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Manual Training as an element in Education.

Manual training is to be understood, as a course of instruction so arranged and prosecuted as to approach the seat of intelligence, and command the attention, 86

through the peripheral senses; and while conveying ^{general} instruction shall train the senses to sharper perception ~~to~~ ^{to} greater accuracy, and ^{to} wider range of execution.

The means of this course of instruction may be almost infinitely varied; but those most universally used, are; drawing, modeling in clay, and cutting forms in wood. The manual subjects are capable of almost infinite variation, and also of invention by pupils. This form of instruction has grown out of the observation of results derived from industrial, technical, and polytechnic training, and almost every conceivable form of handicraft has been claimed to be productive of general educational results by teachers in different schools in both this country and Europe.

① ~~This has given rise to a great variety of schools claiming the title "Manual training" but having other~~

These educational results it is claimed, are derived from the better education of the physical senses; ~~and~~ sight, touch, and hearing; which enables pupils to observe more closely and rende^rs them more expert in gathering knowledge of all kinds. Also with such a course of study combined with the ordinary routine of the school pupils are better able to correlate their school studies with the physical things to which they relate, to more efficiently carry forward intricate trains of thought, and by this means save time in their school work. It is also claimed that in the modes of education now in general use there is neglect of the training of the physical senses to a degree that is hurtful, both to the pupils progress while in school and to the development of his capabilities for useful action in after life. Manual training is urged for the correction of this evil, ^{by} supplying a systematized course of training of the physical senses, and is not intended to otherwise change the general course of educational work.

in school. The recognition of these difficulties, and of the advantages that have accrued from manual training as a remedy, has given rise to a great variety of schools claiming the title "manual training" but having other objects in view. Therefore it is necessary to clear the way somewhat by definitions.

~~having different objects in view. Therefore it is necessary to clear the way somewhat by definitions, of these different schools.~~ Perhaps I may give a sufficiently clear understanding of these by quoting, synoptically, from the report of a commission appointed by the state of Pennsylvania in 1887 to examine the whole subject.

This commission reports that ; "In recent discussions the terms technical education, scientific education, industrial education, manual training &c. frequently occur; and it is doubtful whether a clear distinction as to the field which they cover is held in the mind by those using them".

On this point the commission feel that definitions cannot, probably, be given that will be approved by all educators, and say; "but the view on which the commission has proceeded, and which has given direction and coloring to all of its investigations

**** may be stated as follows"

"Scientific education (The physical including the chemical and mathematical sciences, and ~~that~~ ^{their} application to the industries) may be regarded in one view as almost purely thoretical; and in another as almost purely practical; this being the usual distinction between the pure, and applied sciences. But since no science can be effectively taught, ^{except} as to its theory, without the aid of the laboratory and the actual manipulation of the materials and apparatus, all scientific instruction comes to have, almost of necessity, a semi-technical cast, (such for instance as the civil engineering or chemical course at college) If carried one step further and conducted with reference to its general application to industry (as in the Sheffield scientific school at Yale) it becomes a general technical instruction. If applied to special industries (a European weaving school, or an American agricultural school) it becomes a special technical, or technological school"

"Technical instruction then", say this commis-
 sion, "is the teaching of science with reference to
 its industrial application, and as a term, is almost
 universally applied to the higher ranges of such in-
 struction, while the term industrial education is
 applied to the lower ranges". I would say that in
 the review of the subject I have lately made the
 usage of the words "technical or technological
 school" ^{is} ~~seem~~ to be applied to the schools which teach
 one or few branches as applied in practice. Such
 as mechanic arts schools-^{and agricultural schools,} engineering schools. While
 the words ^{poly}technic school indicates a broader
 scope- These are scientific schools in the broad
 sense, intended to fit pupils as general civil en-
 gineers, as architects, or directors of mechanical
 works of various kinds.

