"The Lines That Make the Clouds" The Essence of the Mathematical Mind in the First Six Years of Life

by Ginni Sackett

Ginny Sackett lists many of the universal attributes of the absorbent mind–pattern recognition, order, incarnation, the rules for language, and numeracy. Her essay borders on the metaphysical as it suggests that the mathematical mind is really a non-entity and is responsible for all aspects of knowledge acquisition regardless of the discipline of the inclusion of mathematics. The end of the first plane is characterized by a "third embryonic" period, which is the formation of character and society and adds to the purpose of the mathematical mind. The mathematical context is mentioned around everyday applications, but when coming back to the theory in Psychogeometry, *the principles of the mathematical mind belong to all of Montessori pedagogy, as logical, connected, and propelling spontaneous exploration.*

I will begin with a true story.

A two-year-old and his grandpa are watching the dissipating lines of contrails left by invisible airplanes across a clear blue sky. Grandpa asks, "Do you know what those are?" The two-year-old answers with complete confidence, "Those are the lines that make

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the clouds." A precociously verbal toddler gives rare voice to the mathematical mind at work in the first plane. Here is clear evidence of an otherwise invisible yet active mentality that has already observed a phenomenon: the sporadic appearance of long, white lines that gradually disperse high in a blue sky. This child spontaneously related it to another phenomenon, the appearance of puffy, white, irregular clouds moving across the sky, and deduced a pattern of causality: these dissipating lines must be the source of the clouds.

This is a charming answer: charming, logical, and absolutely wrong, thus presenting a sudden dilemma for his grandparents: risk damaging a fragile ego with a correction or abandon him to an illusion? Honesty wins out, and grandma says, "Actually, those are contrails; they come from airplanes so high in the sky we can't see them." The toddler considers this because he knows airplanes and has flown in them. With no fragility in sight, he simply responds, "Oh." Apparently, mathematical minds value truth over ego and the deduced pattern is adjusted in his mind to new information.

It is through countless events just like these, that a child creates himself from birth. This is the mathematical mind at work in the first six years of life. When we explore the essence of that mind at work, we discover its critical role in the formation of the human personality and discover, along the way, the child's natural road to formal mathematics.

A Concept with a History

So, what is the mathematical mind? Perhaps in the interest of full disclosure, it is best to answer first by stating that the mathematical mind isn't real; that is, it isn't real in the sense that you could dissect a human brain and find it in amongst the gray matter. It is a concept, an abstraction, created by humans in an attempt to explain and label something we experience about that brain

> The mathematical mind is working without awareness as the absorbent mind is observing through a comprehensive, sensorial exploration of the real world; discovering relationships between and among the accumulated data; and creating explanatory patterns for what has been observed and discovered.

and the mind it supports. It is one of many abstractions (the absorbent mind and sensitive periods are two others), which it seems we humans can't resist creating. As such it is itself a great proof of the phenomenon it names. We have this topic, the mathematical mind, because of a universal human reality: the drive to construct an image in our minds out of something we experience in the world, a concept we eventually name, then proceed to act and interact with it as if it is real, as if it actually exists as a discreet object. But the only place this object truly exists is in the amazing phenomenon known as the human mind examining and trying to understand itself.

That we can and do label our mind as mathematical is itself an expression of the fact that our mind works in ways that are mathematical, which leads to two cautionary statements: If we think the mathematical mind is just about mathematics, we profoundly misunderstand the intention in using the term. If we think the mathematical mind is only relevant to the second plane of development onwards, we miss its profound significance for human development in the early years of life.

Now, a little background: such as, where did this term come from? Montessori borrowed the term from a seventeenth century French mathematician, philosopher, and theologian, Blaise Pascal (1623-1662). Pascal's interests were profound and broad, he invented a mechanical calculator (the Pascaline); produced groundbreaking work related to geometry, probability theory, and the defense of the scientific method (a new idea in his time); and wrote the following in 1653 in an essay named *Discours sur les Passions de l'Amour*:

> There are two types of mind ... the mathematical, and what might be called the intuitive. The former arrives at its views slowly, but they are firm and rigid; the latter is endowed with greater flexibility and applies itself simultaneously to the diverse lovable parts of that which it loves.

