

THE FOUR PLANES OF DEVELOPMENT IN THE MONTESSORI THOUGHT

We seek to go to the origin of Montessori's thought. To go to the origin means to go to the Montessori manuscripts, those published and those not published. As we meet the details of her thoughts in these writings, it is important to regard the details carefully, because to eliminate or change even the smallest element might mean to eliminate that detail which contains the real characteristic of Montessori's thought.

When we look at the physical places where the method was born, we are reminded that in this simple setting a work was begun that is truly the work of man with man, not man over man---teacher with child, not teacher exerting pressure over the child. In January 1907, Dott.ssa Montessori brought the children together. Like all scientists, it was by accident that her discovery was made; by chance that her opportunity was provided. The president of the stock exchange company of Istituto dei Beni Stabili was interested in the business of real estate. Small children in his newly constructed project housing buildings were wrecking the property---and for him that meant devaluation and loss. So he, having heard of Montessori's work, asked her to put the "little savages" together in a room which he would provide. So to defend the adults' property from the children's damage, the chance was made.

Montessori was able to transform this work from that of the defense of the adult to the defense of the child. Her social work became the work of education and then it became a scientific work.

Earlier Montessori's experience has led her to a hospital where she observed mentally retarded children. The nuns pointed out the "little beasts" scrambling after crumbs on the floor. Montessori recognized in their activity the work of the hands, the much needed exercise of their motor abilities which was provided in no other way. Her work subsequently with the mentally retarded children caused her to wonder, if the abnormal children, in whose eyes she sought to discover the flame of intelligence, responded to her methods, what might be the result with the normal child.

When she began her work with normal children, she discovered that their psychological needs were completely different from that of the abnormal children. Because psychiatry was just beginning at the time, there was not a psychology of normal behavior. Thus there was no normal pattern with which to compare her development or her work. She had only descriptions of abnormal behavior. And so when she began, Dott.ssa Montessori had to invent the experience of working with the normal child. At the beginning, psychology of the normal child derived from the psychiatric knowledge she had of the abnormal. And because of this, her psychology of the normal is a result of the psychiatric base.

She traces a line of work called "The Four Planes of Development" or "The Four Planes of Education." Sometimes she talks about the phases of development of the ages, sometimes the phases of the development of the individual, sometimes the periods of growth, or the phases of life. The four planes of education do, in fact, equal the four planes of development. Education in the classical tradition has often meant "to put inside" as one would fill a vase; or "to give shape" as one would mould with clay by the hand of the teacher. Here there is an identification between the teacher and God---one who knows and commands and is the authority. In this situation education does not equal development. But if education means to predispose the natural helps for the potentialities to develop, that is, if it means to help life, then truly education can be identified with the word development. Thus the four planes are one in the same.

Education for us means to help the laws of life, the laws of development. To explain these four planes, Dott.ssa Montessori used this chart: The Cycles of the Construction of Man: The Cycle of Life. Represented are the periods of the construction of the man.

Considering the line of the Montessori graph, the Dottoressa says: I believe that this graph with successive triangles reflects the scientific study of the individual because the four periods are determined by nature. And the natural law cannot be modified. It is a conservative and universal law...and must be respected. (Perugia, 1950)

The dominant characteristic of the graph is the consciousness we have that education must be in relation to the growth of man instead of to the social needs. When Montessori talks about the social graph, she says: "The scheme of the current scholastic organization reflects an organization made by society by using the means at its disposal. And I agree that in this scheme the secret of continuity is enclosed, even though education is not completely in relation to the needs of the individual, but in relation to the needs of the society." (When she says that it encloses the secret of continuity, it means that society provides in such a way that the 6-year-old will have a school to attend and a teacher to teach him. She is referring to the public schools.)

She goes on to say that there are characteristics common to both graphs. Certain parts correspond, but a union does not exist between them. Her conclusion is that the aim of the Montessori movement is that of removing the disagreement that exists between the two concepts of finality and causality. The aim is to reach an agreement to promote the unification of the two.

In a technical sense, we should draw one graph which includes the characteristics and requests of both. Thus, Montessori prepares the possibility to transfer the Montessori ideas and requests into public education. She is realistic, having understood that the secret of continuity lies in the organization of the state school, and not in a private Montessori school. And, at the same time, she agrees that it is easier to construct a tight Montessori school than it is to transfer the Montessori ideas into the public situation. But the aim of the Montessori work must be towards the unification of the requests.

The Montessori movement at an internal level possesses institutions for the different age levels. These various institutions for children and for teachers have specialized as the cells. They work around a specific period of the life of the child, but the aim of all the institutions is the same. It is to give a help to life, a sentence Montessori uses to define her own method.

We can see the unity of the Montessori philosophy in those institutions which have been established to help the children and those which train the adults.

Level	For the Children	For the Adult
0 - 1½	Montessori Birth Center (includes pre-natal care. Rome	Montessori Birth Center. Rome.
1 - 3	Montessori Nursery School. Rome.	School for the Assistance of Infants. Rome.
3 - 6	Case dei Bambini. World-wide.	Training Course for Children's House. World-wide. School to obtain Certification at the Children's House Level. WW.
6 - 11	Montessori Elementary School. World-wide.	International Course for the Training of Montessori Elementary Teachers. Bergamo.
12 - 14	Montessori Junior High School. Rome, Bergamo, some U.S. institutions.	
14 - 19	Montessori High School. Rome	

The Four Planes of Education. . .

In sixty years the Montessori method has given this wide range of institutions. We note that the first two levels and the last are found only in Rome.. That the training for the Montessori Elementary teachers is only in Bergamo. We have, in fact, a continuation of space without unity. But there is continuity of ideals. The unity of ideals must unite the institutions, both the ones which help children and those training centers for teachers.

If we identify the Montessori method as a help to make children strong, we can stop at any level, being sure that we have offered to the children every possible help so that they can continue anywhere.



What is it?

At any given point in time new things are much discussed, but not easily accepted because of the conservative nature of man who, encountering something new, rebels against it. If we had followed this particular characteristic of all mankind, if the history of mankind's development had hinged upon it, we would still be in caves. A large part of mankind has accepted all the material developments of civilization, but a great part of mankind remains behind in the development of the spiritual qualities of the life of that civilization. We can say that as man increasingly satisfies his material needs, he has become attached to his material progress and has forgotten his spiritual needs. That spiritual nature progresses because of a few who love to learn, who explore the new, who will not accept the imposed traditions of the past without examining them first and evaluating their worth.

Why should we accept change? Too often the schools ask this question. In the field of education, for a long time education was free. Each people offered it in the way they thought best and no one was obliged to go. Often learned persons formed groups of youths who wished to study. Thus many philosophical movements are formed throughout history--- by those teachers of the few who wished to learn. Some speculate that man appeared on earth a million years ago---others that he arrived ten million years ago, but only since Napoleon has school attendance been compulsory. He started the system; and, having conquered nearly all of Europe, suddenly compulsory school attendance was established in a large part of the world. It was decreed that children should go to school at 6 and learn to read and write. How were these schools conceived? Like military bases. The windows were few and very high so that there would be no distractions. There were long wooden benches fixed to the floor so that the children were obliged to remain still. The teacher's desk was placed in a high position above the other benches so that the teacher could "control" and "impart his wisdom." Prizes and punishments were the rule. There was no child participation. The program was organized without any consideration for the needs of the child and his development. It was fixed instead by and FOR the adult.

Then adults, even before Montessori, began to revolt against such a system. Itard and Seguin in France, Pestolozzi in Switzerland, Tolstoy in Russia, began to recognize the great damage to the psyche of the child done by such a school system. Through their study and writings, they became the new guardians of the child's life. At the same time there were scientists who began to investigate the physical development of the body. They, too, began to recognize the physical damage done to the young child's development by this system. Montessori, in his approach to education, brought these two movements of thought together, concluding that there is no division between the physical and the psychical, that they must be considered as a unified whole and the development of both seen as crucial considerations of an educational system. All the recent progress in biology has confirmed Montessori's theory. It has been discovered that many physical problems are a result of psychical difficulty encountered in the environment.

Little by little it is understood that the school should be the guide for the next generation, a place where youth could develop in a harmonious way. Dott.sa Montessori said that if one lives in a happy environment, one adequate to the psychic development, that one becomes more beautiful. The beauty is the fruit of that harmony, formed mainly through the environment in which the individual develops. The responsibility of the adult, both parent and teacher, towards humanity is great because an apparently unimportant event, during the child's development, may bring very serious consequences which appear in the adult. The thief or the murderer, as children, are seldom different from other children. They only reflect the society's deficit, its defects. And so in the case of the mentally ill. The defects can be avoided if man is scientifically studied, resulting in the necessary care for the child's development.

The most fragile periods are from 0 - 6 and 12 - 18; the periods of the two births. In these periods the body easily gets sick; and the psyche is delicate, too. All this must be considered by those who educate. It is a mistake to oblige a boy from 12 to 15 to heavy physical efforts: we must be indulgent. Now these things are well known and many remedies have been found. But still the governments have not been able to find

the right way, making the mistake of keeping the program for the children from six to twelve very light. Some countries do not start their school program until the age of seven. Instead, these years between six and twelve are the years when the child can work best. The new programs have substituted the old hard programs with soft irresponsible ones. They have reduced the number of subjects, reduced the time and staggered the learning periods so that the children have no extended period of work in which to approach concentration.

The school has not understood that learning cannot be imposed, but that it must form through a long internal development. This development is achieved through work and concentration. The adults should know that it is possible to give the children everything if their interest is stirred and then the children are allowed to work at their own pace. We must allow much possibility for activity and opportunity for repetition.

We must follow nature's principles, a pattern which is the same for the atom as it is for the animal. In all beings there are points of great activity called PSYCHOLOGICAL GRADIENTS, a phenomena discovered by a biologist named Child Carles. His work was done during the years from 1869 to 1954---and much of it at the University of Chicago. These points of great activity do not work all together, nor with the same intensity, Each follows its own pace, an independent course. All the cells begin the same, looking alike. Gradually they assume a shape and become specialized. This leads us to a further consideration of the main principles of nature: 1) development through the specialization of the cells, 2) freedom and independence in that development, 3) construction of the organs, 4) unification of the organs through the circulatory system, 5) for animal beings, the communications system established through the nervous system.

An organism, then, is not simply a group of organs. Each cell becomes adapted to that which it must accomplish, transforming according to the function it must carry out. In the way that an organism develops, so has humanity developed, from the appearance of man on earth to that man of the present day. The different centers of civilization became strong in their isolation; then later they were absorbed by a greater organization. Those different civilizations got together, forming new and stronger civilizations. If there were civilizations which could not adapt and join others, these civilizations were absorbed by other civilizations. They then had to surrender their precious possessions and their own progresses to their conquerors; and thus mankind was enriched. This union of different civilizations happened sometimes by force, sometimes peacefully. It is a mistake not to tell the children about historic periods of violence and war. At a certain point they must realize that forms of violence have played their role; but that now the time should be over when isolated groups exist and develop, abandoning other groups to misery and slavery. That the very progress of civilization now demands that those groups with wealth and security heed and help the others.

Many discoveries have been made in the past, but man is not spiritually prepared to meet these discoveries. They are discoveries which could be a great good to humanity or they can become great dangers. This depends on the way we will use them. If we are not able to understand and help young people understand the rules which govern the universe, the discoveries themselves will make our planet tremble to its very essence.

Education must be a help to develop responsible men. As adults we believe that we are free---and we are not. Through long experiments, many mistakes have been eliminated and it is possible to have a key which opens the doors to a happy and healthy education. From our courage as teachers and through our perserverance to follow this way: one made of researches and patient work, one made of the experiments written by Montessori, can come a new way. And on that depends the future of humanity. Montessori said that she did not found a method, that we as teachers and adults should only be a help to life. That we must accept the good part of everything new. To be able to change our mental structures is important, to become mentally flexible. We must not say "I did this in a certain way when I was young, and so. . .this is too new. . .I reject it. . ." and put the new aside. We must instead be alert and responsive to the new. There is a rigid way of thinking that can make us historical Montessorians, that attitude reflected in the protest that "we must do it because it was originally done that way." That keeps us from being real Montessori thinkers.

Dott.sa Montessori was a scientist first of all. And she challenges teachers to be the scientist first; to be open to the new, to analyze it, to experience it, to see if it works. Some of the Montessori principles are eternal and we must follow these general schemes. Those principles that Montessori intuited in her work, with the children, have now been scientifically proven. Biologist's investigations now of the brain continue to bear out and discover those things which Montessori discovered about children by living with them and watching them. They now describe the psychic embryo at birth as like "an empty bag." The child inherits only the physical animal needs. He acquires the human parts from the group in which he lives. He comes without instincts, but only with the elanvital, through which direction the potentialities to become human through the environment, to construct his own mind, unfold. Thus we see the eternal lines of Montessori theory. And by following them, we educate youth so that he may become adapted to his own times.

COUNSEL TO THE MONTESSORI TEACHER

A six-year-old from the casa or from his family environment, is not one similar to the one of fifty years ago. This child is already full of interest about his culture because our world is dynamic, our environment more stimulating in comparison to one of the past. We must try to understand the child's interest and help him. We must give him the possibility to be himself, to work, to be active.

The children must feel that they have in the teacher a friend and a helper with whom they can express themselves about anything. When they feel they are understood, they can enter fields of knowledge believed to be unaccessible to those so young. It is enough that they feel that they are understood, that the adult is interested; and then they can make their own experiences, those both intellectual and practical which together create their work. It is important to understand what freedom means. It is not a lack of guidance. The Montessori school is grounded in the idea that freedom is based in discipline. When this kind of responsibility is obtained, the children gradually develop in a harmonious and spontaneous way.

Another major idea of Montessori's is the indirect preparation. The Montessori principle of the indirect preparation signifies that each thing the child acquires or learns is not valid only for that moment---of for the direct aim towards which it is done. But it is, above all, an open door towards the future. It is a sown seed which will germinate and bear fruit much later. This is the method used by nature in the evolution of life: the method of the growing period, so that the intelligence is always open, ready to go higher. What are the indirect aims? They are sources in the environment, lessons which arouse interest, pictures and ideas which strike the intellect, sources of materials which can be handled. All of these push the child towards activity and gradually help him to make analysis. By repeating the experiences, the same are deposited in the subconscious; and will eventually come to the conscious in the form of synthesis. The child is not conscious of this work, but the teacher must be.

Montessori discovered the functions of these processes by observing with what materials the children were able to make their own conquests. The point of consciousness means that point at which the child is able to make a synthesis of thought. And it is towards this point that we slowly move through the indirect preparation.

AN IMPORTANT NOTE ON "THE LESSON"

The small child observes carefully the movements of those around him; this is his indirect preparation for the development of his own movements. Because of this indirect preparation, he knows how to begin, his muscles know the cues. And the ordering of movement comes. The indirect preparation has done its work in the subconscious.