"Manual training in the strict sense of the
 term would mean simply training of

of the hand; but as currently used with reference to education the words indicate such an employment of the hand as will at the same time train the eye to accuracy, and the mind to attention. The scientific element, or the teaching of science pure and simple is not necessarily involved in the expression. As, however, pure science can scarcely be taught without looking somewhat toward its applications, so manual training cannot be made ^{effective as an} ~~effective~~ educational process, except by constant reference to the broad foundation in the mathematical, physical, and natural sciences upon which it rests."

This commission also regard the industrial schools as educational and say "Educational with reference to the practical side of life, but, education al"

It must be understood that what is here defined as manual training, is in no ^{proper} sense technical

teaching, or the teaching of the hand or eye for any particular business purpose. All its advocates declare this, and the most able opponents admit it; except as to a ~~very~~ few so called manual training schools (a commission ^{appointed by the} ~~from~~ ^{board of education} ~~from~~ Boston) characterize the (Woodwards) and the Chicago school (Harris) St. Louis school, as ~~the~~ schools of mechanic arts.

This quotation from the superintendent of the New York City schools who has 10,000 children in the manual training departments represents the general claim on this point, he says;

"People who dream of of the pedagogic branches and the manual training branches in the same department as separate and unrelated things have not ~~been~~ grasped the subject. The manual of this course of study has been so arranged that all of the branches of education ^{are} ~~and~~ interwoven in such a manner as to make a distinction impossible. Manual training does not mean simply training of the hand, it means

the training of every faculty.

use as aid in general education

The object of manual training is three fold;

First; It is used as a means of fixing the attention, and holding the interest of the pupil in the subject matter being taught, ~~and is a means of illustration.~~

Second; It is used to connect thought movement with the material things with which it is normally related.

Third; It is used to train the peripheral senses, particularly the touch, the eye, and the ear to keenness of perception, and the muscular sense to accuracy and range of execution. (r

The first of these objects, that of fixing the attention, and the good results that may be derived from it, may be illustrated best by some review of the mental processes. (r

In his description of Coleridge, Carlyle says; "His talk, alas, was distinguished, like himself, by irresolution; it disliked to be troubled with conditions, abstinences, definite fulfillments; loved to wander at its own sweet will, * * * and you were

bitterly reminded of Hazlitts account of it" "Excellent talker, very, if you let him start from no ~~point~~ premisses and come to no conclusion" Now Dr. Carpenter has used this extract in his mental psychology as an illustration of the difference between what he calls automatic activity and mental direction. Also M. Ribot introduces it into his monograph on Diseases of the will, in the chapter on ^{impairment} ~~improvement~~ of voluntary attention to illustrate the condition of a great mind when it lacks the power of direction, and as a contrast between thought movement undirected, and thought movement ~~directed~~ directed by the will.

^{above}
In the ~~the~~ citations the important points in relation to manual training are found in the meaning of the phrases Automatic activity and mental direction as applied to mental processes by Dr. Carpenter; ~~and~~
Also M. Ribot, whose views I will notice presently, seems to

convey almost the same ideas in his terms voluntary
attention and artificial attention, ~~or attention under~~
~~the direction and control of the will.~~ Every child
or young person has a large degree of automatic
mental activity. A kind of mental energy according
to Dr. Carpenter that is set in motion easily by ~~sem~~
sense impressions such as are received through ~~the~~
sight, touch (by the hand) or hearing. This mental
activity will be energetic, or of mild degree, in propor-
tion as the sense impressions has aroused the
thinking faculty X It may take the form of wonder
surprise &c. at best a kind of semi-static action,
or the mental movement may take the form of inquiry
into the nature of the material object which has
aroused the peripheral sensation, and from this pass
to reasoning upon the relation of this with other
phenomena, or things. All of this is in the first
place almost purely automatic in the child, and each

impulse to thought movement is of short duration.

