IS THERE A SCIENCE OF EDUCATION?

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This is an age of science. Men believe that all things are under law. This includes and compels the belief that the domain of science is universal. We demand a scientific solution of all problems, a scientific explanation of all phenomena.

Science has transformed the arts. This has given additional impulse to the scientific spirit. Sciences are now demanded for all the arts. In answer to this demand, sciences are multiplied. We have not only the sciences of matter, force, and life,—physics, chemistry, and biology,—but we are offered also sciences of mechanics and of agriculture, and finally a science of politics, a science of history, a science of education, and more.

But now a protest comes. Goldwin Smith denies the science of history, another denies the possibility of social science, and we of the educational guild are compelled to allow the question, "Is there a science of education?"

The question is double; or rather there are two questions in the one: 1. Is a science of education possible? 2. Is there a science of education yet formulated?

To the first question let us answer, Education is a series of facts or results which occur under the laws of mental and vital growth. It is therefore the field of a possible science. A science is the systematic statement of the facts and phenomena produced by a single force or set of forces, and referred to their proper laws.

If it be urged that the forces acting in mental growth and education are complex and hard to track, this proves the science difficult, but not impossible. Many another science involves phenomena which baffle investigation.

Is it objected that among the forces which enter into education is the human will, and that therefore it must remain forever uncertain and indeterminate? We answer that all the social and spiritual sciences are of this character. They all have this free element in them. They differ from the purely material sciences in their methods; but it is foolish to refuse the character of a science to any great field of facts, as Goldwin Smith does to history, simply because there is a free force in it which cannot be measured and counted by ordinary mathematics.

We conclude, then, there is a possible science of education. The
phenomena of mental growth take place under the control of fixed and known or knowable laws. They constitute a system.

We advance to the second question: Is there already a science of education? We have seen that there is a possible science; is there an actual one?

Let us admit at the outset that much which has been written on education is mere empiricism or speculation,—partial facts, assumed without scrutiny, generalized without truth, explained without verification. Much that passes as educational science is merely educational art,—empirical processes, based on partial or prejudiced observation, and supported by unproven theories. From Solomon to Herbert Spencer, we have a plethora of books, half practical, half theoretical, but all partial and many false.

There is a philosophy of education, but not a science. A science is built upon facts; philosophy is made up of principles. Science is inductive; philosophy is mostly deductive.

Many great thinkers, ancient and modern, have philosophized about education. Solomon, Plato, Aristotle, Luther, Bacon, Comenius, Milton, Locke, Rousseau, Basedow, Cousin, Pestalozzi, Froebel, Reaumur, Diesterweg, Hamilton, Mann, Wayland, Porter, and others of less fame, have caught sight of many principles belonging to educational philosophy, and have propounded scattered maxims of great value. Every successful teacher knows and employs many of these. But these do not constitute a science. The many and essential disagreements of educators are additional proofs that as yet there is no settled science of education.

The principles so amply discussed by the great educational writers relate rather to the objects and methods of teaching,—the art of education—than to its science. The uses of education,—to the individual, to society, to religion; the values of different studies,—for discipline, for culture, or for practical life; the general methods of instruction; the teaching process to be employed in each study, and for each stage of growth; courses or curricula of studies, and systems of schools; the relations of the state and of churches to public education; the connections of education with liberty, with public wealth, and with crime,—all these have been discussed in unending debate.

Most of the great German writers named concern themselves with the values of studies and with methods of teaching. Milton, Locke, and some others content themselves with marking out a proper education for a gentleman, or for the youth of their country and times. Pestalozzi and Froebel caught a view of some of the fundamental
facts of mental growth of childhood; but neither of these men were of the true scientific spirit, and they soon lost sight of facts in their too eager pursuit of theories. Most of our American books are books upon methods, written by men of successful experience as teachers, but too hurried to attempt the long and patient observation required to build up a true science. They are full of excellent precepts, and abound in acute remarks and philosophical principles, and they often exhibit a broad grasp of educational truths.

But if there is not as yet a true science of education, it must be confessed that the larger steps have been taken towards forming one. Its great field has been truly discerned and divided into its two chief natural divisions,—first, that of powers to be developed, psychic and physiologic; second, the objective field of knowledge and art to be reached and mastered. Many of the effects of special studies and exercises have been noted, and mental science has revealed the nature and relations of many of the so-called mental faculties. What then is the science of education?

To answer this question, note the real characteristics of modern science. It is first of all a transcript of nature,—a truthful ascertaining of nature’s facts, and their real connections. It demands always and everywhere:—1. A painstaking, persistent, unrelenting study of facts. 2. A careful, unprejudiced, obedient induction of an explaining theory, in full and fearless accord with the facts observed. 3. A rigid and exhaustive questioning and verification of this theory. Science lies infolded in nature. It is man’s province reverently to learn it from nature,—the science of education as well as all science.

The fact-learning stage in the science of education has mainly been omitted. Formerly men took too little account of facts in their study of the sciences. Our first need now is for facts.

Our conclusion against the present existence of a true science of education will seem clearer if we note more fully the fields of observation to be visited, and visited not with the careless and cursory attention heretofore given, but with the keen and steady scrutiny which the chemist gives to his experiments, which Huxley gives to biological phenomena, and Helmholtz gives to physics.

Childhood is still an unread riddle, almost an unknown land. The real steps by which it emerges from the darkness and imbecility of infancy,—by which the faculties are unfolded and ideas become shaped,—are scarcely suspected. We need facts such as only the parents and primary teachers can observe,—facts gathered daily, hourly almost, through the stretch of childish years, with an obser-
vation of scientific keenness, and recorded with scientific cor-
rectness and completeness. This must be repeated by the same
observer in as many cases as possible, and the observers must be
multiplied widely and their observations trained upon the same
classes of phenomena, till we have the means to determine what is
constant and what is variable in these phenomena, and what are the
causes, range, and exact character of the variations.

Even the school-room phenomena are not yet fully understood.
We only know in a general way that children learn by studying, and
that certain studies have certain educating effects. We need here
both broad and microscopic observation, continued from day to day,
through term after term, upon all classes of pupils, and under all the
varying conditions; to note all the successive phenomena of learning,
in every differing study and exercise. We need less theories and
more facts.

Physiology must be more deeply questioned. We need to know
the physiology of childhood, of youth, of manhood. We must find
out the laws of physico-vital changes, of growth,—chiefly of nerve
and brain growth. Every mental phenomenon has its physical side.
We need to know this side. As far as possible, we must ascertain
what changes in body or brain stand uniformly associated with every
mental change, whether as causes or results.

Air, temperature, food, sleep, exercise, health, and sickness must
be put under question in every possible form. Especially do we
need to know more of that complex something which we call temper-
ament or constitution, and on which, in such large measure, depend
the energy, persistency, flexibility, activity, and power of the mind.

Much, it may be, of all this will continue to elude the most keen
and careful scientific observation; but in every field of science there
are obscure regions shut off from the most persistent observation.
We must invoke the aid of intelligent mothers. The writer knows
already several educated women who are keeping daily record of the
development of their children, noting carefully the dawn of each new
idea, the incipient effort of each new power, and all the phenomena
of the sentient as well as of the physical life. Let others be inspired
to join in this crusade for facts. Let the field of observation be
more carefully mapped out. Let teachers join in the effort, making
well-devised systems of experiment, and recording carefully the facts
perceived. As hundreds of telescopes nightly sweep the skies to
gather astronomic truth, let thousands of eager searchers direct their
gaze upon the phenomena of childish life. Thus and only thus will
the possible science of education become an actual science.