But the subconscious does not accept imposed orders. We can only order the conscious. If we understand this, we understand the indirect work of the indirect preparation. Thus all the materials of the different subjects have an indirect preparation. Each level of work contains the indirect preparations for the next. Before we consider any material for the child, we must be sure that the indirect preparation has been made.

Then the lessons have the purpose of bringing to the conscious that which is already stored in the subconscious. Few children are able to become aware of what they know without the lessons. Thus our help in this way is very important.

Consider the indirect preparation for The Fundamental Needs of Man lesson. It is the child's own needs. Through life itself he knows the need for food, for shelter and clothing. Often the children have had experience, but they don't understand the organization until confronted with it. With the botany nomenclature lessons, we help the child observe familiar things in a new way, bringing to the consciousness that which might never come from the subconscious otherwise.

We give the first general view and then proceed to the details for important reasons. Only when the whole has captured the interest of the child can he appreciate the details. This pattern is found in many of our materials: geography, mathematics, history, language.

The teacher must be guided by an understanding of the relationship between freedom and activity: the freedom to work, the activity which is a work expressing freedom. The teacher must be able to visualize and assess the whole plan of study so that he has, within himself, an itinerary to follow. Thus the teacher can follow the children's questions and may respond to their individual directions; but, at a certain point, he is able to bring the work back to the main road---leading the children to the real point of the lesson.

The teacher must create points of interest in the classroom through which the indirect preparations are made. After the lesson, there must be always the opportunity for the child to work on his own---through commands, researches, etc.

The teacher must clearly know the materials which provide the indirect preparation for each new work, each piece of material, each lesson.

The teacher must coordinate well those points when help should be given to the child; when he is ready for a new lesson; when he needs to work longer or in a new way with the same problem. We must not be in a hurry to give new lessons. The child must be ready. At the same time, we must not wait too long and see his interest dwindle because he has not been moved on to the new. Timing is crucial.

The teacher must know the sensitive periods and how the child works.

If a presentation is not understood, we must repeat it with a new element introduced to retain the interest. Then, if it is still not understood, we must be patient and reintroduce it at a later time.

The children can be left to themselves only when they are working well.

Many times more than one material has the same aim. This is so that a child who does not easily understand or fails to become interested with one material, can have the same learning experience with another material.

With the elementary children we always begin with the general plan and then proceed to the details. The general presentation is given as a collective lesson: that is, with a large part of the class---all at that particular level---involved. Then we use the group lesson (a smaller number of children: 6 - 10) for the lessons in the details.

An important consideration is whether the lesson or the environmental experience comes first. In the children's house, the environmental experience precedes the lesson. In the elementary school, the reverse is true. The lesson comes first and then the environmental experience. This is a result of the diversification of the children's needs at the two levels. The casa child needs sensory experience; to collect a greater quantity of images for the construction of his mind. When he has collected the images, the lesson is helpful as it brings to his consciousness and organizes all of those images. He is ordering the information he has collected. The elementary child already has a mind rich

A NOTE ON THE LESSON. . .

in images; he has gone beyond the purely sensorial level. Thus we give him the lesson first. We are giving him new eyes through which he now can gather what he needs; we are providing guidelines for his observations, his explorations.

The young child is a collector of information. The elementary child has become a real explorer. He is on his way to synthesis which each man reaches in his own unique way.

We must make the classroom an alive place with pictures which call the children's interest. We must bring as many real things into the classroom as possible. And we must take the children out of the classroom often, too. This kind of a trip must be preceded by an accurate and clear idea of what will be seen. John's suggestions are particularly pertinent here. Before visiting a museum with the children, he visited the museum, selecting carefully certain important and interesting things to see. Then he prepared a list of those things and made copies for each child. These forms were presented in the pre-trip discussion. And during the visit the game was to find and check off each of these points. It became a kind of treasure hunt in this way and a good structure to the experience. He also, on another occasion for a visit to a museum, prepared the children for sketching some of the things they saw by having them sketch various objects in the classroom. Then, during the visit, each child sketched several items of particular interest, thus recording their experience in an interesting way. And, at the same time, developing their powers of observation. The children must know the aim of the exploration or the field trip. We must create point of interest which can be real helps toward the construction of the child's intellect in every experience. We must be sure that everything is presented clearly.

We must give to this elementary child freely; we must sow as many seeds as possible.

There are three basic kinds of lessons: 1) the collective lessons, for the general presentations and preparation for outings; 2) the group lessons, for the presentation of details and to give exact techniques (How to build a terrarium); 3) the individual lesson, for the presentation of special materials. This third type of lesson is almost never used in the elementary school.

Don't forget the three-period lesson. Use it whenever it will help the learning process. It has a special power all its own.

THE NATURAL CONSTRUCTION OF CHARACTER

We must begin by clarifying the meaning of "character." We consider man: the mammal, a member of the animal kingdom---but different from the rest of the animals. He has many physical and psychic characteristics similar to the animals; he is a close relative of the primates. But he is something unique, something different. In him there are two directions, both present in evolution:

- 1) The direction guided by instinctive reactions. The natural impulses: the need to survive, thus the need for food, for an adequate environment, etc. And the need to procreate, to insure the continuation of the species.
- 2) The direction guided by intelligent reactions, which tend to dominate the instinctive reactions.

These two tendencies exist from the beginning of evolution. If we have studied and understood evolution, we will have noticed that there is a tendency to decrease the instinctive reactions and a tendency to increase the intelligent ones. Through evolution, we perceive a perfecting of the nervous system and a formation and growth of the cerebral hemispheres.

The beginning of the growth of man began a million years ago---or more. We know for certain that since then there has been a constant increase of intelligent reactions and a decrease of the instinctive ones; that is, a constant development of the mind. It seems that the growth of the cerebral hemispheres stopped developing about 40,000 years ago, a moment in history coinciding with the appearance of Homo sapiens on earth. When man appeared on earth, he already possessed psychic acuties, those which differentiated him from the animals. But his psychic potentialities were not yet well developed, so his position was originally one of inferiority to the animals who already possessed an intelligence and instinct developed over a period of millions of years. But man's psychic faculties, this new kind of brain that we call the conscious mind, gave man the power of the imagination---a purely human faculty. This faculty enabled man to gradually form a set of individual abilities as well as a group of psychic possibilities. And this group of abilities and possibilities different from the animals is called **character.**

This group of abilities not only distinguishes man from animals, but distinguishes one man from another. And, perhaps more importantly, distinguishes one group of persons from another group. Man does not bring, at his birth, his character. Man is born free, without pre-established instinct. But he is born with potentialities which allow him to adapt to any environment and to construct his own mind, his own character.

Montessori's conclusions of thirty years ago are now those newly confirmed by the biologists of today. The behavior of man is learned for the most part, and the animals' behavior is inherited. When man is taken from the human group, he loses his human qualities. Man has natural impulses which always exist and are necessary; but when we talk of character, we refer to the psychic qualities. We cannot forget that there are these natural impulses. The development of man depends on whether the psychic character---that character acquired through the environment---succeeds in controlling the natural impulses; or if the natural impulses (reactions) are stronger. The psychic faculties must be developed enough, to a high enough level, for this control to be achieved.

To eat. To survive. To procreate. How does the human mind control these natural impulses, these instinctive reactions? It is the psychic characteristics which distinguish man, and yet we do not deny our identification with the kingdom of animals. Is it not an intellectual problem, then, to strike the balance? Perhaps part of that intellectual reality is a true appreciation, not only for the instinctive reactions; but also for the intellectual capacity of man to know the pleasure of their satisfaction.

Another characteristic of man is that the satisfaction of his physical needs---the condition for his survival---is not a condition sufficient enough to make him happy. Why? Because man has constructed a part of himself, a psychic sphere, superior to his instinctive sphere. In order to be happy, man must feel himself needed by something or someone. If this psychic need is not satisfied, the physical health is broken.

This is an important concept. The plight of the older generation is a case in point. Too often these persons of wisdom and character and ability are unhappy and find their health failing as a result of the lack of some useful activity. There is no place where they are truly needed, a great misconception of our own society. They, too, just have a useful and active part in life and in the society. And it is a great tragedy that their talents go unused at the price of their own unhappiness and a great loss to the culture itself. But the elderly person is not the only man afflicted with poor health as a consequence of feeling unneeded. Truly, it seems that this feeling of uselessness, of helplessness to answer any real needs, is a psychic affliction of a great portion of human beings living in the machine age. At times it manifests as apathy, as boredom and the problems of leisure time and its use. But at the heart of such complaint is a deeper feeling of being unneeded. If a man's job can be done by a machine, or if he can no longer conceive of its purpose, then his great psychic need to be useful goes unserved.

There are, of course, great problems at this particular juncture of history which demand our attention, which make the human being a necessary element of our continuing life on earth. The ecological problems loom newly important to our lives and to the welfare of the earth's inhabitants inclusive. The world needs peace. There are many hungry people. Perhaps we may guide the children's attention at a very early point in their lives to these situations where man must begin anew to work and serve, where he is truly needed. And on a simpler level, we must remember with our children that they must always feel that they are needed: that his help is not simply welcome, but that it is a necessity for family living or for the work of the school. That he must answer that need in terms of helpfulness and brotherhood, in a certain responsibility to himself and others. The child's goal is to construct the adult and he cannot do this by playing. Children of large families, children on farms with regular chores, have an early experience in being a useful, active part of their society and their own lives. These children are surely happier. We must find new ways to give our children this sense of being needed. The living being must feel that he is truly useful and important in his society. Thus it is important to have an adequate environment. He must, the child, feel sure and stable guides which help him towards this understanding. We must help him learn to serve.

It is difficult now to create an adequate environment for the man of the future because we live in a time of great change. So we run the risk of guiding children to the construction of a character not adequate to the situations he will meet tomorrow. We must try to understand those guides that Dott.sa Montessori suggests which can be a help for today. We must particularly seek to develop a character in the child which is flexible to meet the changing world he must live in.

It is helpful to consider how the character has been constructed in the past. It has generally been a construction through symbols invented by man through the power of his imagination. Through his language symbols. Through his customs, his habits, his morals. It is strange that the customs of man have never been organized to make life easier, but often they make it more difficult. Always they impose restrictions as in religious restrictions which are often severely limiting. Even the ideas of beauty often follow a very strict and difficult code.

The social character of man is built especially in the first years of life, but it continues throughout the four planes of development. The most important part of this construction is during the years 0 - 6; and this construction occurs in an unconscious way. Dott.sa Montessori said that just as the child does not think in order to build his body, so he does not think in order to construct his psychic design. We use the words "psychic design" because the child doesn't absorb the specific intelligence of his parents, but rather absorbs his psychic design from the total pattern of his environment. And that pattern represents the psychic construction of man, the accumulated intelligence of his development throughout history. It is expressed in that environment to which the child is born and thus is absorbed by the psychical activities of the mind of the child.

In order for the child to absorb what humanity has constructed, that which is expressed in his environment, the child has special sensitivities. We must be sure that he has an opportunity for experiences in every area: sensorial, cultural, and social. These experiences bring him towards the final aims of independence, self-control, mental order (exactness), enrichment of the imaginative forces, and the love of work. Thus the child is naturally constructing his character through his own experiences.

"Experience is something more than teaching: it is something already lived, a part of life itself." In the casa, the practical life experiences are games for the children. They are "games with a name." Gradually the children come to know that certain things must be done out of necessity and that someone must do them. (There are not masters and servants in our world??) There are simply things which must be done. It is not degrading to sweep the floor or to pick up the garbage because---in order to have a clean environment---we must do it. And those things which must be done are important things. They meet the needs of life. They are a necessary part of living, as valuable as any other activity that we choose and do.

So we are all equal workers. And everyone must be treated with respect, politely. We must develop in the child a sentiment of help and humility. A sentiment is not just a feeling, but an integral part of the character, a part of the self which is constructed.

We must understand that love cannot be taught to children as a matter of words. We must help the child to develop this love in the simple ways of caring, through real experiences of caring for plants and animals, in responses of concern and caring with each other.

We want to teach the children obedience. But again, it is not a matter of words. Obedience is something that he must learn through his own experiences. If we want the child to obey, we must remember that obedience goes against nature. (Obedience to the rules of men) There are several kinds of obedience:

- 1) Impossible obedience: we must know, before giving an order, that the person is able to do what we ask. It may be that he is physically unable. Or he may not know how to begin. Or there may be another psychic difficulty which prevents his obedience. This is as real as the physical incapability.
- 2) Forced obedience: The person obeys by force. Sometimes this kind of enforced obedience must be utilized, but only as a remedy. Certain rules must be respected. The children must know which rules are established and that they are established for the common good. Therefore, they must be obeyed.
- 3) Obedience with joy as a result of a love relationship between child and adult. When the child understands that the adult will help, his obedience is a response of confidence in that help which the adult will offer. He knows that, by obeying, he will receive that help.

With the child of age 6, we meet him, hoping that his character has been well constructed: that he has had those opportunities for experience which are so necessary in its construction. If not, there will be much work to do, much help needed. We must remember that children actually seek to understand the laws of society and that they seek to organize themselves according to those rules. Often the children get together, choose a leader and obey him.

At six we have a significant development of the conscious intelligence. And there is a great physical change, too. Now it is useful to reason with the child because he can understand. Still, the best way continues to be that of making his own experiences. In this way the children feel that they themselves have discovered right and wrong. Children need discovery and exploration: that involve obstacles. And in those difficulties which they meet, there must be a moral lesson: the whole being must answer this principle.

THE NATURAL CONSTRUCTION OF CHARACTER. . .

The child must feel that he is doing these things because he has chosen them, because he has organized certain rules, has internalized them, and has decided to obey them. This is the fourth kind of obedience:

- 4) A conscious kind of obedience: The individual obeys, not through force nor through love, but because he is willing. Because he himself has established the laws and he wants to follow them.

In the classroom the group must agree on a certain number of communal rules in order to maintain the social order. The children should decide, with our guidance, what rules shall govern them. Thus they have a respect for those rules which they themselves have agreed upon. This way, of course, is far more difficult. It requires times and thought as we educate the child to the processes of democracy. But it is a great work that we must undertake: not simply to teach the principles of democracy as desirable, but to help the children understand the personal responsibility that it implies. We must take the time and care to help the child make democracy a personal reality for him within his group. And we must help the children make the system work so that each may see its fruit, its reward, its justification. Too often in our world, democracy means simply that the elite, the educated, take over and often take advantage of the uneducated masses. It is the teacher's job to provide the education for those masses, to make those men participants, thinkers, free men who are able to act on their own part in a "knowing" way. For the man who controls the system, this is a threat. "If we educate this person, we can no longer command him." And we must remember his attitude. We must remember, too, how easy it is to accept the dictatorship where only one person thinks. In the classroom, that one person can too easily be the teacher unless she accepts her responsibility to her children who are the potential free men of tomorrow.

Obedience is not mechanical, but a natural force of social cohesion, united to the will. If we are able to truly understand obedience, we will realize that it is an **exaltation of the will**. Obedience is not possible without the individual will to obey. The imposed obedience, which is without self-control and not a result of the will, takes an individual to many forms of personal destruction.

