MONTESSORI PRINCIPLE OF AUTO-DEVELOPMENT.

(From Home Notes, Apl 16, 1915, p 73)

1915 Apl 16: I have been giving a good deal of thought at odd moments of time, to the application of the Montessori principle of auto-development, to the case of children of primary school age. Indeed why should not the principle be carried out in all stages of life, even up to the highest classes of the University. It is certainly safe to say that, as a rule, that the great generalizations of Science are dumped into the minds of students, before they are ready to receive them as a product of their own auto-development.

Beginning at the Beginning

To begin at the beginning of things how are we to proceed with little children, so as to give them the great happiness of discovering for themselves some of the generalizations of Science; and what part does the teacher or director take in such a process?

We wish to develop the reasoning powers of children from within; and the chief part of a director is to provide material for experiments which may lead the children to discover for themselves some of the generalizations desired.

It is the old question of feeding the chickens. It is the duty of the director to provide suitable mental food, and place it before the children so that they can pick it up for themselves.

Observation and memory lie at the basis of reason. It is our duty to see that the facts from which generaliza-

(tions

can be made are readily accessible to the children.

They will absorb some of these facts and ——

(Interrupted. The interrupter, Mrs Bell, says "Go ahead", so I will proceed with the auto-development of my ideas. AGB)

Choice of Material Important

The material to be presented to children seems to me to be of the very greatest importance, indeed to lie at the very root of auto-development, and it is here that the guiding hand of the Director is most manifest. We wish to lead the child to make observations of facts from which generalizations can be made.

The Director, or Directress rather, needs to reverse this order. She must consider first the generalizations; and then what facts should be observed that would naturally lead the child to make these generalizations. She must then invent material by means of which to familiarize the children with the facts. The necessary preliminary is the invention of suitable material.

This whole line of reasoning is an illustration of the fact that the adult mind proceeds from generalizations to details; whereas the immature mind proceeds from the observation of concrete facts to generalizations. The Directo proceeds from the generalizations to the material; the child from the material to the generalizations.

The process we want to stimulate in the mind of the child is, first, the observation of important concrete facts Then to cultivate his memory of the facts observed so that he can compare them in his own mind and note their likeness

and differences. Indeed the process of reasoning consists largely in the discovery of likenesses and differences.

(Interrupted)

For example: In the ordinary House of Childhood, we familiarize children with different colored objects; red balls, blue balls, &c; red silk, blue silk, &c; blue sky &c. These are all concrete things.

By remembering a whole lot of objects that are blue, the child generalizes, and arrives at the abstract idea, "blue"; and so with other colors and other qualities.

He first observes objects; and then comes to note their likenesses and differences.

The red balls and the blue balls resemble one another as balls, and differ from one another in their color; then memory comes in to bring up the images of other objects:- Red silk, blue silk, &c; red lips, blue eyes, blue sky, &c.

He then compares, not objects, but recollections of objects; and observes the likenesses of color in objects of different kinds as well as the likenesses of objects of the same kind which differ in color.

It is by the comparison of recollections that he arrives at generalizations of greater magnitude and importance than he can obtain by direct observation. Hence the very great importance of cultivating the memory.

The Cultivation of Memory

Memory lies at the base of abstract reasoning. The memory of multitudinous objects leads to the abstract idea of color, to the abstract idea of geometric form, and to

numerous other abstract ideas that can only be aroused in the mind by the memory of multitudinous things learned originally, individually, by direct observation.

Thus observation comes first. Memory brings together in the mind a multitude of past observations. Then the reasoning powers are brought into play by grouping together in the mind the remembered facts according to their likenesses and differences. Just as we gain the abstract idea of "blue" independently of any object attached; so we obtain all other abstract notions even up to the greatest generalizations of Science.

Encouraging Observation

We have then this idea to guide us: We must provide material for observation, and cultivate the power of the child to observe for himself. We must then cultivate the memory so as to enable him to remember and call to mind the recollections of his observations on things not present to his senses at the time.

Here is a blue ball, what other blue things can he remember to have seen. This is an exercise of memory.

Here is a piece of colored silk thread. Now ask the child to go to the other end of the room, and see if he can pick out a reel of silk thread of the same color from his remembrance alone. Then let him verify his observations of color, by bringing the specimen from the other end of the room and comparing it directly with the original object. This is an exercise stimulating the faculty of memory.

