, and intellectual and moral faculties—the material structures in action.

PHYSIOLOGY, which rests upon astronomy, physics, and anatomy, and which could never have attained to the rank of a science, without those fundamental sciences, should form the third grand division of medical sciences; and can never be thoroughly comprehended without the knowledge of astronomy, physics, chemistry and anatomy.

That physiological phenomena depend as absolutely for their exis-

tence and manifestation upon astronomical phenomena, as upon physical and chemical phenomena, may be rendered perfectly evident by even a casual glance at the facts, that astronomical phenomena affect all bodies, whether they belong to this world or to the countless systems scattered through the great ocean of space; the law of gravity affects all bodies, inorganic and organic, inanimate and animate, and forms an essential condition for the existence of the universe in its present order; the plants and animals of our globe have all been constructed with exact reference to its structure, mass, and force of gravity, and the forces of the sun and sister planets, and fixed stars; if the mass and force of gravity of our earth were increased or diminished whilst plants and animals retained their present constitution, the mechanics and chemistry of organized beings would be deranged; the weight of the moon and her distance from the earth, the distance of the earth from the sun and sister planets, the relations of the earth with the fixed stars, the length of the year and day, the inclination of the earth's axis, the size and shape of its orbit, and the duration and revolution of the seasons, and the character and intensity and distribution of the forces of the sun, have all been arranged by the great Architect, with exact reference to the constitution and preservation of the organized beings existing upon our globe; a single alteration in the astronomical relations of our globe would result in the complete destruction of animated beings.

4. You should study the nature, relations and causes of the abnormal, physical, chemical, nervous, vital and intellectual actions of the organism: *Pathology*, therefore, rests upon astronomy, physics, chemistry, anatomy and physiology. If man be related to celestial and terrestrial bodies; if the existence of man be dependent upon the adjustments of the solar system, the seasons, the climate, the action of the vegetable kingdom, the soil, and upon the great circulation of matter, kept up by the forces of the sun; if the derangement of only one link in this complicated chain of phenomena would result in the destruction of the human race: then it is evident that astronomical changes must be attended by corresponding changes in the phenomena of man; that the changes of the day, and month, and year, and seasons must be attended by corresponding changes in the constitution and phenomena of man; that derangement of the adjustments of the solar system must be attended by corresponding derangements in the little world of man, and his diseases arising from whatever cause or causes, must be influenced by these changes; that changes in the resisting medium through which the sun and his attendant planets are progressing; physical and chemical changes in the surrounding atmosphere and in the waters and soil, and in the vegetable kingdom which elaborates the materials for the structures of man, and in each one or all the organs and tissues and apparatus of man, may each one, singly or combined be the sources of diseases.

5. You should study the physical, chemical, anatomical, physiological and pathological relations of remedial agents.

MATERIA MEDICA AND THERAPEUTICS, necessarily demand a knowledge of physics, chemistry, anatomy, physiology and pathology.

6. The application of the principles of physics, chemistry, anatomy, physiology, pathology, materia-medica and therapeutics to the treatment of disease, constitutes the art of medicine, which for convenience of study and practice is divided into three branches, PRACTICE OF MEDICINE, SURGERY AND OBSTETRICS. It is evident, therefore, that the thorough knowledge, and practice of the art of medicine demands a knowledge of all science; and that the study of surgery, obstetrics and practice of medicine, should commence with the most general and least complex branches of science, upon which they are founded, and proceed up to the most complex and restricted, according to the logical order of the classification of the sciences.

Gentlemen: after you have mastered all the complex phenomena of medicine, and determined the relations of man to the exterior universe, and armed yourselves with all the inventions and instruments of science and art, your education is not complete. You are not to regard the science of medicine as a mere means of gaining wealth or power, or distinction, or as a mere means of intellectual education; it has far higher and nobler ends.

The physician works with deadly knives, and still more deadly medicines; he is intrusted with the lives of his fellow men; his life is spent in the nearest communion with the sick and dying, in sight of the very gates of eternity; the work of the physician, therefore, requires the highest self command, the loftiest moral training, and the purest religious belief. The intimate association with disease and death; the frequent view of the effects of vice in all its forms; the temptation to promote private interests, and elevate one-self in the good opinions of others by the secret undermining of the professional reputation of rivals; the great power which the privacy with which a physician works, confers of injuring rivals by those delicate and almost imperceptible stabs, which are all the more powerful and fatal, because inflicted at a time when all the sympathies are aroused; the temptation to exaggerate personal qualifications and power over disease: all tend, if not restrained by a noble, self-sacrificing spirit, by high moral culture and pure religious belief, to degrade the noblest profession, the noblest field for the exercise of the highest intellectual and moral faculties, into a field of strife—into a dark school for the development and education of the meanest and lowest principles of evil. As immortal beings, and as members of a profession which deals with immortal beings in their last extremities, you cannot if you would, shut your eyes to the importance of MORAL EDUCATION.

Happily the very pursuit of knowledge tends to develop the moral faculties.

It has been truly said, "that knowledge is not a couch whereon to rest a searching and restless spirit, or a terrace for a wandering and variable mind to walk up and down, with a fair prospect, or a tower of state for a proud mind to raise itself upon, or a fort, or commanding ground for strife and contention, or a shop for profit or sale; but a rich store house for the glory of the Creator and the relief of man's estate."

Scientific education has a far higher end to accomplish than the

reflection in the human mind of the relations and laws of the members of the universe, and the enrichment of the intellect with that knowledge which enables man to predict the course of future events, and direct and control the powers of nature to the advancement of his physical and social position. The last and most perfect work of all science, and of all true education, will be to prove beyond a doubt that man needs a revelation, and that the revelation of the Bible, is exactly what man requires to complete his range of knowledge, and enable him to fulfil the great ends of existence.

We have endeavoured to place before you an outline of the principles of Medical education, and inspire your minds with a true sense of the extent and dignity of Medical science.

Gentlemen, you have commenced the study of a noble profession which will exercise the noblest intellectual and moral faculties, not merely during the short period allotted to medical education, but throughout your entire lives. As you attempt to survey the immensity of the study upon which you have entered, let me impress upon you the great truth, that the principles of success lie within your own breasts.

If you neglect the study of the fundamental branches of medical science, contenting yourselves with only a superficial knowledge of the most practical departments; and if you are fired with no higher ambition than the desire of wealth or reputation, you will never attain true eminence—you will never feel the dearest of all emotions to the honorable mind, the approval of an enlightened conscience—you will never honestly feel that you deserve the confidence and respect of your fellow men—and you may be reduced to “that fearful state of dependence in which man finds himself, a blot upon the universe of God—a wretch thrown up by the waves of time, without a use, and without an end, homeless in the presence of the firmament and helpless in the face of Creation.”

You have everything to excite you to action—the ample records of the science of two thousand years are unrolled before you—you have an extended field for action—a nation of thirty million of freemen—a nation which stands before the world as the champion of Justice, of Civil and religious liberty—a nation which by her climate, her geographical situation, her inventions of science, and her improvements and enterprise is the very heart of the world.

In all your labors you should be encouraged by the thought, that “the humblest cultivator of natural knowledge, is like the coral insect, helping to rear an edifice, which, emerging from the vexed ocean of conflicting credence shall be first stable and secure, and at last shall cover itself with verdure, flowers and fruits, and bloom beautiful in the face of heaven.”