Another thing which cannot be taught is collaboration. The sense of collaboration develops in the child as he makes his own experiences. The child must be aware that man's survival depends on his collaboration with others. The farther we go, the more important this principle becomes. No one place, no one state, no one party, and no one can live in isolation. Even the rich countries have begun to understand that they must help the poor in order to sustain their "demand." Thus they have discovered that one solution for surplus is to give it away.

We must allow the character of the child to develop naturally, thus forming in him a real will, one which never takes the individual to violent reactions but brings him to real freedom. If we allow the child to do what he wants before he has developed a personal responsibility, we are not giving him freedom. Freedom is the result of development: the construction of the personality. Development can be reached only through effort, through personal experiences, through activity. Anyone can give orders, but no one can teach development. From Kahlil Gibran: **Work is love made visible.**

The young boy becomes a man whether he has the opportunities for the natural development of his character or not. He may become an excellent person even though they are lacking in his development because of the human tendency towards perfection. Unlike animals, the development of man is not fixed, but constantly progresses. And in all individuals there is a striving towards something better. In order to help the new generations become more liberated---to give them a new idea of freedom, we must help them adapt to life, knowing that this leads to greater happiness.

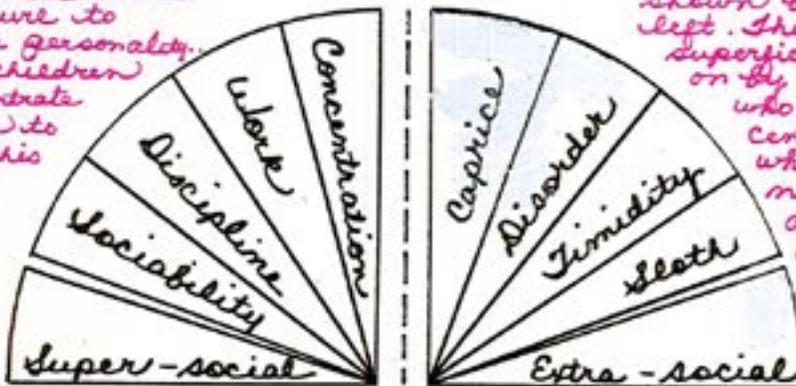
If education is mistaken, if it does not provide for the development of the character which offers this adaptation to life, it produces deviations of character. Many defects in children and adults is the result of not having had the opportunity to develop the character in a normal way. Often the defects develop during the years from 0 - 3 as a result of negligence or mistreatment. These defects increase and worsen with time. The result is accumulating deviations throughout the four planes of development.

There are two basic types of defects: those of the "strong children" and those of the "weak" children.

- 1) The defects of the strong children are: strong whims, acts of violence, rebelliousness, aggression, tendency to destruction, desire to possess, lacking perserverance, incapacity to concentrate. They are often children who cry, who talk loudly and make noise for enjoyment.
- 2) The weak children express defects in a different way. They are children who cry without reason, they are easily bored, attached to the adult, tell lies, often refuse food. They have many fears, are agitated, restless sleepers.

Many times the characteristics of the latter are not considered negative. Sometimes the adult encourages such behavior. The weak child is often called "the good child" because of his quiet passiveness. On the following chart, from The Absorbent Mind is entitled "Normal and deviated character traits in children." On the left side we see the characteristics of the normalized child. On the right, the deviations.

"Such deviations come from a failure to organize the personality. . . Once the children begin to concentrate all the lines to the right of this mid-line disappear, and there remains only one type which has the characteristics



shown by the lines on the left. The loss of these superficial defects is brought on by the child himself who passes into the central line with his whole personality. . . his normality has been attained. It is the most important single result of our whole work."

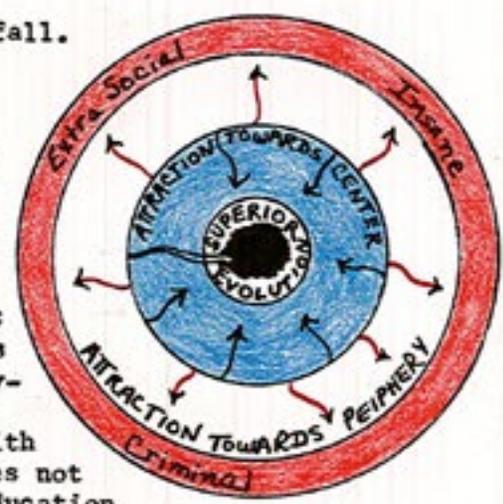
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Normalization occurs as the intelligence controls the natural impulses; a child is never totally normalized because he continues to interact with the environment.

Dott.sa Montessori said that if the child does not have the opportunity to develop a normal character, the masses will not be prepared for social life. They will be living in hope that a Messiah will save them.

The next chart, also from The Absorbent Mind, is entitled "Circles of attraction for superior and inferior social types." The concentric circles represent different degrees of adaptation:

- 1) The red circle shows those who have not adapted: the anti-social, the insane, the criminals.
- 2) The white area is that in which the majority of people fall. They are able to live in society, but have a tendency towards extra-social activities. They belong to the group but they are not pleased about it. They are unhappy, feeling that they need help, feeling empty. And often this person fears the emptiness. Here we often find the young person whose passions and enthusiasms are strong and so are his depressions. Montessori said that only through education can we lessen the numbers of this group. We know that city-living increases them: psychologists have shown in experiments that many things living in too small a space, even though they have everything needed, develop extra-social characteristics.
- 3) In the blue we locate those persons who are contented with themselves and happy. If the number of persons here does not increase, it is not a fate of birth, but a failure of education.
- 4) In the black we have those persons who have reached a high level of spirituality and have sacrificed their lives for humanity. Socrates is here.



OBSERVATIONS: At the MONTESSORI SCHOOL FOUNDATION OF BERGAMO: February-March 1974
Via Vittorio Emanuele 31A
Bergamo

The following recorded observations span a period of approximately a month at the Montessori School Foundation of Bergamo. Observations are made during this time of two different age levels: children 6 to 8½ whose physical situation makes an integrated work experience, the three rooms in which they work providing a cross-section of subject experiences and materials. And children 8½ to 11 whose work is divided into three rooms, each encompassing a particular subject area; one room for history, geography and science; a second for language work; the third for mathematics and geometry.

February 18, 1974: 8½-11 in the History, Geography and Science Room.

This is Monday morning, the weekly group session for all classes. In the meeting of the children today in this room, the work is The Tree of Life. At 9:00 the children are gathered in a circle on the floor in the midst of which is displayed the large rectangle chart of the Tree of Life, devoid of any matched materials; and the Time Line of Life. Within fifteen minutes, during which time the teacher is introducing the work, a group of older children join the group already gathered, bringing the total number of children to 40. This large number of children provides some particular difficulties in the group experience, but the diversity of ages provides some excellent features also.

The introduction, in which the Time Line of Life is discussed as a prelude to the Tree of Life Work, is handled as a series of questions and answers, a review of previously discussed material that the children seem to know very well. One child gives a particularly excellent account of the research work of an archeologist in connection with the fossils, reflecting some good research. The mood of the group is expectant; the attention overall good.

Moving to the work at hand, several children are chosen to distribute all of the circles representing the various phyla, classes, orders, etc. represented on the Tree of Life. The distribution itself is interesting as each child is obviously eager to have a number of the pictures to place. The material lends itself well to this large group since there are many such items to be matched. Then all crowd towards the chart in the middle of the floor (the Time Line of Life is removed) and the density of this crowd does not begin to give way until some of the matching has been done and the interest is not so overwhelming. The child who possesses the first great circle of the animal kingdom is proud to begin the work of the matching, speaking a short statement in definition. Then each child awaits the point at which his circle must be matched, the work progressing logically from one phylum of the invertebrates to the next. Each child, as he places his material, gives a brief discourse on the particular aspects of his addition to the chart. The teacher works well within this presentation of the children, emphasizing the particularly important points, asking questions when something is missing, adding some information here and there.

But the general tone of the presentation, until the last division of the cordates, is that of a review. The children know the material well. The older children seem to know it almost too well and their interest does not stay at the high level of those younger who seem eager to listen as well as to speak when their turn comes. The size of the group makes a certain amount of shifting and restlessness inevitable. And occasionally the teacher finds it necessary to call the group to order---to lower voices---but there is at no time a serious break in the attention. And the presence of the older children provide an excellent source of detailed information, some of which the younger ones leave out or may not yet know. When the mammals have been presented in more detail by the teacher at the end, she proposes a particular study for the coming week: a different one for the older and the younger group.

The classroom work as done here in a large group is particularly interesting, and is handled well. It seemed, at times, that the teacher said more than was necessary given the number of older students in the group who were eager to contribute their information.

We observe one girl, about 10 years, in particular. She holds her two matching circles for about 45 minutes, both of hers coming near the end of the presentation. She has waited patiently, interested in what is being said, but from her demeanor we know that she knows quite well all those facts which are being reviewed. And now when the circle identifying the amphibian class is placed, she quickly comes with the order she holds. She carefully positions it on the tree and lifts her head to speak. The teacher picks it up and proceeds to explain the order herself, leaving the girl only to mouth the words of the short speech she must have rehearsed a few times as her turn approached. We feel her leaning into the next sentence, but she is precluded as the teacher continues. And she ducks back to her place quietly, asking one last question which is lost in a general request for quiet. The second time this same child finds it her turn to match, she is more clever: she explains all that there is to be said about her particular order as she moves forward to place her circle; then without hesitation she places it and asks a final question before there is time for interruption.

This is only a moment; and does not truly reflect the general competence with which the teacher handles the group. For her attitude is one of patience, interest and thoroughness which the children respect and respond to well. It is noted, however, because we must always bear in mind the importance of the contribution of each child: not only those who are just learning and need to participate, but those who are sure of their information and want also to share the group experience. We must see them as a real help for the other children and recognize that the children's participation and offerings to the group are nearly always more effectively received than our own. That we must listen first to what each child has to say, and that we must always make enough time so that speaking well is part of the experience, too.

When this work is completed, there is a short break in the classroom, during which a smaller group of children prepares to give a presentation they have worked with previously. The others take ten minutes to sit at their desks, leave through a notebook, move a little and talk quietly. Then the circle is repeated and the group listens to the presentation that the smaller group of children make. This is still very much a learning experience for those presenting the material. The teacher helpfully prompts the information and suggests that when they cannot remember a particular point, that they simply read it from the prepared cards. This brief presentation is a reminder that much of the nomenclature work provides excellent reading exercise. The group at this point, now having spent nearly two hours in the group formation, is beginning to break attention and the concentration on the matter at hand is much weaker. When, at 10:45, an announcement of some kind notes the end of the session, the dispersion is quick and appreciated.

In conclusion, we must observe that the group worked well and the materials were handled well, with particular indications that this material had been well-digested by the group in many previous sessions. Their understanding of it and their knowledge of it was most complete and gave them an obvious sense of pleasure as they participated.

February 19, 1974: 5 - 8 Special Class for English-Speaking Children

This is an unusual classroom setting, created for the English-speaking children of the Montessori students in Bergamo. It occupies a very small room and consists of only 6 children from age 5 to age 8: two of those are absent, so we observe only four of those children at work throughout the morning. In addition, there is for the first hour a group of eight Italian children present for an interesting English lesson which we will later discuss.

The small classroom and the small number of students create several interesting problems. The children are divided into two groups, as evidenced by the work plan for the week displayed on the wall. Mentioned are those persons in each of the two groups and the work that should be accomplished for each during the week. Miss G'Ann explains that the children report their progress to the group leader who makes sure that all the projected work is being done. So, in spite of the small number composing the group, there is a real attempt to meet the need these elementary children have for the group experience. G'ann does mention that the difficulty here with the small group is primarily that of the lack of the stimulus created among the larger group of children.

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We observe the teacher's successful check against an overavailability of her own help, an obvious pitfall in such a situation. It is helpful that her attentions are occupied by the Italian students for the first part of the morning, for this seems to get each of the children to work independently. Then, when that lesson is over, she continues with work of her own so that the children feel no need to rely on her unnecessarily. The teacher's own work has always seemed a particularly important facet of the classroom to me, and is here demonstrated. That is, the teacher in her work is a model for the children and also a positive impression of work as the business of living, not just the business of children.

Here the teacher's participation with the children is limited to the answering of questions, a suggestion for further work when a child has finished a particular exercise, and on one occasion a helpful variety of suggestions for work to the one younger child who is wandering and having difficulty beginning a period of real concentration. The method used for the answering of questions deserves a further note:

"How do you spell where?"

"How do we make the sound 'wh'?"

"How does this animal raise its young?"

"How do we begin the word 'what'?"

"Here is a good book, about the animals. I think we can find what we want to know in it."

"How do you spell oblique?"

"See if you can find that word in the geometry nomenclature."

The three older children, two 7 years and one 8 years, work steadily and well throughout the two-hour period. One child spends the entire morning with the animal picture cards, taking one and identifying its habitat and characteristics with a title from each of the series of "How Animals Satisfy Their Needs." A second child spends the whole morning trying to construct a solid with nonegons. The third child work with the exercises of Sentence Construction and then does a geometry command. The teacher comments that the geometry commands capture the children's attention and interest in a particularly good way---that they pursue them very carefully and enjoy the work. These three children appear to be normalized and at a well-developed stage in concentration. In spite of the smallness of the room, there is no notice taken of the observers. The fourth child, the 5-year-old, begins several projects but is not able to really level her concentration on anything. She is carefully led towards several possible activities, but not pressured into work at any point.

Perhaps the most interesting feature of this classroom is that it is a view of the newly-formed classroom, that one which begins in spite of the lack of material; which teaches as it becomes an elementary Montessori classroom. The materials reflect this situation. We first note those materials from the manufacturer present, judging them to be perhaps some of those essential pieces of beginning equipment: 1)Globe #3, 2) The metal circle insets, 3) Two large bead frames and corresponding forms, 4) Checker board, 5) Division material (test-tube), 6)All memorization material for the four operations, 7) Decimal system material, 8) A stamp game, 9) Movable alphabet, 10) Sandpaper letters and wall chart, 11) Dot board, 12) First box of first series of constructive triangles, 13) An excellent small blackboard, movable with recessed squared pattern, 14) Two drawers of the geography cabinet.

The following material has been made by the teacher: 1) Titles and labels for "How Animals Satisfy Their Needs", 2) The beginnings of the Geometry Nomenclature, 3) The first six impressionistic charts, 4) A chart of the noun family, 5) Arrows and cards for several categories of the exercise "How Man Satisfies His Needs---the progress of Civilization."

The following material has been made by the children: 1) Small environment, constructed with origami animals, a cardboard box barn, felt clumps of hills, etc., 2)Chart for "The Fundamental Needs of Man" both designed and written, 3) The Reading Analysis symbols: circles and arrows, 4) Charts pasted of the dynamic figures constructed with the constructive triangles. It is this handwork of the children and the teacher that lends a particularly creative spirit to the classroom and seems to make up for anything that might be lacking in terms of a larger group. Omitted from the list of materials present was the adjective grammar box; and the children had made the noun grammar box.