Then reason comes in by the comparison in the mind

of numerous memories, and the mental observation of their likenesses and differences.

Stimulating the Power of Reason

First in importance as lying at the base of everything else is Observation. The Montessori material is admirably fitted to stimulate the power of observation in a very little child.

Then comes the cultivation of the higher power of Memory; and here again the Montessori material is admirably fitted to stimulate the memory of past observations; and I think this approaches the limit of the Montessori material for very little children.

I am not so sure of this; for we do have material for the stimulation of higher faculties in lacing, buttoning and in the other occupations of the Montessori system. But what we want to get at specifically is the stimulation of the power of reason itself; and it is principally in children a little older than those usually found in the Montessori schools, that the power of reasoning begins to manifest itself conspicuously.

What sort of material can we provide to stimulate the faculty of reason?

Here we may be guided by the fact that the reasoning faculty first manifests itself, that abstract ideas begin to bud, when the child begins to note the likenesses and differences of things:- This is the first step of reason.

The further development of the reasoning faculty depends upon the accumulation within the mind of the memory of numerous past observations; it depends upon memory.

Evolution of Power to Reason

Reason is evolved from previous experiences, and the recollection of these experiences, and it first manifests itself in the mind by the observation of immaterial likenesses and differences. It depends upon observation and memory. It is a purely mental process abstracted from concrete things.

The child, having noticed some likeness between things observed in the past, searches his memory for other things that resemble the others in the property noted. He thus begins to group together in his mind the things remembered according to their likenesses and differences; he begins to organize his knowledge.

This is the beginning of science, which consists of "organized knowledge".

This is an age when nature reveals the fact that this process is becoming prominent in the mind of the child. It is when he begins to make collections of objects of various kinds:- it may be of pebbles and stones, of shells, of birds' eggs, of coins, postage stamps &c.

Here then is an indication of the kind of material wanted to stimulate the faculty of observing the likenesses and differences of things; of stimulating his attempts to organize his knowledge. AGB

(Interrupted)

Points for Expansion

(From Home Notes, Apl 16, 1915, p 80)

1915 Apl 16: Materials, swings and pendulums. Measurements, thermometers; barometers; balances; weights; balances with unequal arms; spring balances; see-saws; levers.

Invisibility of black thread. Cards; dominoes; dice. Measurements of length, weight, time. Pendulums and swings for time. Mercury; water; float objects on water and on mercury. Liquid measures. Cubic centimeters. Mathematical problems performed with measuring instruments.

What objects to be attained by measurements; make plans for toy houses and buildings. Useful houses; houses for pets; rabbits &c.

Specific gravity. Do something of use or interest to the child. Traps; traps to catch, not to kill.

Processes of arithmetic more important than accuracy of working for mental development. Addition without words. Multiplication by sight.

Twisted catgut. Damp, dry, untwist, twist &c.

Magnets. Compass points to north. Magnetic toys; floating needles; magnetic properties of iron, copper, brass &c.

The mechanical powers; prisms; spectroscopes; colors produced by prisms. Balloons; pendulum beating seconds; marbles; hoops; gyroscope-tops; devil-among-the-tailors; bricks to build with.

Cubes; cubical measure; angles and angular measures; triangles for ratios; right-angled triangles; properties of

similar triangles; measurements of heights and distances by triangulation.

Straight bar magnets; suspend them; use them to magnetize steel and iron.

A spring-balance gives weight or force independently of direction. Pulley can change the direction of a force without affecting the quantity; wedge; screw; inclined plane.

AGB

THE COLLECTING AGE

(From Home Notes, Apl 17, 1915, p 82)

1915, Apl 17: It seems to me that we should encourage and stimulate children to make collections of various kinds and to arrange them as they wish themselves.

There is another thing in connection with the auto-development of a child at the collecting period. He no longer desires to work exclusively alone. He is stimulated very largely by the appreciation of his fellows and classroom work becomes possible. In fact individual work has not the supreme importance it has at an earlier age.

He becomes more and more a social being as he grows older. He becomes more and more fitted to work with others in the attainment of a common aim. He likes to associate himself with others in games of various sorts involving co-operation to a much greater extent than he does in the earlier stages. He starts out in life as an essentially selfish being. As he grows older he becomes more and more social in

his habits, until he depends so much on the appreciation of others that he is in considerable danger of losing his own individuality and being swayed and led by others.