In *The Absorbent Mind*, we find Montessori using the term in the chapter "Further Elaboration through Culture." She uses it to describe a universal characteristic of being human, specifically, that the human mind "develops and functions … with exactitude":

> In our work we have given a name to this part of the mind which is built up with exactitude… we call it "the mathemati-

> cal mind." I take the term from Pascal … who said that man's mind was mathematical by nature, and that knowledge and progress come from accurate observation. (185)

Of course, Pascal and Montessori are not alone in recognizing this universal human characteristic. Here are just two contemporary statements that provide more details about this exact functioning through observation: the first from mathematician, and NPR's "Math Guy," Keith Devlin:

> The human mind is a pattern recognizer.…The ability to see patterns and similarities is one of the greatest strengths of the human mind.…visual patterns, aural patterns, linguistic patterns, patterns of activities, patterns of behavior, logical patterns, and many others. Those patterns may be present in the world, or they may be imposed by the human mind as an integral part of its view of the world. (60)

The second, from Professor Nassim Nicholas Taleb, who observes that:

> Our minds are wonderful explanation machines, capable of making sense out of almost anything, capable of mounting explanations for all manner of phenomena, and generally incapable of accepting the idea of unpredictability. (10)

We can note in passing that Devlin and Taleb also suggest in these statements that this mathematical mind can come back to bite us (and it does), but that is a thought for another exploration. For now, let's direct our attention to a closer look at the mathematical mind as it functions from birth.

From a Montessori perspective, we can generalize that in the first plane (ages 0-6), the mathematical mind functions without awareness as the absorbent mind; whereas, from the second plane onwards, the mathematical mind functions with awareness as the reasoning, imaginative mind.[1] At any age, Montessori specifically links the operation of the mathematical mind with several life-long human tendencies.

[1]There is undoubtedly a limit to the awareness of the mathematical mind as "explanation machine" at any age, as suggested by the previous quotes from Devlin and Taleb. The essential point here is that as the mind matures from age six onwards it can decide to explore and analyze specific experiences in the environment to the exclusion of other available experiences, whereas the first-plane mind lacks such discriminatory specificity.

- Order: Montessori describes order as forming the basis of the human mind. She states,

  > …the form of man's mind, the warp into which can be worked all the riches of perception and imagination, is fundamentally a matter of order. (*The Absorbent Mind* 185).

- Abstraction and Imagination: Montessori tells us that abstraction and imagination

  > …play a mutual part in the construction of the mind's content.…Of its nature, the mind not only has the power to imagine (i.e., to think of things not immediately present), but it can also assemble and rearrange its mental content, extract – let us say – an "alphabet of qualities" from all those numberless things that we meet in the outside world. (*The Absorbent Mind* 184)

- Exactness: Montessori highlights the significance of exactness for the abstractions that form the basis of the imagination, stating that

  > … abstract ideas are always limited in number, while the real things we encounter are innumerable. These limited abstractions increase in value with their precision. In the world of the mind, they come to have the value of a special organ, an instrument of thought which serves to give us our bearings in space, just as a watch gives us our bearings in time. (*The Absorbent Mind* 184)

Montessori seems to summarize the action and interaction of these tendencies in the following:

> If we study the works of all who have left their marks on the world in the form of inventions useful to mankind, we see that the starting point was always something orderly and exact in their minds, and that this was what enabled them to create something new. Even in the imaginative worlds of poetry and music, there is a basic order so exact as to be called "metrical" or measured. (*The Absorbent Mind* 185)

The Mathematical Mind at Work

When we explore this mathematical aspect of the human mind in action, we see over and over again some characteristic activities that could be summarized as

Accurate and Detailed Observation

- The discovery of relationships between and among what is observed
- The creation of orderly patterns from what is observed and discovered

These activities are clearly at work from birth and are essential to the formation of the personality during the first six years of life. The mathematical mind is working without awareness as the absorbent mind is observing through a comprehensive, sensorial exploration of the real world; discovering relationships between and among the accumulated data; and creating explanatory patterns for what has been observed and discovered. All of this work is done without any selectivity or discrimination, and making no value judgments regarding what to observe or the resulting explanations. This is the absolute beginning point for each human individual in terms of the formation of the personality and its emergent intelligence. The quality of all that follows depends upon the quality of experience at this first stage. And apparently, this mind unconsciously cares about that quality, which is the telling point of the "lines that make the clouds" anecdote: this two-year-old mind was more interested in accuracy of explanation than in simply being egoistically right!

