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## SCIENTIFIC.

An Address to the Literary and Philosophical Society of South-Carolina, by Stephen Elliott, Esq. President of the Society.

(Concluded from our last)

### 4. Anatomy, Surgery, Physiology and Medicine.

Of these sciences, man has always appeared duly to estimate the value. The tortures of pain, the apprehensions of death, have led him, in all stages of society, to fly to art for relief, to yield himself submissively to real or pretended skill, and in all ages of ignorance, to worship, almost with divine honors, the masters and principles of the "healing art." Guided by the star of science, anatomy and surgery have progressed with rapid steps, and have fully partaken of the splendor of modern improvement. Whatever the most enlightened eye could scrutinize and detect, whatever the most dexterous arm could execute, may be found in their annals, monuments of their skill and matchless excellence. But the progress of medicine has been more questionable. There appear to be limits which we are not permitted to pass, secrets we are not allowed to explore. The principle of life is still unknown, and that mysterious power, varying with every temperament, modified by every peculiar organization, seems to give to disease, in each individual constitution, a distinct form. Hence it has been difficult to give to medicine system; to form theories illustrating the causes, symptoms and termination of each disease; when disease itself, affected not only by physical, but by moral associations, exhibits as many anomalous aspects, as human character, or human feelings. Hence, perhaps, in no pursuit, has successful practice depended more on personal sagacity, on the faculty of considering disease, not in the abstract, but as combined in every case with individual constitution, temper and habits. Theory after theory, has been swept away. The dogmatics, the empirics, the eclectics are forgotten; the principles of mechanics and of chemistry, the doctrines of vibration, of irritability, of excitability, have all been insufficient to explain the phenomena of disease; and medicine still offers a wreath of unfading verdure to him who shall be able to trace the hidden springs of life, to mark their development, their expansion, their decay; who shall explore the latent sources of diseases, shall arrange its associations, shall explain its modifications, shall counteract its efforts, and arrest its progress. We mean not, with Lord Bacon to say, that the labors bestowed on medicine, have been all in circle rather than in progression. In physiology, in the *materia medica*, in the treatment of many diseases, there has doubtless been great improvement; but the foundations of the science are still unstable. The systems that have reduced medicine to one single principle, or practice, to one dominant doctrine, have proved but splendid quackeries. Of the diseases, which two thousand years ago, proved the scourges of our race, how few have been subdued; and of the countless generations of man, how few are there, even excluding those that perish by violence or accident, who die from the natural decay of the organs of life, who, having performed all their functions and fulfilled all their duties, fall like autumnal leaves in the fulness of days and of maturity.

### 5. Agriculture and Rural Economy.

To the connection between agriculture and the physiology and philosophy of plants, I have already alluded. The fundamental principles of this art are every where the same; but we find in the practical details, a thousand variations. A difference of climate, of temperature, of exposure; a predominance of heat, of cold, moisture, of dryness, all tend to produce new modes of culture, to require new objects of cultivation. In all countries the leading features of agriculture, the preparation of the soil, the application of manures, the rotation of crops are similar; but in practice we find every plant possessing a peculiar habit, and requiring an appropriate culture. In a new country, like ours, where in the climate, the soil, the articles of cultivation, and more especially in the cultivators themselves, we differ widely from those nations, from whom we have been accustomed to derive our information, it is peculiarly important to record our own practice and experience. Nor is it successful experiment only, that we ought to relate. It is often as useful to perpetuate our failures, as our successes; to buy the signals and reefs of an extended coast, as to mark the channels. From the want of a written record, much of the knowledge of our fathers has already been forgotten; and there are many points, belonging not only to the main, but to the collateral branches of this subject, on which we want information. The embarkment and recovery of our extensive marshes; the draining of our deep swamps; the conversion of our sandy pine barrens into pasturage, if not into tillage; the improvement of our present modes of culture; the introduction of new objects of cultivation; the rotation of crops most suitable to our agriculture; the melioration of our stock; the permanent enclosure of our lands, the foundation of all good farming; the formation of meadows; and the general improvement of our rural economy, are all objects of important inquiry. The tardiness with which in an enlightened age, new modes or articles of cultivation are introduced into different coun-