I think it certainly should be one of our objects in the formation of character to preserve and develop a strong personality, a strong individuality that will not readily give up his own ideas and be swayed by others.

The Formation of Character

The older we grow the more we are affected by public opinion: that is, by the concensus of opinion of the people who surround us.

The man of weak principles gives way, and lets others decide what he shall do.

The selfish man, weak in the spirit of altruism, drives his way through life without much reference to others; although even he too, feels the restraining influence of an outside public opinion.

Egoism and Egotism.

We should aim to develop a healthy egoism or self-respect, as the mainspring in life; combined with a spirit of altruism, or equal respect for the rights and opinions of others; for this is the attitude of mind that is necessary in a social community. In my mind I distinguish between egoism and egotism. The egotist disregards the rights and opinions of others as inferior to his own. Whereas, by egoist, I mean a person whose self-respect is highly developed as the basis of character, but combined with an equal respect for the opinions and rights of others.

I am afraid I am wandering from my subject; but the chief thought is that our processes of auto-education should aim to lead the child to develop himself into a social being, capable of fitting into a society or social community, taking his part as a strong self-respecting individual, and yet respectful of others: an individual who, while tolerant of the opinions and rights of others, will do nothing inconsistent with his self-respect and his own ideas of right and wrong.

In the composition of this individual, self-respect, to my mind, forms the essential basis; or, as I frame it, a strong spirit of egoism, tempered by altruism.

Anyway, the point I have in mind is, that as a child's education advances he should become more and more of a social being. The children should work more and more in groups, and learn to work together for the attainment of a common end. That is: We should have classes at work together more and more, instead of individuals working singly and alone quite independently of others.

Organizing Knowledge

When children arrive at the age when Nature prompts them to make collections, they also develop the desire to exhibit their collections to others.

A boy cannot make a collection of objects of similar kind without noticing minute differences that would escape his attention at the time the objects were individually obtained.

In preparing his collection to be exhibited to others he will naturally arrange the specimens in some sort of order

and, by arranging them, he is organizing his knowledge and exercising his reasoning faculties.

Here it is important that he should be left alone to make his own arrangements, according to his own ideas; for our object in stimulating his desire to make a collection is not the arrangement itself, but the stimulation of his own reasoning faculties.

Development of Power of Comparison

A geologist doubtless would prefer to have him arrange his stones and pebbles properly according to their geologic formation, of which the child knows little or nothing, excepting what he is told by others. Such an arrangement made on authority leaves him helpless and dependent upon others; whereas an arrangement founded upon his own independent observations stimulates his powers of comparison and leads him to group his objects together in accordance with characters that he has himself observed. The stimulation of auto arrangement develops his own reasoning faculties

I can only say that it appears to me to be of the very greatest importance that children should be allowed and encouraged to make collections of all sorts; and to arrange the collections according to their own ideas.

It is really of little importance whether the object are arranged rightly or wrongly (according to our notions), so long as the child has been using his own reasoning powers in effecting a grouping of the objects satisfactory to himse

He will arrange, ad re-arrange his specimens in acco ance with the condition of his knowledge.

The process of grouping his specimens is developing his powers of comparison, and making him observe likenesses and differences much more minutely than when he observes a single specimen alone, and compares it in his mind with the recollections of other specimens.

In his collection he is dealing with concrete things. The larger the variety of concrete things he deals with, the greater the variety of mental impressions that will be stored up in his memory.

He picks up a stone in the field, and, recalling by memory the specimens in his collection, he thinks the specimen something new, puts it in his pocket, adds it to his collection, and arranges it in what he thinks its proper place.

Encourage Children to Make Collections.

Here we have, not only the stimulation of the power of comparing an observed object with the recollection of other observed things, but the verification of his impression by the direct comparison of the objects themselves.

I am pretty sure that encouragement of collections of different kinds by children will be found to be an important means of exercising the faculties of observation, memory, and reflection. In other words, of exercising the reasoning faculties of the child.

Such collections therefore will prove invaluable material for the auto-cultivation of the mind. AGB

MEASUREMENT

(From Home Notes, Apl 17, 1915, p 88)

1915 Apl 17: Measurement lies at the basis of all exact knowledge. Hence, among the material provided for children should be instruments of measurement; and they should be familiarized with their use.