> Evidence of this incarnation, this creative formation of the personality through the characteristic activity of the mathematical mind, is omnipresent in all human societies. Yet, as with many universals, it is typically unquestioned, unnoticed, and unrecognized by those who provide the models for the absorbed behaviors.

The reason for this becomes obvious: The deduced patterns represent a perceived external order that becomes the foundation for the internal order of the mind. In other words, the foundation for

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the intelligence itself, the "form of the mind" which (as Montessori stated) is "fundamentally a matter of order." This internal order occurs as a progression from specific lived experiences to generalized abstractions held solely in the mind. As Montessori elementary trainer Kay Baker was heard to remark recently, "Experience precedes abstraction." There could be no better summary of the action of the mathematical mind in the first plane.

This is not a mysterious progression, it is a journey every one of us pursued avidly in the unaware first years of life. Think about it: When did you create the abstractions that form your mind? Abstractions for the objects found in the built environment, such as objects we sit on? Repeated experiences in the external world of specific things people sit on became a generalized abstraction of "chair-ness." Over

and over again your mind followed this progression for sensorial qualities: specific heavy objects forged the generalized abstraction of weight; for the rules of language in English, repetition of auditory patterns indicating plurals by adding the sound of *s* at the end of words to a generalized abstraction of how to pluralize any noun; abstractions of animal types generated abstract classifications such as "dog-ness"that become equally identifiable in a Chihuahua and a Great Dane; natural numeracy in specific experiences of counting five things generating the generalized abstraction that anything can come in sets of fives; and for emotional qualities, you had specific experiences of people meaningfully saying "thank you" and that led to a generalized abstraction of gracious gratitude.

In the first plane, the cumulative outcome of all of this processing is cultural adaptation, which is the self-creation of a person of a particular time and place and a prime goal of the absorbent mind. The plasticity of this process is universally recognized, even if it is not always understood to the depth characteristically found in the Montessori perspective. Its hallmark can be found in the phenomenon of cross-cultural adoption of young children, which has become common in our global society. Every infant unquestioningly observes the specific activities of the people around her to discover the habitual patterns of their behavior. Montessori explicates this relentless process of cultural adaptation, all of which is happening completely without the awareness of the child who creates the outcomes

> The child absorbs…from the world about him the distinctive patterns to which the social life of his group conforms. He absorbs the basic or summarized part, the precise part, which…is repeated in the habitual life of the people. He absorbs in short, the mathematical part. And once the patterns have become established within him, they remain as fixed characters, just like his mother tongue. (*The Absorbent Mind* 189)

Montessori labeled this absorption "incarnation" – a literal embodiment of these habitual patterns of behavior as the "fixed characteristics" of the external society becoming internalized structures of the personality; and she definitively acknowledges the universal power behind this developmental task, elaborating that "the pattern is something potent and creative, giving form to the

personality in just the same way as hereditary features of the body are shaped by the genes."

Evidence of this incarnation, this creative formation of the personality through the characteristic activity of the mathematical mind, is omnipresent in all human societies. Yet, as with many universals, it is typically unquestioned, unnoticed, and unrecognized by those who provide the models for the absorbed behaviors. Without it, the transmission of human culture in the built world of the supra-nature would cease, for it is possible only through the activity of the child, driven by nature to seek, validate, and embody accurate knowledge of the world he must navigate for his survival and his fulfillment.

The application of the mathematical mind to this end is most discernable in a child's imitation of the habits and practices he observes. The mathematical mind, it seems, is never idle; it uses any object or opportunity at hand to act out the deduced patterns of behavior observed in society, repeating them as best he can until the pattern is confirmed. This is the source of a child's play acknowledged by Montessori for its developmental significance and honored through the activities of a Montessori prepared environment by the term *work*. "It must be remembered," she tells us, "that most of the activities of the child, including play activity, are inspired by observation"(*What You Should Know about Your Child* 77).

> The deduced patterns of external mathematical fact are incorporated into the emergent internal order of the older first-plane mind with enthusiasm and joy. They are "riches of perception and imagination" that, once known through external experience, can be brilliantly woven into the warp of a burgeoning, orderly intelligence.