The important mission of manual training is, to sustain these peripheral impressions, and so direct the thought movement that the pupil will acquire the habit of control of his thinking, mental direction by which he becomes, able to pursue a definite subject of thought, connecting it with things related in consecutive form. This is to be done by the consecutive presentation of material objects to the pupil, or by requiring him to form them in drawings, in clay models, cutting them in wood &c., and later by a wide use of scientific instruments. These are always to be connected with subjects of study and serve to fix and maintain the pupils attention and exercise his power of directing his mental processes. They are also exercises in the orderly use of his peripheral senses, serving to train his perception by sight to increased range and accuracy and his muscles to more strict co-ordination of movement.

The muscular sense is brought into play and the muscular power regulated to the resistance to be overcome in its application to material things and accuracy^{and range} acquired in the use of tools or instruments.

In his monograph on the will M. Ribot has devoted considerable space to attention. He finds that there are two distinct forms of attention which he calls voluntary attention and artificial attention. These terms are closely related to Dr. Carpenter's terms automatic activity and mental direction. If I understand him rightly, what he calls voluntary attention is spontaneous and natural, such as that attention momentarily held by the^{presentation} of a new toy to a child. Artificial attention, he says; "is always a product of art and is engrafted upon natural attention and draws its sustenance from it as the graft draws its nourishment from the trunk in which it is inserted." In spontaneous attention the object attended to acts by its own intrinsic power, or com-

mands attention through the peripheral nerves as by touch, sight, &c. Its action is extrinsic (afferent) ^{or} from without inward. In voluntary attention the case is reversed, the act becomes mental, an act of the will directing the mental movement toward the object, is intrinsic (efferent) and when maintained begets a process of comparison with other objects of memory which institutes reasoning. In this case the artificial attention is willed becomes a conscious action of the mind. It is no more a matter of chance but is chosen, or accepted. This capability of the mind is developed by education; is enhanced and built up by the orderly presentation of subjects which arrest the spontaneous attention, first, by means of objects which sustain attention, until the habit of attention and mental movement then by following out more purely mental processes under the direction of the will is formed and becomes a fixed faculty of the mind.

These expressions of the manner of developing attention to peripheral impressions and from these developing habits of orderly thought, if correctly stated seem to give us the strongest incentive to the close application of rules of training to the physical senses with the view of forming correct habits of observation with the view of strengthening the will and reasoning powers. In this the training or development of the power of quickly seeing, ^{for instance,} all of the points of form ~~of~~ ^{or} color of an object to which inquiry may be directed, and correlating facts thus obtained with those derived from other sources of information, would seem to be one of the ~~most~~ important objects of school work. In the prevailing modes of conducting educational work this training of the eye, together with its associate physical senses, is almost wholly neglected, or left to the chances of infant education and the education of the playground. Many educators and not a few of the great observers of our time are directing attention to this deficiency.

In following out the discussions ~~of this sub-~~
~~ject~~ ^{to which this has given rise} the expressions; training, or developing, the
 "capacities for useful action" and training the "ex-
 and are used to express results attained, or sought
 ecutive faculty" are continually met. These terms,
 though not always used in exactly the same sense,
 certainly are not materially different.

The phrase "capacities for useful action" seems
 to have originated with Lord Armstrong of England-
 of big gun notoriety-and we may best know what he
 meant by it by persuing some of his sayings. Lord
 Armstrong employs 13,000 men and boys in his works
 at Ellswic, which he good naturedly calls his repub-
 lic. Of this he says "I can affirm with confidence,
 that had I acted on the principle of choosing men
 for their knowledge rather than their ability I
 would have been surrounded by an incomparably less
 effecient staff than that which now governs the
 Ellswic works" We see in this that he means

the ability to do in the executive way, for he speaks specially of his staff. This is brought out forcibly in another sentence. "Not only should the mind be trained to habits of thought, and in quickness and accuracy of perception, but the hand, the eye and the ear, should all participate in training exercises calculated to make these organs more available as instruments of the mind".