OBSERVATIONS. . .

A final note on the English lesson for the Italian children, conducted with particular skill such that I do not want to forget the principles involved. First, the blackboard was utilized to spur conversation, but words never written. Instead for the practice of "Good morning" and "Good night", etc., the sun and moon were used on the blackboard, the sun in different positions for the various times of day. Thus the children had a visual key to remind them of the phrases, but at no time was a word written to confuse the learning of the spoken word with the learning of reading or writing. When numbers were recited, again the number symbols were used. For vocabulary enrichment, the simple nomenclature booklets were used with the phrase "What do you see?" And the pictures shown were all of very familiar things: mother, brother, book, tree; just as all the phraseology was of the most familiar: How old are you?, What is the date today?, I see a friend. Interesting that with the small children, their own language was spoken about half of the time, a real point of encouragement. And the whole lesson proceeded slowly and carefully, so that pronunciation was emphasized and there was plenty of time for the reinforcement of sounds through listening time. The lesson concluded with two children's songs in English which the children liked especially and which involved a considerable range of vocabulary. The first is my favorite "This is the way. . .I wake up. . .so early in the morning."

February 20, 1974: The Elementary Classroom, ages 6½ - 8

The remarkable character of this classroom is the diversity of activity that has busily begun at 9 o'clock in the morning. The physical setting is an appropriate study in the "striking of the imagination." Visually the room is a carnival of color and design, of picture and flower, the materials everywhere offering the invitation to work. Of particular note in the material presentation are a number of tables used specifically for a particular game or exercise. The bank game is laid out on one table, the Time Line of Life with corresponding arrows on another, one table is reserved for the numerical decanomial with the wall chart hung directly above. Another table houses the Time Line of Man and the Geometry nomenclature, another table is equipped with the language symbols, glue and space for that work. The table where the experiments are done is equipped with a number of plastic trays in which are contained all those materials needed for one particular experiment. Thus the children can easily begin the work with the necessary equipment already grouped. We watch at one point two girls working with the large magnet, bringing up the metal shreds that are mixed with the dirt---one of the first history introduction experiments. At another table the checker board is being presented to three children---and that checker board will perhaps remain in that position for awhile as the children work at length with it. Another table is especially constructed for the bead decanomial with a wooden-framed felt mat of a large square into which the constructed decanomial fits exactly. On still another table is displayed several of the divisions of the botany nomenclature, showing only the picture cards. And finally we note a large and well-filled bookcase, the top shelves of which are stacked with books. The neat stacks are a little too high to be accessible and their arrangement prevents one from knowing what books there are without disturbing the stack considerably. As a consequence, at no point in the morning are those books used by any child, a point which deserves some thought. It seems to me that the opportunity to sit down with a good book should be an experience that is always possible and encouraged in the classroom; and even a few comfortable chairs to make this especially attractive seem to me to be in order. Overall the classroom itself is a wonderfully happy and busy place; the sunlight streams in from large windows on two sides; and the diagonal arrangement of the tables in the room makes the freedom of movement particularly interesting. One last material note: we are reminded in this observation again of the great need for containers of all kinds: here tins are used to hold the verb box booklets, arrows, labels of various kinds. There are trays for rock collections. The set of geography maps used for the study of the first six land forms are kept in a kind of scrapbook folder on one side of which is the map and on an opposite page a listing of the formal names of each of the forms shown. This pattern is repeated for other geography maps: the rivers of Italy, etc. And seems a particularly good way to handle this material.

OBSERVATIONS. . .

We meet this morning Terry, about $6\frac{1}{2}$ -7. She has laid out one of the small booklets from the Big Red Verb box (here from the tin) vertically composing the columns; and then she copies the words into her notebook. It is a pleasant task, handling the tiny booklet, and one she can do without a great deal of thought. It is a mechanical work. Next she begins work on the large bead frame with a friend. Each works on a separate form, but they share the same frame, the other child performing most of the bead calculations. Each time the two show a decomposition of the multiplier on the right-hand side of the form, they immediately add the corresponding rows of zeros to the multiplicand in red. They then write the multiplicand digits. We observe this process several times. Another interesting note on the use of the forms: each child, when he begins with the form, first draws the colored lines at the top of each column over the black printed ones. A good guide for the work and also a rehearsal of the order of the hierarchies for the child. In the work with the bead frame, the two girls seem to have the most difficulty with the addition of the partial products. At the end of each multiplication the two go to the teacher for a check on the calculation. At no time do they show a carry-over on the frame from one hierarchy to the next, so they are apparently doing static multiplication. Perhaps the work is too simple for them, for the mental concentration is scarce, the work done between social exchanges; and the only part which really commands their attention is the addition. They appear to need an introduction to the next passage. When they have finished three calculations, they take the three completed forms to the teacher who scotch-tapes the forms into their notebooks. It seems there is a better way to handle this so that the children might do this themselves. Now Terry's attention has wandered to a yellow rubber band. Her notebook is opened before here and her pen ready, but few words are written. She is experimenting with the rubber band. The last half hour passes almost without activity. She has, at no time during the morning, become involved in her work.

In contrast to her performance is that of a boy about 7 who works steadily through a series of exercises, demonstrating a real normalization---a total involvement in the work. He begins with a series of sentences which he writes in his notebook, carefully spaced so that he later can go to the table where the symbols are located and paste the corresponding symbol for each word. He returns then to his place at the table and illustrates whatever he has written, exercising great care with the drawing and the coloring. Then he proceeds to prepare a form for work with the large bead frame. He has carefully written the calculation, which seems to be one of his own composition and marked the colored lines at the top. He has, during this preceding hour and a half period, been greeted by several friends, but he has hardly noticed. He is seated across from a child who, we are informed, is an exceptional child. He has been sitting with his notebook before him, trying to decipher an arrow from one of the time lines, writing an occasional word, for nearly an hour. Our first child, busily preparing for his next work, suddenly stops, looks kindly at the second child and asks him if he would like to work with the bead frame with him. The second child is transformed by the invitation. He glows. He goes quickly to bring a form of his own; and then, copying carefully from the first child's form, does the work with joy. The first child waits very quietly until the second is ready and then he begins the calculation on the frame. The second is slower and must copy most of the work, but the first one waits. And allows the second to perform the bead calculations in turn. It is a fine moment of charity; an expression of sensitive caring.

February 21, 1974: The Elementary Classroom ages $6\frac{1}{2}$ - 8

We observe the work of the decanomial game of substitution. The table is arranged so that the teacher sits before the felt square on which the construction is done. Then there is space to one side where one child can write in her notebook; space on another smaller table extended perpendicularly from the first where the other two participants can write. The construction is done from the angle, first placing the one-bead; then the two 2×1 sets and the 2×2 . Next the threes, etc. When all of the bead-bar sets of a particular quantity have been arranged, the transformation to squares is begun. One child each time does this substitution of the squares, beginning with the square of the quantity, then, using the method of combining those bars closest to form the successive squares, replaces each of the groups with the actual square. The interesting aspect of the work itself is the written calculation that the children make as the work progresses:

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For the quantity of 5 the children write:

$$\begin{array}{l} \text{First construction: } 2(5 \times 1) = 10 \\ 2(5 \times 2) = 20 \\ 2(5 \times 3) = 30 \\ 2(5 \times 4) = 40 \\ \underline{5 \times 5 = 25} \end{array}$$

and they add:

125

$$\begin{array}{l} \text{Substitution: } 5 \times 5 = 5^2 = 25 \\ 5 \times 5 = 5^2 = 25 \\ 5 \times 5 = 5^2 = 25 \\ 5 \times 5 = 5^2 = 25 \\ \underline{5 \times 5 = 5^2 = 25} \end{array}$$

and adding:

125

Thus the children observe the construction and the calculations simultaneously. For the first several passages done in this way, the children hesitate in their written calculation, and it is carefully verbalized by the teacher. By the table of 5, two understand the work well. The third is then invited to do most of the substitution work and by the end of the 6 construction, she, too seems to have grasped the concept. The work proceeds slowly and carefully. It is completed only through the 6; and then the construction is left displayed. Later in the morning two children who have seen the presentation on the previous morning return to the board and finish the entire construction and calculation on their own.

At the same time, another particularly interesting work in mathematics is observed with a group of three children age 6½. They are doing multiplication with the decimal system material. A side table displays all of the numeral cards, the bank. On another small table are baskets of the decimal material, the quantity bank. On that table are slips on which are written multiplicands and smaller cards on which are written the multiplication symbol, the multiplier 2 and the equality sign. The three children are seated at a table on which there is a tray for holding the combined materials and two baskets in which they gather their quantities from the bank. Two children sit opposite one other---the cashier. The cashier selects one of the prepared multiplicands and the other two gather the small numeral cards and the quantities. The cashier does the checking of the quantities brought and puts the quantities together on the tray. One child then, seeing that there are four thousands, rushes to bring the large numeral card. Then they proceed to count the hundreds and discover that there are 18 hundreds. Says one, "We need the 18 hundred card." Another: "There is no such thing." A third: "What shall we do?" And the three go for help to the teacher. She returns with them to the table and clears up the process, insisting that they begin with the units for the counting of the quantity. In so doing, they remember the process of exchanging and solve the problem themselves. The teacher returns to check each calculation that they do. After the second calculation, Mrs. Honnegger stops by and shows the children that it is necessary for only one child to bring the small numerals and both should bring the quantities. They understand. They have moved one step farther along towards an understanding of the process. She also suggests that they show the multiplication horizontally instead of vertically, that is $2,457 \times 2 =$. When the three have completed the three multiplications, their interest is still high. The teacher presents them a simple division and they do it, but with some difficulty. The interest expires. But the cashier, still enjoying the game, gathers two more children and the multiplication begins again.

This is the same classroom observed in October. Several differences can be noted. The social fabric of the children's interaction is more developed. Special friendships are evident and much work proceeds in pairs. The activities are much more diversified. There are considerably more children working well and independently. One child works all morning on a composition; another progresses well from a composition to the addition snake game and then to the stamp game of addition. The larger bead frames have replaced the smaller. The wall charts and other displayed materials reflect work in many areas: particularly interesting are the calendar sheets that have been done for each day of one month and hung. It looks as though one child each day did this work, writing a short composition about the day after pasting the calendar page on the sheet. The teacher is one I like very much. Her composure is admirable; her response to the children always calm and quick. She asks for quiet once this morning and again asks one child to work at her desk, one who is having difficulty working. But her presence is more felt than heard or seen. And the class is truly approaching normalization.

February 25, 1974: The Elementary Classroom, ages 6½ - 8

On Monday morning in the elementary division, major presentations are made to larger groups of children, who appear to be divided according to age or general progress. At 9 o'clock what appears to be the oldest group of 10 children are seated with one teacher for an introduction to a mathematics material. We observe Mrs. Honnegger's presentation of the vertebrate/invertebrate charts with four groups of children, each involving about ten children and each on a slightly different level. The youngest group of children are working independently at tables when the morning's observation begins; but later they come for the animal kingdom presentation. Thus the character of the morning is that of group work, the positive beginning of another week.

The different levels on which the vertebrate/invertebrate charts are presented is of particular interest. The first group is aged about 7. The presentation begins with the review of several animals with the story cards. Because the information is fairly well digested by the children, the review itself, besides providing a good introduction to the chart work, is a reading exercise. First the labels are matched to the picture cards. Then the children take turns reading the stories. Mrs. Honnegger carefully redefines the difficult words as the stories are read in conversation with the children. When a child reads haltingly she stops him and passes the story to another, commenting that "You are not reading." The rebuke to the first child does not distress him, but seems rather to provide a kind of enlightenment about his own limitation. He listens carefully to the others read thereafter. Another child who reads with some hesitation is questioned at the end of the story, "Now, what have you understood?" This kind of review and the conversation that continues throughout the reading of the stories is a constant reinforcement of the information. When a particularly important point is made, Mrs. Honnegger leans very close to the children and whispers, "This is very important." And they listen very carefully. When the story cards have been put aside, the phyla on both charts are reviewed in a general dialogue. The children know it well and are eager to answer. There is a very careful way in which Mrs. Honnegger makes sure that each child really understands, a great care for the progress of each one that the children know and to which they respond. We are reminded, too, that the small size of such a group provides the opportunity for real participation by each one.

And so three more presentations are made of basically the same information in order to meet the needs of the children through small groups. At the close of the first presentation, Mrs. Honnegger organizes all of the story cards, pictures and labels together--- a rubber band around each of the sets---that the children have just worked with. In ten minutes the group comes back, one by one, to take these small treasures of information. And they return to their tables to copy the information of the story into their notebooks. This indicates perhaps that these are new stories---advance preparation for further progress on the chart itself---preceeding the actual chart work with a thorough knowledge of the individual animals. She also now displays the labels for all those pictures on the blank charts through the phyla. The next group, then, begins with a discussion of these divisions already labeled, beginning with the definition of the animal kingdom and finishing with an introduction of the mammals---the new. This is a specific characteristic of each presentation: there is a review of the old and then a progress to include some new information. This second group does not know the information quite as well---they are younger--- and they are directed to study the material so that they can see the Time Line of Life. The third presentation of the material is almost exactly the same discussion as the second. It is particularly interesting to see this work; having seen the children work so competently with the Tree of Life in the upper division. It is here that the foundation is laid for the broad understanding of such a large classification. In the conversation of this presentation, the same concepts are repeated and emphasized in new ways over and over again so that the details become as clear as the multiplication tables---and as logically organized.

The fourth presentation is given to the oldest group who have now finished with the long mathematics presentation. They are asked how much of the chart they know; and they indicate that they have studied through the amphibians. But as they begin to talk about those first groups of the invertebrates, the information comes slowly and poorly. They are dismissed with the suggestion that they study. I wonder how they study. Perhaps the short definitions are used in such individual work with the chart---these definitions have not been used in the presentations of the day. The chart is left complete with the labels when the presentations end.

February 26, 1974: The Elementary Classroom, ages 6½ - 8

On entering this morning's observation in an elementary classroom I had not previously visited, I proposed the question to myself, "Does it work?" If I were a visitor seeing a Montessori classroom for the first time, if I were an educational evaluator, what evidence would there be for the success or failure of the Montessori method. With that in mind, I noted carefully the first impression of the children at work.