There is no way to externally interrupt or redirect this progression from observation through imitation to incarnation. In this context, then, we must look to the quality of the opportunities available for the child's observation and imitation. The quality of the opportunity becomes paramount as the quality of the opportunity directly affects the quality of the final incarnated pattern. For the maximum

outcome, the mathematical mind hungers for the most reliable versions of the reality this child will inhabit. Yet too often this hunger is poorly and inadequately satisfied.

Montessori clearly distinguishes those opportunities for activity that fail to nurture the goals of the mathematical mind. She identifies many objects typically offered to the child by the unaware adult as

> …imperfect and unproductive images of reality. Toys, in fact, seem to present a useless environment which cannot lead to any concentration of the spirit and which has no purpose; they are for minds astray in illusion. (*The Secret of Childhood* 164)

And she compassionately notes that

> The baby finds all that he himself needs in the form of play-things made for dolls; rich, varied and attractive surroundings have not been created for him, but dolls have houses, sitting-room, kitchens, and wardrobes; for them all the adult possesses is reproduced in miniature. Among all these things, however, the child cannot live; he can only amuse himself. The world has been given to him in jest. (*The Advanced Montessori Method* 16)

With this perspective on the child's incarnation through imitation using objects in the environment, Montessori gives us clear criteria

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for evaluating anything made available for a young child's activity. The implications for childrearing and for childhood education infuse the principles that characterize Montessori practice. This practice acknowledges that the power of the mathematical mind drives the child to absorb the "mathematical part" of culture in order to form his personality, and that a child thereby grows and develops through what are today described as experimental interactions with the environment.

These experimental interactions with the environment are at first conducted by the child Montessori characterized as "the unconscious creator," which is the child from birth to approximately three years of age, a child pursuing experience to create the characteristics of his time and place. As the child matures, however, energy diverts to the refinement and perfection (or completion) of these creations. Montessori characterized the child from three to six as "the conscious worker" (under the power of what she termed "the conscious Absorbent Mind"). She places this older first-plane child in the "third embryonic period" for the formation of character and society. The personality will be completed in this third embryonic period, and by age six there will be a crystallization of the child's individual character and his social life – all based upon patterns of action, interaction, attitude, and belief he deduces from observation of every aspect of the surrounding culture (*The Absorbent Mind* 242).

The Natural Road to Formal Mathematics

How does formal mathematics fit into this picture?

Mathematics is an integral part of the human supra-nature, the built environment of human culture surrounding every child from birth. Formal mathematics is the result of a long history of the human mathematical mind at work, an accumulated body of human knowledge and a universal human activity. Humans apply this accumulated mathematical knowledge to the most mundane and the most profound of their concerns. Every society has a basic level of mathematical fluency necessary to participate in everyday life. Most also have some level of esoteric knowledge that becomes the province of relatively few, either through ascribed privilege or

specialized training. Mathematics has had philosophical, religious, magical, and mystical associations throughout its history. To the uninitiated, the workings of modern higher mathematics can still seem to partake of magic and mystery.

However, we can keep in mind that all mathematics represents first and foremost an achievement grounded in everyday human experiences. Formal mathematics begins when we humans systematically observe, explore, and define the patterns of relationship that pertain to the objects, forms, and qualities of the physical world. All humans can intuit these relationships and will conform to them long before articulating them. We all recognize and obey the law of gravity even if we never define it as a formula.

The history of formal mathematics is the direct result of what we are naming as the mathematical mind.

- We observe and discover the relationships inherent in our universe.
- We abstract the principles which govern these relationships.
- We derive universal formulae to describe them.
- We apply this knowledge to alter our environment, creating the supra-nature.

From this perspective it is not surprising that Montessori and her colleagues discovered that mathematical experience is the rightful province of the first plane child, whose mathematical mind is actively engaged to absorb and incarnate patterns of physical reality within the surrounding culture. All that is necessary for this experience to be successful is to provide the appropriate opportunities – high quality, reliable and consistent opportunities to observe the mathematical facts as summarized by human culture through comprehensive, sensorial explorations in the real world: hence the concrete, sensorial, materialized abstractions found in the mathematics area of a Montessori Children's House.