We discover in this that Lord Armstrong's expression: "capacity for useful action", which is so widely quoted, has its foundation in capability to observe closely and correctly, and to reason connectedly, on the particular subject in hand, ^{It} is a result of the capability of maintaining fixed attention, which Monsieur Ribot tells us is developed by ^{processes of} ~~calculated~~ education, _{to} call this faculty into being, and strengthen it. On reading Lord Armstrong further we find him opposing industrial schools. He says pointedly that in the shops themselves is ~~the~~ the best and most

suitable place for acquiring this form of instruction

Therefore the instruction meant by Lord Armston is not that which enables the man to perform certain muscular movements with regular accuracy as we see it developed in the ordinary mechanic in performing the piece work now so common in the great shops of the manufacturer. This is training in the repetition of particular movements for the accuracy of doing that one thing perfectly and rapidly in which the development of range of observation and movement, or even of breadth of reasoning is for the time of such employment held in abeyance. It is manual training ^{for} ~~for~~ specified dexterity of the hand and is the opposite in use and in effect from manual training ^{for} the development of range of observation by the conjoined ⁱⁿ senses, and of the wide variations of muscular action necessary to these, in the development of the power of the will to follow up sense impressions by the continuous control of the reasoning

faculty. The education of the physical senses is to fit them for the uses of the reasoning faculties in gathering the facts of the physical world, to render them sharp and explicit in the performance of the important work of furnishing correct data for thought movement.

This then is the basis upon which manual training is required, in general educational work. It rests upon the structure of the mind as connected with its several sense organs and the natural methods of its unfolding, or development. Mr Wellford Addis in the report of 1887-1888 of the Bureau of education at Washington says, "had manual training been introduced under the term mind training it is doubtful if it would now be understood as (confounded with) trade training, and much of the difficulties of its introduction would have been avoided" In another sentence he says ~~that~~, "the manual training course has been instituted on pedagogic principles and is not subject to the bread and butter argument.

The confounding of manual training with trade training is perhaps naturally a first impression. Manual training is an out-growth from technical teaching. In the humanities course of instruction in our ~~colleges~~ colleges, in the high school course, and in the grades of the public schools, the training of the physical senses has been left to the chances of infant ~~observation~~, ^{self culture} and the playground, for their development; and the pupil is bright or dull of observation, and in his school studies as well, much as this chance development has been well or ill with him. In ~~the~~ teaching of the ~~science~~ sciences which underlie the industries, combined with the application in practice in technical schools, it has been found that this physical practice has so rested upon the mental capabilities and ^{energies} that the pupils have made greater advances in mental attainment than pupils in similar studies who have not had this practice work. In following effects back to causes we have been led

those in which Idiocy has been acquired. In these Dr. Sequin has reported & remarkable results. In one case a child had become idiotic after an illness occurring at the age of two and a half years. At the age of five years, with idiocy fully developed, manual training was tried. This child could not be induced, either by command or example, to lift a wooden pin and put it in a hole. The child's hand was taken and the fingers closed over the pin and the pin conveyed in this way to the hole- ^{that is the child was made to perform the act passively} This was repeated many times a day for many days before the action would be performed by the will of the child, but finally it was done and afterward repeated by the child when told. From this other actions were performed first passively, then by will. The will power gradually grew and expanded until a degree of mental guidance was acquired within one year that in a large degree served the personal wants of the

child, and ~~changed~~^{arr}anged the blank facial expression of idiocy into a degree of intelligence. This is only a strong example of what is being done in greater degree for hundreds of more hopeful cases of the same nature all over the world. In this class of cases the training must begin with the peripheral senses. These senses are the only avenues by which the brain, so lacking in intelligence, can be reached. So true is this, and ^{the results are} so palpable, that Dr. Sequin in a lecture before the New York Medical Journal Association has been led to say, "Therefore instead of referring all ~~imitations~~^{imitations} to the brain, spinal cord and sympathetic we must recognize the power of the millions of the peripheral brains to give impulse as well as to receive it & **** If the good results shown in the case of idiots subjected to manual training have ~~done~~ been obtained by this method alone, then the sovereignty of the brain is at an end, and the new physiological doctrine of

decentralization contains in germ a new doctrine, and new methods, of education" It must be remembered ~~that~~ ^{that} in these cases the results are obtained by manual training in its purest form, and in ~~very~~ many of the cases much improvement must occur before any of the older modes of education can begin. Many idiots are in the mental condition of the very young child but lacking its aptness at self culture. The self culture of the child is a result of its attention to peripheral impressions. It seems to be shown that some idiots owe their condition to their inability to give attention to these sense impressions. The cultivation of this ability effects in some degree their restoration.