This is a smaller classroom, the tables almost crowded along each wall, but the tables themselves large rectangles that seat up to six children with ample room for work. The narrow corridor between the tables in the middle still provides enough room for mat work on the floor, and already there are two such works in progress. Two girls are examining a nomenclature from "The Needs of Man" having matched the labels and now carefully reading the definitions for matching. These arrows seem less difficult than those used for the Time Line, reminding us that there should be a graduated reading difficulty in the nomenclatures which the child meets. The second matwork is that of one child, who sits in her chair next to the mat where she has laid out a zoology nomenclature of the turtle and, having matched all the materials, is copying the definitions in her notebook. At table #1, there are five children: one works with the stamp game, doing subtraction; one child has with him a prepared sentence board on which he has matched the word symbols and is now copying sentence and symbols in his notebook; the other three are writing carefully in their notebooks what appears to be original compositions. At table #2 there are only two children: one works with the first passage of the checker board, the second is busily coloring a map that she has drawn from the geography puzzle map of Europe. At table #3, a small table at the end of the aisle, three children are standing together with their notebooks before them, without materials, writing some calculations in the notebooks. At table #4 we can observe another stamp game operation and a second child copying red verb labels into her notebook. (We note that the presence of so many short written materials that give the possibility of copying new words encourages writing in a simple way. The habit is thus easily developed. This child copies with obvious enthusiasm.) At table #5 three children are writing in their notebooks, steadily, quietly. And finally, at the teacher's table, three children are seated across from the teacher as she presents the snake game for multiplication. Every child is working. Each one seems totally satisfied with his particular pursuit. The diversity of materials increases as the morning progresses: we see the subtraction memorization materials utilized, the decimal system bead materials, several other nomenclatures, picture cards.

Of special interest to this visitor might be the immediate impression created by the various wall charts displayed in the room. Not only does it indicate all the activities that are being considered at once by this group of children; but it creates for each of them an environment of interest and invitation, a reminder of all those things possible for work. The wall charts provide a permanent visual storehouse of the learning experiences in which the children are engaged. We see the zoology nomenclatures, several from The Needs of Man, the geometry nomenclatures through the first lines, many phonogram wall charts, the botany nomenclatures of the plant, the types of roots, the parts of the leaf.

And if he is not yet convinced, there is further evidence of the marvel of this method. Close by us two boys are at work with the picture cards from the animal series. The first is studying the picture and the corresponding story. After about ten minutes, he hands the story to the second and asks him to look at the story while he repeats the information. The process is repeated several times with two other cards/stories. These two boys are seven years old. And, in fact, this group seems to be predominantly 6½ to 7½. On the tables are strewn the children's masks and hats, this being the last day of the carnival. It is interesting that on only one occasion does a child even take note of the paraphernalia and that is to move her fairy wand out of the way so that she can continue her work. Finally, there is a reprimand---the teacher asks for quiet. The noise continues. She announces that there shall be five minutes of quiet sitting and NO ONE CAN WORK. The children put down their pens and wait. When the time is finally done, everyone eagerly resumes the work. This is the real punishment---that one is not allowed to work. And, in fact, after this short moment, the quiet is reasonably improved. But it is not so much in the result as it is in the remarkable character of the reprimand.

On the chart we read from 0 at the left, representing birth, to the omega sign at the right. The line is a ray going to infinity until such point of death which terminates the life and makes the line segment. Each of the four segments into which the line is divided is equal. The flame at zero represents the center or the psychic "charge" or life of the individual.

A line intersects 0 and diverges from the line of life. This is the LINE OF PROGRESSION. The farther it goes, the farther it gets from the line of life. It represents the progression of particular sensitivities, those which have not existed before nor will they exist again. At a certain point, the line becomes convergent and returns to the center line, thus creating an area of development. And it is within this area of development represent the major possibilities for developing the characteristics of the child at this age.

The most important element of the graph is the changing direction of the lines. When the line begins to converge, and the direction is changed, we have an interruption of certain sensitivities. But this is not negative. It means that there is a new progression originating. At the vertex we have the maximum expression, the maximum development of the child's characteristics during that age-period. The progression alternates with the regression, the line from the bottom back to the center line; and then we see another progression begin. It is at this turning point that we have the fall of the old sensitivities and the advent of new characteristics. It is important to recognize that the rise and fall of the capacities, the particular sensitivities is totally independent of the will, but is, instead, biological in nature.

Montessori divides the first and third periods into two smaller triangles, naming within each one of those periods a first and second period of development. These small periods of development she saw as a parentheses of life which open and close repeatedly; a series of births and deaths.

Her concept of the development of life was three-dimensional; the graph itself having a real spatial quality.

The graph below that which depicts The Stages of the Ages in Evolution represents How the Society Provides Education for the Child. Sections might be marked off here indicating the particular divisions of the educational system which are followed in a particular country. The sections will vary from nation to nation. The vertex of the angle, for instance would correspond to age 7 in Switzerland, for that is the time when the education for the child begins. In the United States, the vertex would fall at about 5.9 years, the beginning of first grade. Then on the graph for the United States, we might mark that line which shows the beginning of Junior High School at age 13, another at age 16 for the High School and a final one at 18 or 19 to mark the beginning of the University experience. It is interesting that Montessori also uses a color on the bottom graph: grey. Grey to indicate the uniformity of the scholastic approach---and how boring that uniformity is. "The monotony of education."

On this second graph Montessori explains that the area between those two diverging lines is the educational field of action organized by society. There is one point in common: ~~the vertex at the origin of the education.~~ We think of this child's first day of school, taken by mother's hand to meet the scholastic community which will dominate such a great segment of his life. The origin is "the first day of school." It is the beginning of scholastic life. From here the line goes up like the steps of a stair. From the educational and religious point of view, this road takes one to perfection---without flames it takes the child tiredly along the straight road of monotony. And in this inclined plane is represented the constant enrichment of the potentialities and the knowledge acquired through life. The inclined plane divided into big blocks represents the main scholastic levels with exams between each to see if the person has acquired the necessary information to go on. The last block is divided into horizontal strips, representing the different fields in the university.

Which brings us to the unusually fine quality of the teacher here. At one point there is a disagreement and a small girl is sent to her seat. She begins to cry, declaring the fault of the other. She is genuinely distressed. The teacher takes her close by the arm and brings her close. Her face is totally animated as she speaks softly and intensely to the child. The bruised feelings begin to vanish visibly from the child's face and a new peace comes, not just for the one child; but in a way for the whole room. This is a teacher with a personality of a rather terse character: she often speaks abruptly to the children and verbalizes her expectations with no hesitation. And then suddenly, in this moment, all the interest and concern springs to her face for this one child and we are wrapped in the genuineness of her caring. For me it is a moment of recognition: a reminder of the real role of the teacher. That the material does not live, but is brought to life by the interpretation of the teacher. That she is the living element in the classroom and the link between their own small world here and the whole world of adult life. She somehow connects all of the children's school experience with the world into which they are "becoming." And as such, the strength of her character, and the realness of her personality, become vitally important in the classroom experience. The personality here is memorable: her face is strong and pretty and she laughs and scolds alternately. But her manner carries the message: "I have chosen to live here with you all. We have very important work to do. But isn't it good to be together."

February 27, 1964: The Secondary Classroom, ages 8½ - 11: Mathematics

The visual experience of this classroom is noteworthy. Mathematics comes alive in color and form in the wall presentations, many of which are done by the children. It is a reminder of the concreteness of the Montessori method, even at this level of abstraction in many areas of the children's work. That is, the cabinet of powers is still present and, though it looks as though it is seldom used, it remains as a point of reference, a reminder of "how we arrived at this point," and it continues as a help only as a point of visual impression. The illustrations on the walls again show the visual representation of important mathematic lessons---there are fewer ciphers, more shapes, figures and color representations which represent calculations. Examples are the hierarchically colored square root designs, the carefully designed fraction calculations drawn according to the circle insets, and constructive triangle charts, visual representations of points in that work. Many of the children in the room are working only with notebook and pen; several writing and calculating written problems of measurement. For this work there is an occasional experiment: a child strides across the room lengthwise and crosswise, comparing the distance according to his number of strides. Others are quietly at calculation. But the materials are significantly present. Two younger children work with the metal insets, doing the first geometrical work of equivalence, trying to draw in their notebooks a figure equivalent to the house they have drawn on the opposite page. They are, in this work, tracing around the entire inset rather than marking the vertices. I want to suggest that they try another way and see the precise results. They are more interested in the problem of equivalence. Two children spend the entire morning with the large peg board. I wish I knew what they were doing.

The most interesting observation of the morning is the characteristics of the children in contrast to those younger ones with whom we have spent the last four days. The children now are of irregular sizes: the boys, in several cases, have grown very tall and broad. And several of the girls, too, seem to have grown tall, their faces taking on a more thoughtful countenance. As observed before, the "best friend" phenomenon is the social factor. The children are working in pairs that do not change throughout the morning. One girl--- notably the same red-haired girl seen working happily alone on the first October observation with these children---is again working steadily without a second. She is very seriously occupied with the metal insets the entire two-hour period, coming only one from her place to ask a question of the teacher. Her face reflects no pain of the social exclusion and so perhaps there really is none. But her quiet work commands the attention. The others, working in couples, exhibit a considerable amount of sociability. Often the work seems to be the topic of discussion; sometimes not. Overall, though, it creates a casual atmosphere of friends together and the low hum of the conversations never is disturbing. The socialization process here is obviously a part of the learning experience. We note the teaching that the children do for each other, too: one boy cannot see his mistake until his partner does the same exercise another way. Then he asks for an explanation and a light of understanding is obvious on his face. The physical nature of the child seems to be a particularly different one at this point, too. Playful exchanges of friendship often took the form of a playful pinch on the cheek or a nudge under the table. And hungry!!! By 10:30 salami sandwiches and crackers were being pulled out of every drawer. The children are changing in many ways during these years.

March 4, 1974: The Elementary Classroom, ages 6½ - 8

This is Monday morning, but the collective lesson is not given, nor are any large group lessons observed. It would have been interesting, however, to know the beginning of the work in this classroom; for at 9 o'clock the children all seem to be working on a similar project: a composition in their language notebooks, the general topic of which seems to be a description of their house, and an accompanying illustration. It seems to be a pleasant task for most of the children, though two children are obviously struggling with words and require the whole morning to complete the task. These particular two children, either from real difficulty in handling the work or from a general problem of settling upon the task, are restless and unable to really concentrate on the job at hand. The others begin to finish gradually, one at a time, as the morning progresses. And slowly the work in the room begins to diversify. This kind of a beginning for the morning has several advantages. The children have a starting point with which to resume good work after the weekend. Therefore, no time is lost in reorienting and serves the same purpose as, perhaps, a group lesson at this point in the week. Secondly, this writing task is handled more easily by some, so that they complete the work one or two at a time. And as they do so, the teacher is able to help guide their next project or suggest a particular direction as they find the time available for continuing work of one kind or another. In this way she is able to speak to and help, if necessary, each child as he brings his completed composition for her inspection.

And so we begin to see several interesting activities begin. Two girls bring out the work materials of Sentence Construction. These include the box of wooden circles and arrows, though only the verb circle is put out. Perhaps the other circles are not here included. This series, then, has those arrows on which are only written the questions, the formal naming of the parts of the sentence not yet begun. Secondly, two forms are brought: both those reading "Question and Answer," but one is a completed form, showing the questions and answers of analysis of a sentence, apparently used as a guide. The second form is blank. The two begin by laying out the verb circle and then all the arrows around it---perhaps they have seen the chart in such fashion. However, they are lacking an important element: the sentence to analyze. And they seem to have very little idea of how to go about the exercise. Thus, they begin with the form, writing "What is the action?" and then, puzzling over the answer, decide on a verb. They proceed to the next question "Who is it that?"; but now they are really stuck. At this point the teacher intervenes; and, seeing the confusion, brings out another set of materials, the paper slips, and makes a presentation of the material. She begins with only one of the girls, suggesting that perhaps the other has worked previously with this exercise, and gives her only a sentence. But soon the second also joins to hear the presentation.

Several other interesting activities are in progress: Two boys are working at different levels with "How Man Satisfies His Needs---the Stages of Civilization." One is working with the placement of one picture-arrow series on the time line strip. Another is laying out a second booklet of picture cards and arrows, reading the information carefully, indicating his first experience with this group. Several children work with the snake game of multiplication, and in their notebooks, when check is made, they write each of the calculations which gives the total for the check:

$$\begin{array}{r} 3 \times 5 = 15 \\ 4 \times 6 = 24 \\ 2 \times 8 = 16 \\ \hline \text{Snake total} \quad 55 \end{array}$$

A presentation of this game is made to two children the middle of the morning. Another child works with the memorization multiplication materials in the class, and still another with the checker board which indicates a great diversity of levels of progress among the children of the class in mathematics. And also indicates the long work of multiplication learning. Both memorization of subtraction materials and memorization of addition materials are being used, too, as well as the stamp game. Several children continue with language work: one matches symbols to a prepared sentence chart and then copies sentence and symbols in his notebook, one child writes information from the story card using the corresponding animal picture from the vertebrate charts, and another child is reading a book. In this particular classroom there seem to be, as on another morning's observation, an excellent balance of language and mathematics work.

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THREE of the children seem to lack total confidence about the information being thus expounded. The others wave hands to answer and, when they cannot command the speaking spot soon enough, their little gems of information spill out anyway. And so the dialogue has the character of a stream merrily tumbling along a rocky bed, chattering excitedly, swirling in tiny whirlpools here and there---but always moving ahead. Overall the recitation is given exactly and completely. If a small fact that the children have discussed is not mentioned, Mrs. Honnegger questions to draw it out. Nothing is omitted that the children know. And, of course, in the repetition, they come to know it all more thoroughly. And we must remark that important affection of the mind: we love what we know well. And so it is that the charts around which the children sit are fast becoming dear friends. When the new presentation is made, the children lean into the material closely so as not to miss any detail of the friend in its unfolding.

Before moving to that point of the new, however, we note the many prior presentations which culminate here in this morning's lesson. The "God With No Hands" fable is indicated by the impressionistic charts. The time sequences in the study of history have proceeded the introduction of the Clock of Eras, and the corresponding experiences with the Strip of Eras. The Invertebrate/Vertebrate charts have been well-considered, though not completely presented. We know that, having seen some of the participating children in a recent group lesson with these two charts. They do know well the phyla and have considered the details of the invertebrates, including a notation of the various classes. So their work will continue with those two charts, staying well ahead of the animals as they appear on the Time Line. Finally, it is obvious that the Time Line itself has been considered according to the presentation of the general view and the specific consideration of the details of the Age of the Trilobites. That is, the first two rows of titles and the overall plan of the Time Line is well understood. The children know the red lines and their meaning, the glacial periods, the general organization of time. . . the review continues. In fact, it constitutes 95% of the lesson.

Mrs. Honnegger asks finally for quiet, for her 5%. She points out the details of the Ordovician period, beginning with the etymology of the name and working through the cephalopods and all the tiny figures shown during this period on the chart. She is abrupt with the child who interrupts---it is her turn now. When she completes the explanation of this new period, she immediately begins a verbal review of what she has just explained. The review serves not only to reinforce the information just presented, but also serves for the newly arrived group of children, about five coming from another lesson. The newcomers are eager to know what is new today, but there is no time to repeat the information. However, the repetition is being made by the children themselves.