Through perfect and productive images of reality, the child can manipulate and explore mathematical fact and discover for himself

the relationships between and among the accumulated data to create accurate and reliable explanatory patterns for what has been observed and discovered. The principles, components, and beauty of formal mathematics are comprehensively and unconsciously incarnated, along with all of the other available patterns of human behavior, into an individual human personality. The deduced patterns of external mathematical fact are incorporated into the emergent internal order of the older first-plane mind with enthusiasm and joy. They are "riches of perception and imagination" that, once known through external experience, can be brilliantly woven into the warp of a burgeoning, orderly intelligence. The generalized abstractions of mathematics experientially join those other generalized abstractions such as "chair-ness," "weight," "dog-ness," and "gratitude"– not as a result of systematic study but through the same powerful action of the mathematical mind creating a particular person of a particular time and place.

One of the clearest places that Montessori describes this process with formal mathematics is in the newly translated *Psychogeometry.* This book is eloquently relevant to the Montessori Casa, particularly in its first 57 pages where Montessori brilliantly summarizes the key principles of our pedagogy. Here we find the rationale for our entire pedagogical approach, as exemplified in something we usually identify as a unique mathematical subject: geometry. As the editors summarize, the Montessori approach recognizes "discovery as the driving force in the pedagogic process." Montessori herself evokes this with two definitive statements: "We only offer the means to prepare the mind for systematic study," a process which "prepares the mind to act rather than receive …" (55; 57)

In the first pages of the book, Montessori looks at the role of interest and effort in this preparation of the mind, seeing them as two sides of the same coin. She states that

> Learning is subject to an essential condition: that the pupil *agrees* to receive the knowledge and is able to pay attention or, in other words, is *interested*. His psychic activity is the sine qua non for success. Everything that is boring, discouraging, and interrupts becomes an obstacle that no logical teaching preparation can overcome. (*Psychogeometry* 4)

Conversely,

> The *effort* put into work, study and learning is the result of *interest* and nothing can be achieved without effort… many have said that it is necessary to choose between interest and effort in education–calling interest pleasant execution, and effort unpleasant execution. However, effort is implemented actively, using one's own energy: and this is done when there is interest.… The old ideas were not wrong, but they corresponded to a preconception developed by the adult. If we consider the child as the cornerstone of education, and if guidance lies *in the choice made by the child*, rather than the teacher's logic, brand new principles are necessarily brought to education. (*Psychogeometry* 5; 6)

One of these "brand new principles" is that of sensitive periods, and these explain an often overlooked source of the interest that supports effort of growth, development, and learning, "Understanding is not enough to be interested. Interest is rooted in the *personality*… (and the personality) passes through a number of different stages that entail *different interests*."

Montessori follows this with a characteristically illuminating statement:

> If initial educational *acquisition* is achieved during one of these periodos, it resembles a *precedent* that paves the way for the intellect in the *future*.… Existing interests are the foundation for further interests–logically connected to them. (*Psychogeometry* 6; 7)[2]

So what fuels the "logical connecting?" The mathematical mind, of course, as it is our portable "explanation machine," with its relentless detection and creation of pattern. In *Psychogeometry*, Montessori explicates one such line of logical connection: In a Montessori Casa, the child's interaction with the entire sequence of exercises using the geometry cabinet, as well as the extensive, open-ended activities with metal insets, provides exact and neces-

[2]Montessori's use of the term *precedent* here is similar to the contemporary term *cognitive antecedent,* descriptively characterized in one source as: "What we already know frames what we see, and what we see frames what we understand." See Paul Hawken *Blessed Unrest: How the Largest Social Movement in History is Restoring Grace, Justice, and Beauty to the World.* Penguin: 2007. p. 15.

sary experience to create precedents in a mind that is then prepared to act in service of a systematic, future study of the mathematical discipline known as geometry. The child's sensitive periods are the source of interest to stimulate the effort of these activities and, all unaware, lay the foundation for a future interest in an exciting mathematical subject. In first-plane terms, these precedents in the mind result from

> …a whole complex gamut of developments: development of the senses, motor coordination and language. Neither analysis nor definition is a concern, but the outside world is being absorbed through sensations and through the constant exertion of motor activity on surrounding objects. (9)

And in language eerily anticipating and elucidating our modern phrase "experimental interactions with the environment," Montessori elaborates,

> This entails active experiments involving movement, research and trial and error. These objects therefore reflect the *child's activity*. This complex activity involves the hand that moves, the eye that recognizes and the mind that judges. (11)

What better triumvirate is there to describe optimal activities ideally matched to the interests of a first-plane child?