The mode or manner of the development of the faculty of observation and thought in the young child has been closely studied by Prof. Preyer (quoted by ~~Dr. W. F. Harris~~) who ^{finds} ~~has~~ it to proceed substanti-

Elaborated in a paper for the National Association of Superintendents of Schools, 1889

ally on the lines I have laid down. (Quoted by Dr. W.T. Harris of Concord in a paper before the national educational association at Washington, 1889) Thought is awakened by sense impressions which command the attention, ~~and~~ with the growth of the faculty of attention the will power is developed, ~~and~~ direction of the mental aptitudes attained, reasoning instituted, and improvement is rapid. ^{included} So rapid that it has been claimed by Dr. Harris that education in such subjects as recognition of form, sharpness of sight, delicacy of touch, and the muscular sense, has been fulfilled in infant self culture before school age. Hence Dr. Harris claims that the processes useful for idiots are not applicable to children of ordinary endowment, and also that many of the manual training lessons of the schools are repetitions of what had been learned. This last must be admitted. Many lessons are illy chosen. But ^{it} is true that so

a

important matter as the training of the senses, which it is admitted constitute the avenues of approach to the seat of intelligence, the avenues by which the reasoning faculty must be reached if reach at all, and through which this faculty must be developed, should be left to the chances of infant self culture and be considered as finished in infant life before school age? Dr. Harris, whom we suppose lives as purely in the realm of the higher regions of thought, ^{as any} has said "Man's power of thought rises from thing to cause, and from cause to cause, leaving a smaller residuum of sense data, and yet getting nearer the underlying reality which causes all sense data" Now if "Man's power of thought rises from thing to thought should we leave those instruments of the mind, the physical senses, through which things impress the mind and develop thought to the chances of infant self education with all its possibilities of imperfection, ^{and} even false sense impressions that may be car-

ried "from cause to cause" and leaving a smaller
 and "smaller residium of mere sense data" for their
 correction while the effort is being made to get
 "nearer and nearer the underlying cause of all sense
 data"?

Certainly such neglect of the sources
 of all ^{original} intelligence, and the instruments by which
~~they are~~ ^{it is} derived at first hand from our environment,
 should have more attention than this from educators,
 and not be left to the chance of infant self culture.
 Furthermore the sentence just quoted from Dr. Harris
 serves exceedingly well as an exhibit of the tenden-
 cies of the mind to leave sense data as rapidly as the
 data acquired allows it to roam "from cause to cause"
 and there is a tendency to depend upon a smaller
 "residium of sense data" in the after efforts at "get-
 ting nearer the underlying reality which causes all
 sense data" Hence there is the greatest necessity
 that the sense organs receive careful and protracted
 training to accuracy and range of perception and the

mind to control of its power of reasoning from these original sense data upon which its development is founded, upon which the structure of its reasoning faculty depends for its nourishment, and to which it must always be returning for correction and guidance. It may be true as Dr. Harris says; "That we do not get at the true reality by sense perception, but by thought". but it is only through sense perception that we arrive, originally, at the power of thought and are enabled ^{finally} to proceed to the purer realms of science and philosophy lying beyond and above the realms of sense data. Then if some teachers make ill choice of manual training lessons let us try rather to improve the means employed and not leave the education of the instruments by which the mind gathers its original sense data to the chances of infant self culture. The need for this in the correlative of the lessons of the school with the physical things to which they relate, or with the