tries, appears to a reflecting mind, a subject of real astonishment. This state was settled hundred and thirty years before the cotton plant was cultivated as a crop. We are now wondering at the success of the sugar cane. We raise no silk, yet some recent experiments have led on my mind, no doubt of the perfect adaptation of our climate to the silk worm. Many of the cerealia and leguminous plants of Asia, Africa and the south of Europe, have never yet been cultivated on our plantations; many varieties of fruit, even of those raised in Europe, are unknown in our gardens. How important would it be to a young country, to have, even at the expense of government, a real experimental farm, where the leading object should be, not so much to improve the actual cultivation of the plants, now forming the common crops of the country, (this may, perhaps, be safely left to individual exertion) as to ascertain and introduce every plant useful for food, for medicine, or in the arts, which could be raised in our country in the open air; and to endeavor to naturalize those which at first appear too delicate to support the variations of our climate.

### 6. Commerce, Manufactures, and Internal Navigation.

On the importance of these subjects, it is unnecessary to dilate. Of commerce, this bond which connects all nations, this animating principle which vivifies every region that it touches, which gives plenty to the barren rock, and abundance to the sandy desert, I shall only remark, that although its practice and arrangements are always most advantageously left to the enterprize of the merchant; yet, while from the researches, and discoveries of science, from the skill of the artist, and from the labors of the agriculturist, commerce derives its materials and powers of action; there are many things in its principles, many in its details, much of its information, and much of its exertion that merit a record.

Manufactures require much attention; and from the state of society in our country, much judgment to select and promote those peculiarly adapted to our situation. The power and wealth of a great empire may change, or even reverse the natural order of manufactures; may nurse them in hot beds, may furnish them with artificial warmth, may rear them to premature perfection, before the necessary arts of social life have gained an establishment. But with us they must rise by their own strength, by their adaptation to our wants and our resources; to our materials, and to our labor. It is wise in every nation to diversify the pursuits of its citizens, to multiply the links that connect them to each other, to render them as independent, as possible, of foreign nations, to enable them to supply their mutual wants by mutual exchanges. Deplorable would be the situation of that country, where the citizens pursuing but a few great objects of culture or of art, and depending for the supply of every other want on foreign resources; depending for the exchange of their own industry on foreign commerce; should find these channels intercepted by war, or internal regulations; they would then have to purchase, at exorbitant prices, every article of common necessity, and have nothing to offer in exchange but those productions, of which every neighbor has already a superfluity.

The improvement of our internal navigation is one of those great objects in which every citizen must feel some interest, and from which every individual would derive some personal advantage. By facilitating the intercourse between the distant portions of our country, by lessening the expense and risk of transportation, the articles of consumption, whether of necessity, of convenience, or of luxury, which they severally furnish, will be more easily attainable; and many productions which now, from the want of a market, command no price, and obtain no attention, would then become sources of profit to individuals, and of benefit to the country. The principles on which these improvements ought to be conducted, afford at all times a subject of important inquiry. The first efforts in the progress of society, are, of course, directed to clear away the obstructions which naturally, or artificially, occur in the streams which can be rendered navigable. The exertions of improved and opulent communities, are employed, to intersect a country, in every possible direction, by navigable canals; overcoming, by science and labor, the obstacles of nature. In these enterprises, some of the highest and most surprising efforts of human power and ingenuity have been displayed. To accomplish these objects, man raises the valley, levels the hills, diverts the stream, perforates the mountain; he leads the river in unaccustomed channels, and the bird of the air views the white sail of commerce usurping her accustomed haunts.

Few countries are capable of such extensive improvements in internal navigation as our own. Forming, from the mountains to the ocean, an almost regularly inclined plain, it is in the power of art to divert our streams from their very sources, to pour them into canals, to distribute and direct them at pleasure, and to supply them with water, not only sufficient for their own consumption, but to form innumerable mill seats, where power can be regulated by system, free from the evils, either of want or superfluity.—When compared with rivers, at least above the progress of the tides, canals, from their security from accident, from the directness of their course, from their exemption from the influence of currents or of winds, and from the certainty with which voyages on them can be made, have great advantages. Hence, they have always been favorite enterprises in all countries, where

the wealth and population have permitted their establishment.