The hand that moves …

The eye that recognizes …

The mind that judges …

Or how better to define the process pursued by the first-plane mathematical mind? The entire progression of activities leads the child:

> …to make meticulous observations of detail, to analyze and to form combinations associated with the characteristics of geometric figures but not as a result of the teacher's exhortations or directions….[With the metal insets], it is artistic creation that becomes the teacher of geometry, and the very beautiful works produced as a result of this serve as a constant stimulus and continuing reward for the progress brought about by the irresistible drive of the individual psyche. (21)

Montessori advises us here that by harnessing this natural process, we prepare "aptitudes in the personality that predispose the child to understand. It means sowing the permanent seeds of interest in the mind" (15).

We see here a natural path to formal mathematics being forged concurrent with the formation of an individual personality forged through meticulous observation and driven by interest. Spontaneous analysis leads to cognitive associations and to discovery of meaningful (and accurate) patterns out of concrete exploration and experience, all of which is driven by the "irresistible drive" of an individual personality.

In *Psychogeometry,* Montessori is focusing on that one discipline of geometry, yet "precedents" for the entire math area can be understood in the same context she describes here.

In all of his experimental interactions with the environment, a child is preparing an entire range of precedents that "sow the seeds of permanent interest in his mind." Throughout the practical life and sensorial areas, for example, the child's personality follows its developing interests to pursue "active experiments involving movement, research, and trial and error." The child spontaneously explores in these areas using "the hand that moves, the eye that recognizes, and the mind that judges." Through application of the three-period lesson in spoken language, these precedents crystallize and are labeled by accurate, exact, and clear language.

The "active experiments" of these areas match the natural interests of the unaware mathematical mind. These are the natural interests such as logical sequencing, order, predictability, and the vital relationships that pertain between and among the sensorial qualities of the world. Incarnated as now-permanent elements of his personality, these precedents "predispose the child to understand" through new explorations also involving "the hand that moves, the eye that recognizes, and the mind that judges" now applied to the facts of formal mathematics itself. The mind is prepared to act. Existing interests formed through these previous activities can now serve as "the foundation for further interests" which are "logically connected to them." In the mathematics activities, a child can create

new patterns of connection built onto the logical sequence, order, and patterns of predictability already incarnated from previous engagement. In the last years of the plane, he can literally incarnate new abstractions related to formal mathematics through manipulation and explorations using already-generalized sensory abstractions such as length, color, volume, size, and texture.

From this perspective, Montessori elucidates the powerful pedagogical principle of indirect preparation, a principle that is essential to successful Montessori education. Not "the teacher's exhortations or directions," but "the irresistible drive" of the individual personality recognizing "the constant stimulus and continuing reward" of its own activity, the intrinsic stimulus and intrinsic rewards that are

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inevitable when the child is provided with the means and opportunities to observe, discover relationships, and create accurate patterns of order out of the otherwise chaotic information of the world.

Emergent internal order forms the foundation for a structured, dynamic intelligence, now effortlessly enhanced with the necessary precedents for future interests that will motivate active learning when the sensitive time for "systematic study" arrives. New progressions from specific lived experiences to generalized abstractions will themselves sow permanent seeds for the aware, reasoned, and imaginative exploration of all things mathematical in the second plane onwards.

Here, then, lies the essence of the mathematical mind in the first plane of development. It is as simple as watching the cloud-like lines in the sky, as intricate as the mysteries of multiplication, seemingly unrelated elements of a chaotic world made sensible through mastery of logical connection and reliable pattern. The world is brought to order in an orderly mind, becoming the launch pad for a limitless yet disciplined imagination that is all made easy because the abilities and capacities cultivated are not a teacher's plan of education, not an administrator's plan of education, not a school board's plan of education, not even a society's plan of education for the young child.

This is nature's plan and therefore the child's plan. The proper role for the mature mathematical mind of adults who guide the child is to be a collaborator with nature's plan in all its intents, in all aspects of the child's self-construction as an individual and social being. We observe for the child's spontaneous, freely chosen pursuit of knowledge about the world he lives in; offer the means for the child's own self-directed activity in this pursuit; provide the accurate and reliable opportunities his mind craves and depends upon; and stay prepared to graciously redirect the child's conclusions should they stray too far from reliability. However whimsically charming the digression might be, we trust that this mathematical mind desires the truth of reality more than any other input and will receive the clarifying truth with equal grace and gratitude.

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