original observations (sense data) upon which they depend is continually felt by pupils in our schools in such a way as to seriously hinder the ⁱⁿ progress. Even so simple a proposition as twelve times twelve is a hundred and forty four is not understood by young pupils, and the multiplication table hangs like a weight on their mental advancement until some circumstance unites its abstract propositions with material things which may by actual count convert its propositions into sense data with which the young mind feels at home. That manual training lessons chosen with ^oproper relation to the subject may be used to advantage, and ~~even~~ ^{even} become necessary to the progress of the learner at any age seems ~~to~~ too patent to require discussion. But I will relate one personal observation made during the war, which made a lasting impression on my mind, illustrative of this point. A man about thirty

had passed the village school as a boy, had a partial college course, taught school for a time, kept books for awhile, then did odd jobs of the kind, and gradually became no account—was without money or prospects. Some months after the breaking out of hostilities he came to me with a copy of military tactics and asked me to help him to understand it. He had volunteered as a private soldier and found himself the awkward man of the company. He seemed much in earnest, I was much puzzled. I could not conceive that a man of his ^{and general intelligence} education could fail to understand the book. But I found that though he could repeat much of it from memory he did not understand the simplest forms of the drill, nor was I able to make him understand them by words. I tried picturing the forms and movements with my pencil; then procured blocks and represented the forms and evolutions of the squad in that way. (I could not use the

real squad because the boys would hoot my pupil)

It was only after several days of this work that he seemed to begin to comprehend. When he thought he understood a form and movement he would ~~turn~~^{turn} to the ~~words~~^{words} of the book and try to connect them with it. I finally found that, though he understood every word he could not connect the sentence with the thing it described, and he had discovered this also. After some days light seemed to come and gradually the connection was made in a few of the forms. Others came easier, finally he would make out new forms alone with difficulty, then easily, and he then rapidly learned the whole system of tactics; and learned it so thoroughly that he was soon superior to his drill masters. He threw his whole soul into his new work and was rapidly rising by promotion when he lost his life in battle.

The whole trouble with this man had been that he had never properly correlated his mental culture

to physical ^{things} ~~culture~~. I am continually meeting something of this, but in a less degree, whenever I am in position to know the capabilities of pupils of our schools. The failure to properly ~~to~~ connect the subject matter ^{taught in} of the ~~truth~~ school, with the things to which it relates, is one of the commonest mental difficulties of pupils under the prevailing modes of education. It is a difficulty that withers ~~on~~ ^{otherwise} the capabilities of many ~~a~~ bright intellects.

With a wise system of manual training such a difficulty could scarcely exist; or if it did exist, it would not fail of early recognition and correction.

The means of this training is certainly in a state of much confusion at the present time. Indeed I may say that the methods are ^{used} in a state of development. Mr. Mellford Addis after a long discussion of the principles upon which it rests says ~~that~~ ^{that} practically that its methods have been formu-

lated out of elements never or only slightly attached to the processes of education and that much time will be required for their adjustment. Yet ^{as already} it has _^ become too thoroughly comprehensive to be called either Russian or Swedish. "It may be called Americanism" But to my mind it still presents the character^s of American haste, of American enthusiasm. This is seen in the widely different courses adopted by the different teachers, and shows only too plainly that the systemization is ~~quite~~ imperfect. The success of individual schools are ^{and skill} due in as large degree to the enthusiasm _^ of the individual teachers as to the plans pursued. The ~~same~~ ^{same} plans cannot always be adopted by others with equal success, even though the enthusiasm be equal, special aptness in the particular methods (~~suited to general education that will be suited to~~) has its results. In time we may expect the development of

methods suited to general education that will be ^{adapted} ~~suited~~ to the average teacher and with which unison of work and ^{reasonable} unison of results may be expected.