As the lesson comes to an end, Mrs. Honnegger has a very serious word with the group. She tells them that they must study. That the work cannot continue unless EVERY child in the group understands what they have previously discussed. That they must all work during the next week and study the new lesson of today as well as the old material which they do not know well. She gives several suggestions for this work: studying the animal picture cards, reading the stories with each one and copying those stories. Studying and copying the information on the arrows which accompany the Time Line. Assembling the Clock of Eras and working with those arrows. She not only encourages them to study; she insists that they must if she is to continue working with them. She dismisses the group with the exception of three who are asked to stay and put away the materials. We wonder if there are also materials with which the children can review the lesson on the fable and the impressionistic charts.

There is one boy in this circle for whom we have particular concern. Yesterday he was scolded for not working until he laid his head down and cried. Today the whole class has gone to gymnastics and he has been left at his place, at the table beside the teacher. During the lesson, his face was bright and interested; and occasionally a part of an answer seemed to come to him, but he was reluctant, perhaps afraid to speak. It is obvious that he works poorly. He was working poorly in October. But are we really meeting his particular needs? his particular problems? Or are we seeking merely to bring him into line, a task which may be too great for him, a case of treating only the symptoms and ignoring the sickness?

March 6, 1974: The Secondary Classroom of Geography, History and the Sciences

In this classroom, as described in a previous October observation, the impact of the quantity of materials is considerable. We remark now on the use of those materials, recognizing many more of them at this point and being able to note how the children handle them. There is considerable work in progress on the Time Line of Life. And it is interesting that now, instead of only the arrows and the various picture cards which the elementary children use to study this line, the children read from a series of small books. The first is entitled "The Time Line of Life, Presentation," which must contain the description of the phenomena depicted on the line, the actual facts that have been presented to the child. The second is entitled "The Principles of Social Life." The third, one we are able to briefly examine, is entitled "The Force of Love: The Marvelous Tale of Evolution." The text begins: The principles which govern the world (universe) are laws so inexorably fixed that we are able to subdivide them: 1) the force of love in evolution, 2) the cosmic task assigned to evolution, 3) absolute obedience in evolution, and 4) universal intelligence which guides evolution. Beginning with a philosophical discussion of cell division, we assume that this booklet proceeds to describe the events of evolution on the time line in an overall scope of the philosophical implications. I wished for time to read the entire presentation. . . and hope that somewhere there is a translation. In a mid-morning presentation, the teacher uses the last two books of this series in connection with a botany presentation.

The Time Line of the Great Civilizations is also displayed and in use. In addition to arrows which direct that specific work, there is an extensive material which develops each particular ancient civilization in detail. It consists of a series of four large charts, the first stating two questions and the others only one. Then there are rectangular spaces on each chart where the sub-questions are asked which expand the larger question area. And in these spaces the children place the corresponding answer cards. The organization is as follows:

- I. What was the Natural Environment?
 - A. How was the terrain?
 - B. How was the climate?
 - C. What was the flora?
 - D. What was the fauna?

- II. What were the principle activities of the people?
 - A. What was the agriculture?
 - B. What type of industries did they have?
 - C. How did they carry out commerce?

- III. What were the expressions of their civilization?
 - A. What language did they speak?
 - B. How did they write?
 - C. What was their religion?
 - D. What were their festivals and ceremonies?
 - E. What were their religious influences?
 - F. How was their literature?
 - G. What was their art?
 - H. In what sciences were they interested?

- IV. What was their system, their way, of life?
 - A. How did they dress?
 - B. What did they eat?
 - C. How were their houses built?
 - D. What kind of furniture did they have?
 - E. What were their tools?
 - F. What was the family organization?
 - G. What was their educational system?

- V. How was their society organized?
 - A. What was the origin of the people?
 - B. Why were they established in this region?
 - C. What was the organization of their government?
 - D. How did they get along with other peoples?
 - E. In what wars did they engage?
 - F. What was their social hierarchy?
 - G. How was their military developed?

Questions

Wolfe

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The corresponding cards on which are typed the answers to these questions for each civilization are grouped according to the civilization. That is, there is a bundle tied with a ribbon of these cards which are all about the Sumerians; another for the Romans; etc. Each of the four large charts are color-coded with an edge trim---and those index cards in each civilization set are also trimmed in the color of that chart to which they are matched. Therefore, the only real distinction to be made is which answer to use for each of the questions. It is not, then, a vertical study of what is happening simultaneously in civilizations, nor is it a comparison. Rather, it is a thorough study of one civilization at a time.

The questions prove the thoroughness of the material. And it is new, which makes it particularly nice to handle and read. However, we wonder if perhaps this is not a case of excess material. Here the research is completely done. The amount of information is considerable and surely very interesting to some of the children. But would they not learn it better and sustain their interest in it better if they searched for this important information in the extensive reference books available in the room? There is so much material prepared for them: the nomenclatures and the arrows and the study helps are in abundance. And all of these things represent vital information. It is obvious that each child is expected to learn it. But what about all of these great civilizations? Would it perhaps not be better for the child to choose one, to research it thoroughly and thus to appreciate his own work and personally gathered knowledge than to try to handle this completed work of another? If he truly understands one civilization well, will he not be able to understand the fundamental structure and phenomena of another---perhaps at a later time?

The teacher spends the entire morning in a series of presentations, another indication of the tremendous amount of material there is for these children to digest. First she presents several of the geography charts with a group of eight children. The presentation is again a group dialogue of previously gathered information and some new elements. The group then proceeds to the experiment table and watch sugar become carbon. A second group is called for a botany presentation. The class is apparently divided into groups to facilitate the work and to keep some order in the materials presented to each child. The groups seem to fall generally along age lines. Finally a second botany presentation is made on the floor with several of the nomenclatures spread. As we leave, a fourth presentation is begun with the Time Line of Life. The independent work of the children with these materials seems overall to be steady and good. But it is limited to the specific materials. I wonder why no one is reading a book?

March 7, 1974: Still in Geography, History and the Sciences

I Change My Mind. I understand the research material for the great civilizations as described in the previous observation. There are, in fact, only four prepared sets of the answer cards: Sumerians, Greeks, Romans, modern Italy. The particular value of this material is the model that it presents for research. The answers are carefully written to demonstrate clarity with brevity. Thus the child begins to understand, through these answers, HOW TO RESEARCH. It is an organization that provides him the keys for his own organization. It is important that we use this material with this very aim in mind. The questions themselves will give to the child a pattern for his research throughout his secondary years.

Today I have discovered the garden in this room, the young green plants coming up in bunches and neat rows in the deep rich humus that the children have prepared. Mid-morning several boys (why all boys?) are breaking up bamboo sticks to lay between the rows in the two flat beds---one a deep glass case that may be an old aquarium, another large shallow wooden box. As the boys work, they are observing the growth of each of the types of plants and discussing. Some plants are relabeled. It is interesting that the labels made for each species state the phyla, class, order and species. Here is the botany nomenclature as a reality---a very important kind of experience. It is obvious that the children have an excellent understanding of the plant development, too; as they demonstrate in a skillful transplant which occurs shortly hereafter on the terrace outside the classroom. Four boys together, which means eight hands, bend to the task of the transplant. The humus is carefully loosened and placed in the pot; then the flowering plant is gently divided, the roots freed, the dying parts of the plant eliminated, holes

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set for the plant with sticks and the little plants neatly tucked in. It is deftly done, all hands sharing the work and the cooperation remarkable. I hope they have somehow helped prepare the soil: their work reflects real knowledge. And there is nothing more important for a child to learn, in my opinion, than how to grow things. The garden itself indicates that this learning is really happening.

A particularly interesting discovery in this room is the lists of the week's work posted for each grade level. This morning, as others in this room, has been a series of group presentations. After each presentation, there seems to be some difficulty for the children to redirect their work into another channel; the transition is often a noisy period, and some children spend a great deal of time beginning something new. However, these lists of the scheduled work for the week provide a real help. Often the children go in twos or threes to consult it. And we see in this room of such a wide variety of study, that such guides are a necessity. The work plans given for each level include projects to be studied or completed in each subject area. As a result of this plan, we are able to better organize the work that the children are doing and we notice that the specific exercises going on are markedly different from those of yesterday's older group.

Today it seems a wonderfully free, yet disciplined enthusiasm for the learning to be done. Except for those transition periods of beginning when a group lesson is finished, the children work steadily and well. At 10:30 we note the following activities: 1) 4 girls working with a topography table map on which are shown the actual reliefs of mountains, etc. With this material they use the geography nomenclature which include the picture cards of the various mountain reliefs and types of valleys, labels for naming each of these, short definitions and an accompanying book which must include the labels and definitions together as a control. (This geography nomenclature is scattered in the classroom; many of the picture cards displayed close to the various landform maps as used here; and the small control booklets found here, too.) May reflect a lack of accompanying wall charts.) 2) two children working with the botany nomenclature on a floor mat, reading definitions and matching to the picture cards. 3) three children with the Time Line of Life, reading from one of the accompanying guide books, 4) the boys are working on the garden, 5) group of 8 in a group lesson, 6) several children working at tables with the map of Africa, noting rivers, drawing the same on maps. Of all the activities throughout the morning, the Time Line of Life is most often used and studied. It has remained on the floor in use during the entire morning today and, on other mornings as best as I can recall, the same situation was true. It is interesting that this continues to be such a major study.

Other material notes: 1) A small book for the study of the strip of ancient civilizations. 2) An interesting research posted on the Ruins of Ur with excellent accompanying illustrations. 3) A small story book called "The Story of a Drop of Water" recounting the Montessori take about the crisis of calcium deposits when each of the elements claim that they are not responsible, but only doing their job. Finally the corals begin to fix the calcium. The ending of the story notes that at this point in history, still all the life was in the water, the earth still naked, but the crustaceans are appearing. It is an interesting example of the way in which the real information can become a wonderful story of the marvelous ways of the universe. 4) Three topographical table maps noting which seem a very good tool: The Coasts, The Ways of Water, and The Mountains (here the Alps and Pre-Alps.) 5) Another story book: The Appearance of Man on the Earth. (without time to read it, we are sure it too would be interesting reading.) 6) Another story: The Great River, which begins with a description of an amazing nation which is connected in a remarkable way by this great river. "What is this strange nation where concordance reigns, where there is such harmony in work? What is the great name of the great river which flows through it? The strange nation is our body and the great river that flows through it is our blood. And who are these strange inhabitants who work day and night without complaint? They are invisible to our eyes; they are millions and millions; and they all have the same name: cells! The cells are not only the sole inhabitants of this nation, but they are the inhabitants of the entire universe. Of what are each of these inhabitants made, each of these cells? In appearance alone they seem to be just a little water, (to hold just a little water??). But in their secret there is the possibility to construct everything that exists."

March 11, 1974: Secondary History, Geography, the Sciences

I cannot resist the group of some twenty-five children gathered around Mrs. Honnegger on this Monday morning in the history/geography/sciences room although I still have not seen language in action yet on this secondary level. The large circle is formed around the Time Line of Life, a mere strip of cardboard that we have seen in presentation and discussion many times before during these four weeks. But today the dialogue is in another vein: it is a cosmic review. It is based on the children's study of the two books: *The Force of Love: the Marvelous Tale of Evolution* and *The Meaning of Man's Appearance on Earth*.

We miss most of the introductory comments. A child is recognized to begin a recitation of the *Force of Love*. And he does so, speaking with considerable expression in spite of his speed; word for word spilling out the information which by now has so many implications for the children, having studied this time line for several years. When he flies through a paragraph of particular note, Mrs. Honnegger arrests the recitation for a moment and clarifies the idea. The child understands it well. Others contribute. She speaks with intensity about the idea of cell division: that when the one cell simply divides, the result is two that are the same. But that through nature's wisdom, the union of two diverse cells is the solution and the provision for the new being, the new existence. As the tale unfolds, the children are eager to add information, to answer the questions which Mrs. Honnegger puts forth to expand the recitation. Of particular significance is the response of the group. About half of the group want to speak most of the time. The other half seems to be quietly listening and contribute occasionally. But the response on the whole is not simply an enthusiastic one, but a thoughtful one. The questions which the children ask reveal an indepth consideration of the implications of the "tale of evolution." There is a long discussion about the fact that language must be agreed upon by a group in order to have value. The girls tend to personalize such information; the boys tend to generalize. They all seem able to relate the principles and ideas presented directly to the situation of their own lives. The *Meaning of Man's Appearance on Earth* is discussed subsequently. It is a discussion centered around those things which man brought in his unique way to the course of evolution: his two free hands, his reason, his imagination, language, the possibility of constructing his own instinct, the social group tendency and dependency. By the end of this discussion, the topic was very topical: it was about drugs, about habits, about modern man's boredom and the boredom of youth, it was about having too much money and about the will to work. To this point, Mrs. Honnegger had very skillfully kept the conversation on a center track, bringing it back when it veered too far from the central thrust of the lesson. Now she allowed the children to expand their discussion into the areas of their own lives where it seemed to have great meaning for them.

We reflect, first of all, that the child of this age is keenly aware of the problems and possibilities of social living; and needs to talk about them. So, too, is he gaining a new personal sense of himself which needs definition. Secondly, we see the potential of the Time Line of Life in a new way. As we interpret philosophically the forces of evolution pictured there, we are offering the possibility to deepen understanding about the social and the personal life of men; and we are doing this by providing a wealth of real facts about real things from which springs the interpretation. It is important, then, that we be as certain as one can be that what we offer the children in our facts about this material---and all others---is the truth. And that we give them plenty of opportunity to extract their own truths. Finally we see, as a kind of revelation, that the Montessori psychology, the lessons which we must understand as teachers, is a real part of the curriculum for the child, too. Gradually he comes to understand the phenomena of the psychic embryo, the horne, the human tendency towards perfection and all the rest. It presents very interesting possibilities. And then, when the children have sat here for two hours in conversation with Mrs. Honnegger and beg for more in spite of their dismissal, we begin to feel a growing reverence for the beauty of the method itself. And a particular appreciation for the extraordinary ways of Mrs. Honnegger.

There is a finale to the morning. The children have prepared a brief sketch, built on the legend of a particular Germanic king of Italy. A child reads the scenario, then another reads the poetic version of the story and others portray it, with lines perfectly learned. And we note that every child in the room seems to know the poem.

OBSERVATIONS. . .

March 12, 1974: Scuola Media

This is a most unusual morning of observation in the Montessori school. We know for sure that this is a state school; that is all we know for sure. It has been stated that the school is run along the lines of the Montessori method. And, in fact, in our observation in the biology/chemistry room supported that theory. The environment in this room was alive with materials, experiments, specimens, handwork of the children. The program of the day began with a presentation of slides from the local botanical center. Two boys handled the projection equipment while the teacher commented briefly on the slides of algae and ferns, asking brisk questions that were promptly answered. The children were interested, quick, thoroughly knowledgeable of the material. There followed an experiment with chromatography. The class had prepared an extract concentrate by soaking spinach in alcohol. Using this concentrate of chlorophyll, then, they used droppers to show speed of diffusion on blotter paper, the result showing the chromatography of chlorophyll: the outer ring of xanthophylla being yellow, the chlorophyll alpha α a clear ring and the chlorophyll beta β a greenish tint. The experiment itself required considerable time and patience and was carried out successfully by each of the twenty-odd students. β The teacher then demonstrated the same phenomenon with the extract shown in test tubes separated into layers and concluded: through the process of chromatography, one can determine the component substances of a particular solution or compound. The children wrote conclusions in their notebooks. Next an investigation of various types of lichens, obviously prepared by the children themselves, was made with the help of two fine microscopes. The work throughout the hour and a half was stimulating, thought-provoking, active.