### 7. History, Geography, Topography and Antiquities.

History and geography now form so important and necessary a part of liberal education, that they want no illustration, and require no eulogium. While history teaches, by experience, the most unerring, though perhaps the least regarded, of all preceptors, the highest and most important truths; while she delineates by actions, not by professions or opinions, the unvarying tenor and principles of human conduct; while she raises a consoling or a warning voice, and reflects, from the past, a gay or a gloomy light, over the prospects of the future; while complete systems of these, or of their kindred branches of topography and antiquities, are not within the limits of our association, we are daily scattered fragments, many detached facts, many local illustrations, that disfigure our views. Many of the facts attending the early settlement of our country are now passing, and are forgetting, will be interesting to posterity. Of the location and ancient traditions of the aborigines of this country, we have no accurate memorials. Of their original arts and manufactures, we have few or no specimens. In the topography of our country we are miserably deficient, in our geography very incorrect. We have no maps of our country on which we can place any reliance; no surveys, except of our sea coast, which have any pretensions to accuracy. The illustrations, or researches of men of science, on any of these subjects, we shall cheerfully record.

### 8. Belles Lettres, Languages, ancient and modern, and Education public and private.

While the severer sciences promote the improvement and power of society, poetry, oratory, and polite literature, improve and adorn the individual. They form the charm and embellishment of social intercourse, they refine, correct, and polish the understanding; they add gaiety or energy to thought, brilliancy and life to language; they give to their possessors that influence in society, which vanity and ambition covet; and in moments of national danger, or national enthusiasm; they sometimes exercise over the moral world, an awful and unbounded power. They form, at once, the fulcrum and lever of Archimedes. But these are personal talents, and in a great degree unconnected with the state of society, whose progress they neither accelerate nor retard; for they occasionally flash through the gloomy slumber of the intellectual world, and while they leave behind no permanent reflection, dazzle the more from the contrast of surrounding night. In free governments, they will always be studied; eloquence in particular, the great instrument of power, with emulation and zeal. But their principles, their nature, and their objects, deserve a careful and enlightened investigation.

Language, the peculiar faculty of man, the organ by which he acquires, and by which he communicates all his knowledge, merits distinguished attention. It should be cultivated with assiduous care, it should be refined and improved with unremitting labor. As all modern languages are composed of the wrecks and fragments of other languages, assimilated and aggregated in ages of ignorance, they partake of the rudeness and imperfection of their native materials, and cannot be fashioned to that standard of excellence, which even our imperfect knowledge could model; yet, to this point our labors should tend. We should endeavor to render language simple in its principles, varied in its combinations, definite in its meaning, harmonious in its arrangement, energetic in its structure. It should afford to every expression a distinct idea; to every idea an appropriate expression.

Languages are said to be keys of knowledge. An extensive acquaintance with them renders common what is local, gives to the present the improvements of the past, unfolds in short, the wisdom and instruction of all ages and nations. Let us obtain them; but let us not, however, suppose that languages themselves, are the great objects of our pursuit. They are means, not ends; they are the casket, not the jewel; they are the instruments of the workman, not the work itself; yet they merit a place in all systems of education, from their intrinsic usefulness; from the facility with which they can be acquired, at an age in which the memory is more active than the judgment; and from the probability that, in their acquisition, young persons will be obliged to study critically and profoundly the best models of composition which we possess; the finest memorials which genius and taste have left of their existence. They deserve also to be studied, because the principles of most languages are so nearly similar, that the knowledge of one aids the acquisition of others; because it is probable that no modern tongue can be philosophically investigated, or thoroughly understood, without the lights which other languages will reflect upon it; and because the acquisition of languages, an acquisition which may be obtained at an age when the understanding is incapable of high exertions, affords so many gratifications in future life, that no one who possesses the advantage appears ever to regret the time or labor which was bestowed on its attainments.

In a republic, education should become a national concern. In no other form of government is it so important that instruction should be universally diffused, that it should enlighten the deceptive mists and overwhelming shadows of ignorance, that it should correct the false views and oblique paths of prejudice, that it

should remove the errors of superstition, and above all, that it should teach the inseparable connection of liberty and virtue. Education should be early, that its impressions may be permanent; it should be profound, that its impressions may be true; it should embrace the improvements of each passing hour, that we may keep pace with our rivals in peace and war; it should be national, that our first feelings and sensations may be the love of our country.