Manual training has sprung from the industrial schools. For present purposes these may be considered to have begun with Henri ~~de~~ Pestalozzi in Switzerland in 1746 and consisted of a system of industrial training combined with general education. The institution founded by him seems to have been maintained until 1827. Fellenburg's great school of agriculture was organized at Hofwyl Switzerland in 1804. This also included the equivalent of the German Realschule and the Humanities course. The noise of Fellenburg's success at Hofwyl caused quite an active agitation in America in favor of manual labor as an adjunct of literary work in educational institutions. This seems to have been the result of letters ^{by} ~~of~~ Prof. Griscom of The New York high school

beginning as early as 1818 and later by W.C. Woodbridge editor of the Annals of Education both of whom visited Hofwyl several times.

The first American school ~~was~~ supposed to be of this kind was the ^{Maine} ~~main~~ Wesleyan seminary in which farming and shop work was united with the study ^{is} ~~is~~ <sup>per-
sued</sup> in preparation for the ministry. Then came the 'Oneida Institute of science and industry' in which there was three hours per day of labor in the shop and on the farm. We see in these how the ideas of Fellenburg were warped in coming across the salt water, for ^{is} ~~his~~ these latter schools instead of teaching the sciences upon which mechanics and agriculture rest ^{these} ~~their~~ employments were added in order that students might pay their way in part or entirely by their labor. The idea was too coarse and rude for anything like manual training as a means of mental development.

After these came the addition of departments of

agriculture to western state normal schools in the fifties. These were for the teaching of the science of agriculture, however, and in this particular were, *theoretically at least,* an approach to the Hofwyl plan. In 1862 came the congressional land grants to establish colleges of agriculture and mechanic arts. None of these had in them other than the industrial or technological idea.

Along with all of these came the Swedish Sloyd which in this country seems to have had its greatest influence in the establishment of the Kinder Garten schools. In Sweden it was originally intended to maintain the national disposition to manufacture household nick-nacks by the family, which was threatened with extinction by the cheapness of the machine made articles (Harris). Afterwards these departments became industrial on a broader scale, and now there is a tendency in Sweden to the adoption

of a purely manual training course similar to the American, and the same discussion as to the manual of such a course.

Polytechnic,

r During the last quarter century, [^] technical, ~~tech-~~
~~nological~~ and industrial schools have been springing up and growing with great speed in all civilized countries. France has adopted the industrial idea and put it in active operation in all her public schools and is spending more money per capita on her school system than any other country on the globe. America is following her closely but in a different way. That which is being done for the whole people in France by order of the government is rapidly growing here by private effort but as yet is provided for comparatively few. Educators are watching these schools with great interest and are finding results in scholarship & personal habits and morality that are so superior, that it is a

Training of the mind in its power
of rightful recognition of the ^{character} ~~value~~
of sense impressions and following
each to its legitimate place in the
multitudes of phenomena

wakening general attention. It is the universal opinion, almost, that these results on scholarship are obtained through the systematic education of the peripheral senses giving the mind sharper tools of observation for feeding and directing the reasoning powers, while more correct habits ^{of} ~~and~~ morals are created and maintained by the stronger direction given to the will and reasoning faculties.

Thus the manual training idea is a development from the industrial, ^{Mechanic arts,} and technological schools and many of its examples still carry with them elements belonging more properly to the older schools.

Some notes

Prof. Harris

In learning arithmetic the boy learns to quantify and measure all things numerically. It is not co-ordinate with carpentering but ^{underlies} ~~underlies~~ it at least there can be no use of the carpenter's rule

without some arithmetic.

Ans.

No~~x~~ will the rule be of any use until its values are learned experimentally-Nor will numbers convey any idea until things have been counted.

Harris

On the basis of the ratios of the sides of the right angle triangle to one another man proceeds to measure all things inaccessible to manual measurement ;he measures the distance of the sun and of the fixed stars. Compare the feeling of self hood that is gained by the soul in the use of the tools of thought with that gained by any form of manual labor.

Ans.

He has used tools of hand which require the highest accuracy of sense perception. The child is in the position of the world when struggling through

*centuries of experiment to find the laws on which
the mind relies for these measurements.*

The union has no thought
that the education of the
senses and the association
of thought movement with
the things to which it is
normally related has
been neglected