But our own observations were partly hampered by a lack of understanding of the composition of the class itself. Three children in the class were almost totally blind. The use of a braille type machine indicates that there is a very special program here for this handicap. The age range seemed particularly broad; we wonder what the age span is. Perhaps what we see is that unusual type of the physical growth which comes in spurts during the years 12 - 15 specifically. At the same time, there were several other indications that the school included a number of special cases. This was particularly true of the second classroom visited, a classroom so barren of materials that we were not able to determine just exactly what subject area it was intended for. Since there was almost ~~work~~ no work underway, we received no clues from the students either. And here there were two extremely large boys, some very small, younger-looking ones, three girls of unusual sizes. It was at this point that the morning became a real guessing-game. Our only conclusion is that surely these are not the children who have been in this Montessori school on the floors below for x number of years. The work in this room, whenever it appeared in a notebook or two, was far below the excellent standard of work in the lower grades that we have seen. The children's own belongings were in disorder, notebooks covered with scribbling, and the teacher, as she quietly and patiently moved from one table to another in discussion with the children; did not seem to have any particular expectations for their work. On the bottom shelf at the back of the room were two sets of encyclopedias that looked out of place and seldom used. On the wall was a cardboard time line of political world history from the year 1772 - 1972. It was a specific compilation of wars, grey and visually dull to correspond with the sequence of events it presented. And what were the children doing? We do not know. Is it the poverty of the state school? Or is this a kind of study hall? Or is this a very special school for exceptional children? If it is an approach to Montessori for the child after age 12, there is still much work to be done.

March 13, 1974: The Secondary school: The Language Room

It is nine o'clock Wednesday morning in the Language room---and everybody's bored. Of 26 children, three seem to be actually working---that is, writing---because they are seated at the teacher's desk. Six others are working sporadically, with several sentences in the notebook to account for the morning. The remaining seventeen children are visiting happily with each other. The conversations may perhaps be classified a language exercise; but these are children who love to work. It is their habit. When we see them in the mathematics room or the history/geography/science room, their time and attention is fully captured. So their faces, though cheerful enough, indicate a lack of something good, something important to do. One has begun pasting figurines; another two have begun drawing pictures of the pretty teacher. They look as though they wish she would notice

them and scold. The children are restless; too noisy. The teacher's response is a "ssshhh" which goes unheeded. And she doesn't seem to notice that no one is working. She is young and seems yet too timid. There is a need here for a strong directive towards the responsibility to work; perhaps a need for a new strike at that imagination.

But that is not the only trouble here. First of all, it looks so traditionally like the "grammar study" room of old. The charts on the wall are carefully prepared---of the verb tenses, and the pronouns and the many ways to use "that, what, who." There are two neat examples of the good composition on the wall. There is, on the shelf, some material--- grammar boxes looking seldom used and a verb box and two containers of labels. There is a lovely yellow display of camomilla on the desk---a Bergamo phenomenon that we shall long remember. And there is a row of books on the shelf behind the teacher---big thick books, each looking like a grammarian's handbook.

A child in the next room finds it necessary to extend the Time Line of Life into this room for lack of space. Immediately the two children who can see it from their seats at the table abandon their friendly chatter and point out enthusiastically several things they can see on the Time Line portion closest to them.

Which is a case in point. Given only the above description of the room's equipment, one has a clue that in this room there is nothing interesting to write about and yet writing is obviously the expected activity. What can one do with the ten functions of "that" if one has nothing to say? Nor are there any books to read. I am constantly perplexed by the absence of books to read. It seems to me that they belong particularly in the language room.

Or perhaps what is more true is that there should be NO language room. Given that every discipline---geometry, history, botany---is merely a formally organized and specialized system of language to describe a particular set of phenomena. That, in the study of each subject area, the children, in order to study in depth, in order to use and learn with the materials, must, in fact, use all their language skills. They must read arrows and definitions and books for their research; they must write the record of their observations and investigations. They must speak well in order to put into practice their increasing skill with the specific terminology of that subject. Not only are these three major areas of language fully utilized elsewhere in an essential way, but also the secondary elements of a language program find many roads for expression in the various subject areas, as demonstrated by the children's poetic drama of the King Theo---on Monday. And why should not our consideration of history include its finest literature as well as an interpretation of history in prose and poetry? How easily we make poetry an anathema by estranging it from the real things. The child begins to suspect that "poetry is thin air, signifying nothing." It is a false impression that we create in a "language room" such as this one. We have confused the tool with the work---and in that misdirected exaggeration we are somehow selling the beauty of the language and its power short.

Finally, we have seen the vigor of the language study in the work of the children at ages 6, 7, and 8. We see this as a result of their own interest in language, that reflection of the prolongation of their sensitive period for language; and a reflection of their integrated learning experiences. In the classroom, the study of The Needs of Man is happening on the mat beside the child who today must WRITE a page. But there and all around him is a variety of impressions which give the subjects, the real matter of composition.

Now, at 8½ - 11, we have not only gone beyond the real interest potentiality for such a detailed and specific study of grammar as this, but we have also isolated it from that which it is supposed to express.

From time to time in this morning's classroom, a child is able to regenerate and begin another sentence. But spontaneity it is not, nor concentration, nor is it the real study of language.

THE FOUR PLANES OF DEVELOPMENT. . .

We note on the second graph the arrows which increase gradually as the line approaches the end. These indicate the increasing quantity of subjects the pupil must learn and the number of teachers related to the pupils of different grades. According to the graph, it seems that the elementary child needs only one teacher, but the university student needs many. In other words, the older person gets more specialized personnel which he needs to teach him; and the young child has the minimum.

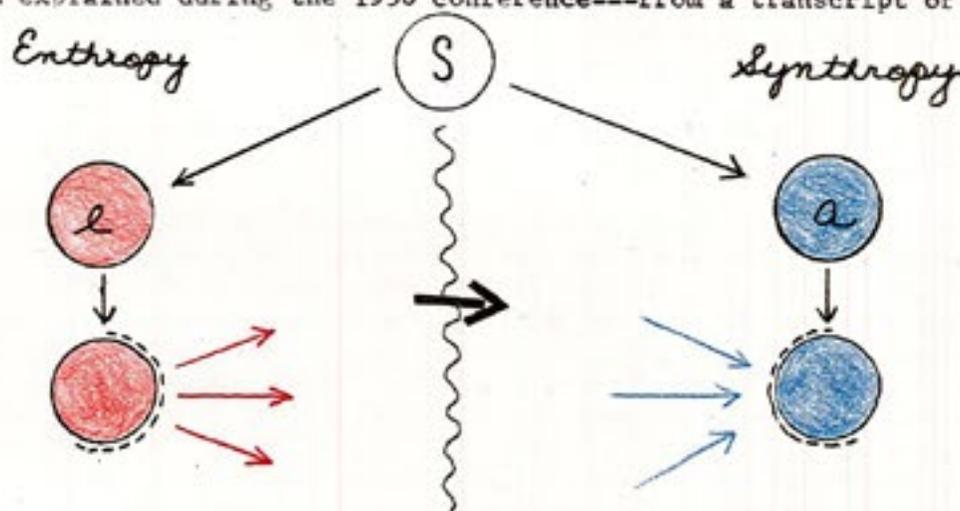
The two words on the chart: Finality and Causality represent a problem of two contrary concepts. There are two other words which we can use for this particular phenomenon:

Synthropy = Finality
Enthropy = Causality

We must carefully define these four terms in relation to physics; then we can apply them to education in general and finally to the Montessori method in particular.

From the linguistic point of view, entropic and synthropic have a common part: thropic which is a Greek adjective derivative meaning "to turn towards." (tendenza a volgersi traverso a determina direzione) "The tendency to turn towards a specific direction." The word phenomenon means "that which manifests," "a manifestation of nature." Then "thropic phenomenon" is a **manifestation of nature having a tendency to turn towards a specific direction.** The answer to the question "what direction?" lies in the two Greek prefixes "en" meaning "towards the inside" and "syn" meaning "they go together; connection, union." Relating these prefixes to the definition we have: **Entropic phenomena are manifestations of nature having the tendency to turn toward the inside. Synthropic phenomena are manifestations of nature having the tendency to turn all together---to meet.**

We examine the physical point of view on these terms with a chart of Montessori presented and explained during the 1950 conference---from a transcript of that session.



The circle is the image of the sphere, representing a source. The source is established. The source may be of two different kinds: **emitting or absorbing.** There is a problem: we know that the emitting source gives light, heat, perfume; but it is difficult to understand that there is also an absorbing source. The arrows shown in groups of three are like convergent and divergent rays. If the center arrow is the meeting source, I can identify these three arrows as waves. The red are divergent rays emitted by a source and dispersed. Then all around that source is the zone of the release of energy. The second blue arrows (3) are convergent. We may suppose that we are encircling a courtyard and must suddenly meet in the middle. The air then is the absorbing source. Our convergent arrows could be shown all around this sphere. The surface of the sphere represents the absorbing area. In both cases, we represent the energy with waves.

OBSERVATIONS. . .

March 14, 1974: Two Elementary Classrooms

It is the last day of a month's observations. The children's faces of this morning have grown familiar. There is a nostalgia for the end of the association with the important and exciting work which we have just begun to appreciate in many ways, at this Montessori school. There is a wish to see just once more each different classroom of which we have been an invisible part. We manage only two.

First a visit with the American children's class. I discover that my son has truly learned to read. This morning he has written in his notebook probably two hundred words, examples of various phonograms. With Miss G'Anne he reads the long list on completion of the long work. He is able to read even those words which he does not completely know by ear; that is, he is recognizing the new combination of sounds and can sound out the complete word. The interesting subsequent activity she suggests is to look up the six or eight words he cannot define in the dictionary. We are reminded of the importance of this dictionary work, and other work with reference materials that give the child the important tools for language. But above all we reflect on the great importance of the study of phonograms for the child who must read and speak and write the English language. Shortly after Scott was introduced to the sandpaper letters and thus the sounds of the letters, he made an early attempt to decipher the written word. He tried to read road signs and began with a few simple readers. But, believing that the sounds of the letters were as absolutely fixed as the quantity of two, he soon encountered real difficulty. "Would" or "have" bore no resemblance to the combination of expected sounds he identified with the letters. And because he was not immediately confronted with the possibilities of phonograms, he grew discouraged and put aside the effort of learning to read. At 7½ now he has met the important phonogram work which brings reading back into the realm of the rational. And he is, of course, very excited that he can read. Our conclusion is simply that the work with phonograms in both reading work and later spelling is something we must offer almost as soon as the child is given the first sounds for the letters. In this classroom every child, with the exception of the five-year-old, is working in some way with the phonogram program. We note the particular program, one from Toronto, built on Muriel Dwyer's "Reading Scheme" (which establishes as the total alphabet certain important phonograms in addition to the original 26 letters). This is called "Spelling Scheme," and we note the source which seems particularly effective: Patricia Schaefer, Toronto Montessori School. The culmination of the work program is the child's own composition of "His Own Phonogram Dictionary." It is a work Scott is just beginning--- with considerable enthusiasm.

In the Italian elementary classroom at mid-morning, the work is steady and good. We note particularly that the children here work long on one particular material, an indication of the degree of concentration developed. And the real phenomenon of normalization. Four children are gathered at the teacher's desk for a presentation of the bingo games of addition. Each child has his notebook; and, with each new combination identified with the game, he writes the combination. It is a reminder of the constant written work which accompanies the various works with the memorization boards. And it appears to be the favorite part of the exercises for the children---those things that can actually be written down and added to their own work. One child works alone with the zoology nomenclature: the first vertebrates. She is studying the frog. On the mat she has laid out the picture cards and the labels are matched. She proceeds to match all the definitions. Then she draws a picture of the frog in her notebook, labels it and writes the definitive statement. Subsequently, she goes to the mat to study one part at a time: first by drawing that part and writing the definition in her notebook, then returning to the mat and studying the definition alongside the picture. Finally turning the definition over to make sure she has learned it, and then she reports to the teacher who listens to the learned definition before she proceeds to the next. It is a well-executed, continuous work that fully engages her attentions. When she completes the exercise, she clears the mat and immediately there is another child laying out the same material for the horse. Two children near me have laid out identical multiplication snake games: they do the work individually and then compare their results. A younger child comes closely during this work to study the process; on another occasion today we see this happen: a younger child watching closely the work of an older. Today some children are reading big bright storybooks. And on the board are the vowels written in capitals for practice. It is a classroom totally integrated in material, a cohesive social unit, a model of the Montessori elementary.

Entropy is a loss, a degradation, always a lower energy level. Einstein said that entropic phenomena are related to death, the death of energy. But the synthropic phenomena is related to the creative phenomena and therefore identified with life. The Italian scientist FANTAPPIE, a professor of higher mathematics, a theoretical physicist, met with Dott.ssa Montessori several times to talk about these concepts. He was particularly interested in the synthropic phenomena.

The priests identify finality with God. If there is an arrow which takes one to an absorbing source, then they see this as a point to which everything moves---God. The Jesuit priest Chardin in his analogy of the last goal, sees the absorbing source as Christ-centered. As Montessorians, we see the human phenomenon as a finalistic phenomenon and it is this synthropic phenomenon which is our real concern.

Part II

The term synthropy is a quantity introduced by Luigi Fantappie, in his researches. He taught mathematical analysis at the University of Rome at Pisa where he took the chair once belonging to Galileo. He was chosen by Brazil to reform their educational system. He met Montessori several years before her death in 1948 - 49; and from these meetings they realized that the concept of synthropy could be identified with Montessori's concept of finality. Montessori was interested in education; Fantappie was interested in theoretical physics, that part which studies wave mechanics. Nevertheless, the concept of synthropy was greatly expanded that it was applied not only to physics (its origin) but also to education and then to medicine, law and every other human and social discipline. From the Italian ministry of defense comes the concept of synthropy as applied to military strategy. But here synthropy is referred to as negentropy---negative entropy. This tightly links entropy to synthropy, repeating the word in the negative sense. Then we have entropic and non-entropic. In Fantappie's explanation of synthropy, he directly refers to Einstein's theory of relativity---the quantum theory. Fantappie's starting point was this intuition:

Several elemental equations of wave mechanics present two groups of solutions (speaking from a mathematical point of view). The first solution (referring to the red sphere) is that which represents the entropic phenomenon: it is that solution which corresponds to the so-called "delayed potentials." He explains why these potentials have the quality of being delayed. The potentials are delayed because they manifest with a certain delay in respect to the instant the waves have been emitted. If we take the arrowheads as potentials, we understand that they manifest themselves at a certain delay in respect to the moment when they are emitted from the source. From the moment of the emission to the moment of manifestation is a certain period of time: the delay. Thus, one conceives aggression and then there is physical expression of that aggression: the time between the conception and the action involves a period of time---a delay.)