A complete system of national education is one of the great desiderata of our age.

### 9. Fine Arts.

The fine arts, painting, engraving, sculpture, architecture, music, multiply the pleasures and enjoyments of life, and give to society some of its choicest embellishments; but it is not for amusement solely, that they should be cultivated. They are capable of nobler exertions;—they should be directed to better purposes. Painting and sculpture address themselves directly and powerfully to the senses; they can appeal to the strongest impulses of the heart. Speaking a universal language, alike intelligible to ignorance & wisdom their influence is extensive & their effects important. They should be taught to exhibit examples of virtue, of fortitude, of justice. They should rise above the sordid or criminal pursuits of man. They should assume the tone of a master, not proffer the adulation of a slave. Their abuses should be most cautiously restrained; for, when they become the panders of vice or voluptuousness, they realize the fictions of Utopia, and diffuse, wherever they extend, a pestilential poison.

Most of the fine arts advance regularly with the progress of civilization; others, like painting, frequently possess more energy and sublimity in the infancy of society; at that period when the feelings are but little softened or controlled by the refinements of social life, in the age of impassioned poetry, and amidst the daily exhibitions of sublime virtue and atrocious guilt. As, however, these arts are in general, not only the companions of highly refined societies, but require the fostering aid of wealth to bring them to maturity, we can scarcely hope in our day and country to see specimens of their high powers; yet of these, as of every other art or science, the fundamental principles may be studied, and should be understood. If we cannot enrich the painter or engraver, or give to the architect an enlarged theatre for his talents, we should endeavor to apply the principles of art to all objects to which they are applicable. To give to our feelings, to our taste, to our judgment, correctness.

Such, gentlemen, are the objects embraced by our association, such the field presented for our researches. In this wide range of literature and science, there is no human civilized being, whatever may be his condition, his profession, his avocations, his pursuits, who has not some interest. Science would give new skill and value to the labors of the mechanic, new resources to the enterprize of the man of business, new dignity to the leisure to the man of wealth, new enjoyments to the man of pleasure, new powers to the man of exertion; and yet how many are there, who turning from some of the paths of science, with aversion and horror, as too difficult, too laborious to be trodden, and considering others as too insignificant, or too obscure, to be worth exploring; who finding every useful acquirement above or beneath their capacities, pass their lives in ignorance or vice, hiding most carefully the talent which has been committed to their trust; neglecting the duties they owe to society, and their country; and debasing those faculties, by which alone they are honorably distinguished in the works of creation. In created nature, man alone deserts his high station, man alone betrays his dignity and rank. In the tribes of irrational animals, each individual fills his allotted space, distinguished perhaps from his fellows by trifling grades of swiftness or of strength; but between that height to which man may soar, and that valley of moral & intellectual degradation to which he may descend, immeasurable is the space.

Yet great as may be the influence of science on personal character, its effects on society are still more powerful and determinate. It was the observation of one of the wisest men of modern ages, it was an aphorism of lord Bacon, that knowledge is power. No axiom is more generally true in its individual, none more certainly true in its national application. Knowledge is Power. How wonderful the difference between the poor, naked, wandering savage, trembling before the elements, which in terror he adores, depending on his solitary, unaided exertions, for food, for arms, for raiment, for shelter, and the civilized man, who, strong in the sciences and resources of society, rides over the ocean, even on the wings of the tempest; disarms the lightning of its power; ascends the airy canopy of heaven; penetrates into the profound caverns of the earth; arms himself with the power of the elements; makes fire, and air, and earth, and water, his ministering servants; and standing, as it were, on the confines of nature, seems, as by a magic talisman, to give energy and life to the brute elements of matter.

It is not from the simple products of the earth, or from the crude materials with which a country may abound, that her power and resources must arise. The most productive regions have frequently been the most weak and dependant. The blessings of nature may be blighted by the ignorance or folly of man. A nation must seek for wealth and power, by encouraging that active and profound knowledge, which ascends the principles, the proportions, the combinations, the affinities of the mineral; the habits, the productions, the qualities, the uses of the