For example: We should have thermometers in the schoolroom so placed so that the children can use them. They should be asked the temperature, read it off by themselves and report. Then experiments

Then experiments should be devised of a kind to interest children involving temperature observations. Note the effect of ice in reducing the temperature of water, and how they cannot cool water below 4° Centigrade, or heat it above 100° Centigrade (boiling point of water). They can boil water in a paper bag, because they cannot heat damp paper above the boiling point of water. They cannot burn the bottom of a kettle by roasting it over a fire so long as there is water in the kettle, &c.

Using the Decimal System.

I am inclined to think that it would be advantageous to employ decimal systems of measurement as involving simpler arithmetical problems than our cumbersome systems of measurement. But this is a detail, which may subsequently be considered. The important point is to have the children themselves use instruments of measure.

Other important material for this purpose would be:

a balance with weights; and accustom them to weigh things.

In this connection a spring balance would be specially important, as giving a measurement of force independently of gravity, and independently of the direction in which the force is applied.

Here pulleys would be of use for supporting weights upon a string.

A weight supported directly by a spring balance will show the same weight as indicated by a pair of scales; but if it is supported by a pulley on a string, and the two ends of the string are connected to two spring-balances, each spring-balance registers one half of the weight, &c.

If they find a weight too great to be measured directly by a spring balance, they can support it on a string by means of a pulley. Attach one end of the string to a hook in the wall, and the other end to a spring-balance. The spring-balance will then register just one half of the weight; and by applying arithmetic (multiplying by two) they can calculate the whole weight, &c.

Yard sticks, foot rulers, &c (Preferably, I think, on the metrical system) for measuring lengths.

A Universal System of Measurement.

Liquid measures for measuring cubic capacity; especially a cubic centimeter, and a liter measure.

The relation of weights to measures of length is much more easily perceived when we use the metrical system. As this constitutes the only system of measurement universally employed it would be well to use it. It also simplifies

very greatly the arithmetic involved in measurement.

A mercurial barometer would also be a good instrument to have in the schoolroom, so that the children may be familiarized with the meaning of"rising barometer","falling barometer" &c. Its use will also familiarize them with the measurement of atmospheric pressure in "inches", or "centimeters" of mercury. A mercurial barometer would be much more useful in this respect than an aneroid barometer.

Practical Solution of Arithmetical Problems

The children should be accustomed to measurements of all sorts; and these afford naturally practice in arithmetic. Arithmetical problems that naturally arise in the school room will be more useful as exercises than set sums, as they represent something that the children want to know.

The following materials should certainly be in the schoolroom accessible to the pupils:- a thermometer; a mercurial barometer; a pair of scales with weights; a spring-balance; a measuring rod for measurements of length; a liter measure, and other liquid measures showing cubical contents, especially a hollow cubic centimeter.

Then as to vibrations, there should be swings in the school playground differing in the length of the supporting cords.

A pendulum beating seconds might also constitute useful material; also pendulums of different lengths.

A balance having unequal arms illustrating the lever principle. See-saws in the playground; and a see-saw having arms of unequal lengths, whereby the smallest child can

balance the largest man. The see-saw has a practical bearing upon levers, and their use in moving very great weights.

We should also have levers of different kinds, including circular levers of wheel form supported upon axes, whereby weights, however small, may be made to balance weights however large. Indeed we might have models illustrating all of the mechanical powers.

FREEDOM FOR THE CHILD

(From Home Notes, April 21, 1915, p 113)

1915: April 21: This morning the first number of Volume II of "Freedom for the Child" came out, edited by Mrs Bailey Willis. It is a very attractive looking number. It contains a frontispiece of me with Gertrude, Mabel and Eliandra Grosvenor. The first article also is one of my "Conferences on Children", taken from Home Notes.

One radical feature in the Montessori method is that the pupils are their own teachers; and that the teachers are pupils, studying the children. Miss Fletcher illustrates this very well; and her account of her studies of the children of the free school at Friendship House is most interesting and instructive. I think it would be a good thing for "Freedom for the Child" to encourage the teachers or directors to publish their studies of the children much upon the model set by Miss Fletcher.

AGB.

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