The second solution of the equation is that which corresponds to the anticipated potentials. (the blue sphere) We still have the potentials, but they are anticipated. This second group of potentials are anticipated because they manifest in anticipation with respect to the instant in which they are absorbed. If we take the blue arrowheads as potentials, they manifest before reaching the absorbing source. Using the adverbs of past, present and future, we have:



If the emitting source was yesterday, the effect is today. There is a certain lapse of time between emitting and manifesting; a characteristic of entropic phenomena. But in synthropy the result is the manifestation of the anticipation.

Fantappie concludes that the absorbing source belongs to the future. The concept of finality towards which all living things move. (Waves manifest before they get together to form the absorbing source.) This means that the end point of work is outside our own experience and that, consciously or unconsciously, all living things tend to integrate towards this final source.

All phenomena are either synthropic or entropic in nature. The two phenomena exist in balance. There exists an integration between these two kinds of phenomena: each natural process has as much an entropic nature as a synthropic one. And so we can show the arrows meeting in one sphere where both phenomena unite. In placing of entropic phenomena, Fantappie says that entropic phenomena are those which degrade nature; synthropic are those which construct energy. **So these two kinds of phenomena limit each other.** The entropic principle favors the release of energy; therefore, the dispersion, the destruction, of all material structures. The role of the synthropic phenomena is the principle which delays the degradation or loss of energy, thus preventing the system in this way from reaching the lowest energetic level. For example, a very hot iron: the more we iron clothes with it or it sits there, the more heat it loses; if we wait for a long period, the iron will reach the lowest level and will become cold as it was before the electrical force. The role of the synthropic phenomena then is that, for a time, I plug the iron in again in order to replenish the energy, thus preventing the iron from reaching the point of lowest energy level.

The title of the chart (as shown in first figure) which was developed by Fantappie and Montessori and presented at the conference of July 1950 in Perugia is: **Concepts of Causality and Finality in Education.** Montessori said: We live in two orders: causality; that is, the principle according to which nothing happens in the world without a cause. And the category of the phenomena of finality, the principle according to which everything in the universe is predisposed towards a specific end. "Unfortunately, only some of us understand that NOTHING HAPPENS WITHOUT AN END. From these two principles---of causality and finality---are born the synthropic and the entropic phenomena.

The causalistic phenomena are those produced by DETERMINATE CAUSES; causes whose terms can be detected and identified with precision. We can describe the characteristics. The causalistic phenomena can be reproduced by man through experiments. From this complex of experiences derives a method of work called **mechanism.** The philosophy deriving from it is **materialism.**

Finalistic phenomena, instead, are those produced by **indeterminate TENDENCIES.** Such tendencies DEPEND ON THIS FINALITY. Unfortunately, this creative finalistic phenomena cannot be reproduced by man by means of experiments. Such phenomena are direct and genuine expressions of nature. We have described the method of work---the work then determines the philosophy of **spirituality.** It is more difficult to talk about and understand the finalistic phenomena.

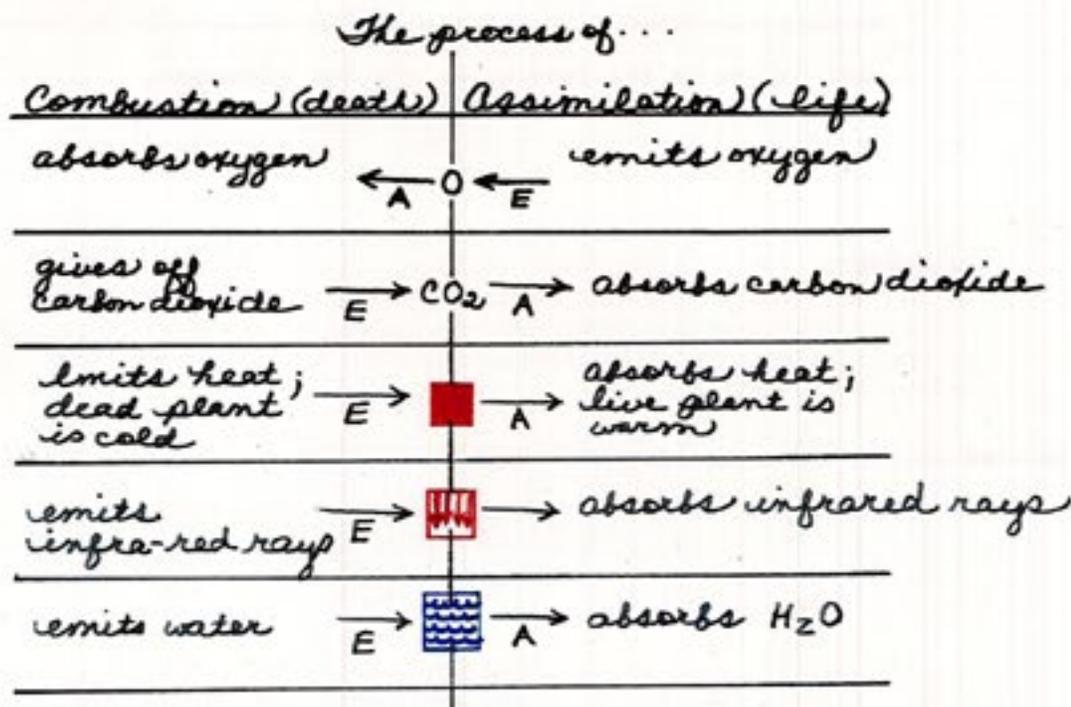
From an advertisement for a German-American television and electronics company comes a sketch: a crystal glass is shown escaping from the hand of the person, falling on the floor and breaking into a thousand pieces. The announcer tells us that by means of avant-garde photographic techniques, it is possible, at the speed of 6,000 pictures per second, to see HOW the glass falls to the floor and breaks into many pieces. This is, in fact, the unusually uncommon phenomena of moving film where, because the action is divided into many pictures, we can actually SEE it happen. We are in causalistic phenomena. Then the announcer calls our attention to the reverse process. The film, running in reverse for us, shows how the little bits of glass join to form big pieces, how those big pieces form the glass which then becomes the whole glass in the hand. "We have shown this film to allow you to go inside the reality of visual phenomena." And you have shown us, too, the phenomena, of finality. . .1973.

In 1950 Montessori wrote: In order to clarify the two opposite concepts, I use a simple fact, a little story far from the scientific phenomena. We consider the causalistic phenomenon of throwing the stone into stagnant water (still water.) We throw the stone. It disappears from sight and goes to the bottom. Immediately there are formed concentric ripples; first small, then larger and larger until they disappear.

Then we see the film of this phenomenon run backwards to see what happened. We see the surface of still water. Then, of a sudden, from the outer edges we see water raising and moving in, forming concentric circles which become more and more clearly marked. And smaller and smaller. And then suddenly, from the water emerges a stone.

She gives yet another example: a pair of binoculars in the desert which an explorer has lost. Gradually the binoculars disintegrate, turning first into bits of matter and finally to dust. Then we run the film backwards. The binoculars are constructed again, the smallest fragments into slightly larger ones until finally the binoculars are again whole in the hands of the explorer. OR. . . a person is killed; the body decomposes, the organic substances breaking down until there is dust. And then we might run that film backwards, too.

In conclusion, Montessori says: Of these examples it is easy to understand the killing---the decomposing; but in the giving of life, in the development of a life in the body, the soul and mind, here we find a difficulty in conceiving this phenomenon. We take a further example: the tree is cut down and it is chopped into logs and burned for heat. In the combustion, the plant takes oxygen and dispels carbon dioxide: the plant gives off heat and irradiates red light, it gives back water. In fact the burning is an oxydation process, a process which gives off great heat, termed "isothermic." But in the growth of the plant, we have the process of assimilation: photosynthesis. The plant, during this process, ABSORBS carbon dioxide and gives off oxygen, it ABSORBS heat, it ABSORBS infra-red radiations (the radiant energy of the sun; the radiation chosen by the chlorophylls), and it ABSORBS water. So **the burning plant is a causalistic phenomenon; the living plant is the finalistic phenomenon.** The living plant is the phenomenon of life; the burning is the phenomenon of death. Montessori concludes that the phenomena are opposites.



Conclusion: The phenomena related to death are opposite to those related to life. Here the phenomenon is expressed by the symbol; the characteristic of oppositeness is expressed by the arrows.

Twenty-four years ago Montessori applied the phenomena of finality and causality to education. We use the term assimilation because, as an educational term, it implies incarnation, a phenomenon we see, for example, in the way the child takes his language.

Montessori analyzes the examples given previously from a critical point of view; in the case of the stone in the water, the child falling from a tree and breaking his leg, the plant burning; we have the causalistic phenomenon. All modern science is based on the principle of causality. But still there are phenomenon which cannot

be explained. We consider the finalistic phenomenon of the stone coming out of the water or the seed which is planted and grows. In general, because our minds cannot explain such phenomena, it tends to reject them. It is not difficult to understand; it is simply a phenomenon that follows a logic different from our own. Finalistic phenomena are present in nature whenever there is a creative phenomena. **Finalistic phenomenon is at the base of life.** We can call those phenomena the **vital phenomena**. In the life which unfolds, the causalistic and finalistic phenomena are so intertwined that it is impossible to distinguish the two. The child growing depends on the finalistic as well as the causalistic phenomena.

The problem lies in applying the two categories to education. What relationship exists between the two phenomena and what is their relationship to the school? The two phenomena are universal. They include everything that belongs directly or indirectly to the cosmos; and therefore they are closely related to man and his education. Therefore, they determine two different educational concepts:

- 1) The concept of causality; the direction policy of causality: as every effect has its cause, it is fitting that the adult is the cause of the development of the intelligence, will, sentiments, etc. of the child. In such a way that the development of all these is the result of the cause which is the teacher. If we have this method, we have causality; the teacher who is the cause and has the force in every educational process. Those who support such education are at the same level in the method of work as well as in the concepts of materialists.
- 2) The educational policy of finality. As everything in the universe tends towards a specific end, life (nevertheless unconscious), man included, moves towards a finality not established by man, but which, pre-established, is external to him. We must recognize in ourselves and manifest both the opposing phenomenon. In the thought of Chardin, every being tends towards the center of the blue sphere which represents Christ: thus the movement of the universe is Christ-centered. . .OR we can call this sphere perfection. In the red sphere exists perfection, but gradually the energy is lost, the perfection diminishes. The blue sphere is the future; we are the phenomena. When we can identify with the blue sphere, we have achieved perfection. Man is moving towards perfection. The crux of the issue is to have faith in man or not.
As Montessorians, the call is for optimism.

NOTE: When we talk of the philosophy of finalistic-oriented thought, we speak of **teleology**: The philosophical study of manifestations of design or purpose in natural processes or occurrences, under the belief that natural processes are not determined by mechanism but rather by their utility in an overall natural design. Ultimate purpose or design. (from the Greek teleos; final, completion, end.)

Analysis of the Psychological, Physical and Psychic Characteristics of the 4 Planes

We have discussed the concepts of causality and finality. And we have seen how these two are related to two educational movements: first, how finality is identified with Montessori philosophy; and second, how causality is present and vital in the education organized by society.

Now we take another look at the Montessori graph of the four planes. We consider first those areas enclosed by the thick red lines. Montessori identifies these with the first and third periods of the child's life, and calls them the periods of construction and creativity. What is constructed? During the first period, it is the individual personality; in the third period the construction of the individual personality goes on, but it takes a social direction. Montessori calls these two periods the two births: first the birth of the individual person, and second the individual social person. So we have a personal individual in the first; and a social individual in the second.

In regard to the first period, we consider the first three years, those years which stretch from the flame to year three. It is a period identified as the thousand days that count, the most important days in the child's life. If we enlarge the first period to include the fourth year of life, we have the dynamic of the sensitive

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periods: those for language, movement and order. (The first two being the most important.) When these needs which nature proposes are not satisfied, during these years, we have what Montessori calls the "individual stigma." When we say stigma, we refer to the negative characteristics of the personality. During the first three years of the third period, if the needs for culture and society are not satisfied, "social stigma" develop. The prototype of this kind of social stigma is selfishness.

At the third period we have the second birth. In any book of human physiology, this period is divided into two periods of three years each. From 12 - 15, the main characteristic is the growth of the four limbs. During this period, the trunk remains small. It does not correlate well with the growth of the bones and tuberculosis is common. From 15 - 18 there is a proper development of the trunk as well as the muscles. Regarding the psychic characteristics of this period, Montessori says: there is a development of the social personality. And especially in the second period, 15 - 18, there is an identification in these children with prototypes taken from life itself. That is, teenagers identify with "heros of the present." These heros are saints as well as great delinquents. These teenagers choose a person according to the excellence they offer: the football player who is the leader, not the best player. A leader may be both a saint or a delinquent. Thus during this second period there is a great increase in delinquents among the young.

But there is also to be found at this age excellent champions of behavior. Those persons who have taken as a model one whom adults consider as "a good person." Our society is so well-informed about psychology that the commercial world and the press related to that commerce (advertising) have often satisfied this need for identification with posters, etc. Our reaction must be one of acceptance, for such hero worship satisfies a need at this age.

There is, especially during the first part of this third period, an imbalance due to the work of the endocrine glands. As a result, we have a teenager who seems to decrease in intelligence. We know that this imbalance manifests when the teenager says he isn't interested in anything. Often they cannot concentrate. Because all the vital forces are consciously and unconsciously disturbed by the sexual problem. Why does Montessori emphasize this inability to work? As a characteristic of this age? She wants to point out on the graph which society provides for the educational structure, the great increase in the work imposed during this age for the teenager. She points out that because of the difficulty this child has in concentration and work, the work should decrease. She does not call this a defect, but a MAIN CHARACTERISTIC OF THE AGE.

In regard to the areas enclosed by the thin blue lines, the second and fourth periods of the child's life, Montessori notes that these are the two periods of development which follow and reaffirm, consolidating those previous periods of growth. In reference to the passage from one cycle to the next, she refers to two physical factors: the growth of the permanent teeth between the first and second periods; and the growth of the wisdom teeth between the third and fourth.

The main characteristic of the second period is an even and easy growth; and a great capacity for learning together with a keen memory. The second period can be identified with the phenomenon of the exploration of the world through the imagination. And, because in this second period there is this great capacity to learn, it is the right period, says Montessori, to give the children the seeds of all the sciences. This sensitive period for culture through the imagination, finds its greatest help (says Dott.ssa Montessori) in the work of the Boy Scouts. The structure of the Boy Scouts, with their encouragement for conscious responsibility is the best help for this period. At this age the child is obedient, calm and serene. Even though during this period, the child seeks to establish his ideas of right and wrong, good and bad. With this search for right and wrong, we have the birth of the moral problem.

Montessori calls these two blue periods by name:

6 - 12: The Serene Age and 18 - 24: The Happy Age