

As we rush into the 21st century, the impact of information and technology will change our lives dramatically. To appropriately apply our current and future knowledge, we must first explore how we think, not in terms of content but the whole field of human thought as a unified system, which is expanding around the world. We must see clearly how thought affects us physically, how it alters our perceptions and how it is changing the world we live in.

Professor David Bohm, as distinguished and visionary theoretical physicist held a deep and passionate interest in relationship between mind and matter. Dr. Bohm suggests that the majority of our personal thoughts are actually collective and have evolved into complex network of automatic reflexes. Rather than we controlling our thoughts, he believes that these reflexes are driving us and in increasingly dangerous ways. Professor Bohm states clearly that the natural order of the mind, with its creative intelligence is being disturbed or damaged by our misuse of memory, resulting in dramatic loss of authenticity, freedom and truly intelligent behavior.

I had the great privileged of meeting David and Saral Bohm in 1978, while documenting the life of Krishnamurti. Every year we would meet to explore how the views of both David and Krishnamurti may impact parents, children and education. The following is taken from our last meeting, a filmed interview in which David describes with his great clarity the challenge we face in bringing about a deep change in ourselves, in our children and in our culture.

*David, you have spent many years exploring the world of theoretical physics, and also the nature of intelligence and human consciousness. For the past few years you have been describing thought as a vast system, operating in each of us and in the world we have created by our use of thought. Rather than something of supreme importance, you are suggesting that the vast majority of our thinking is really a collection of reflexes, which operate automatically and mechanically. You also suggest that thought has artificially and incorrectly divided itself form the physical body and our emotions. Perhaps this is a good place to begin.*

Thought is not separate from perception. In fact, thought also is not separate from feeling because thought can induce feelings. The thought that somebody treated me badly can induce anger or thoughts can induce feelings from memory. In order to understand this further we should make a distinction between thinking and thought. Thought is the past participle of something that has been done. Thinking is going on right now.

We tend to think that feelings are always active because the word feeling is active, but we could imagine the word felt, introduce the word felt and say besides thinking and thought, there are feelings and felts. There are direct feelings, which you get when you see something or experience something.

Then there are feelings that come from memory. Those feelings however may not be seen as feelings that are coming from memory. They're experienced as actually the same as direct feelings, just as our representations are experienced as direct perception. That confusion is very serious because it will lead us to try to deal with our projections and representations as if they were real.

*It seems that this confusion comes when we fail to notice that an emotion or feeling is actually not coming from the present experience, but rather from something we have felt in the past. The source is really coming from our memory.*

Thought is the activity of the past and the present. Thought is the past. We can understand thought as a conditioned reflex. We could take the example of Pavlov and his dog. The dog has a natural reflex. When it sees food it salivates when it's hungry. If you ring a bell many times every time it sees food, it will then salivate when you ring the bell. Perhaps ringing the bell is associated to the memory of perceiving the food and then salivation occurs. Eventually it skips the stage of perceiving the food so you'll get a conditioned reflex. I say thought works like a conditioned reflex. When you think something, when you have thought something, it leaves something in the memory and that something reacts according to the situation by our association.

*Is thought always the past projecting itself into the present and is this what you call a reflex?*

Yes, but it's constantly changing because every experience goes into the past. Whatever you learn goes into the past and becomes thought. As the reflex gets more and more automatic it becomes more thought and less and less intelligent, less and less adapted to the particular situation. We tend to fall back into automatic reflexes.

*To grasp what you are saying we need to distinguish between a direct perception and the mechanical activity of our thoughts.*

For the moment I'd say that perception is the ability to perceive something new, which is not contained in memory. The most elementary perception is sense perception. You can see where things are, although memory enters into the way that perception is organized, there must be something in there, which is not just memory.

*When we open our eyes and see something - this is one aspect of what you are calling sense perception?*

Very often people see so automatically that they hardly notice anything. It has essentially no perception or very little. Or with more attention they pay, the more of a quality of perception comes in. But thought is more than that. Thoughts introduced feelings and felts. From a thought there can be an association which gives rise to a felt and that may in turn give rise to more thought and that may affect perception.

*So we have our direct sensory perception and also past feelings or what you call felts and they seem to combine somehow to give us this impression of reality. There is also what we call intellect, which plays a role as well.*

To call thought just the intellectual part will not be adequate. The feelings which come are associated with and also part of the same process. Everything which is the response of memory should be put together and called by one name and thought is about the best and the most characteristic name.

*You describe how these physical, emotional and intellectual patterns become layer upon layer of memory, which then repeat themselves.*

We do need repeated patterns but the question is whether the repeated patterns will dominate or whether something else comes in which is more intelligent. It's clear that the repeated pattern does not have intelligence. Its ability to adapt to new circumstances is limited. People have compared that pattern to a computer program. I think that's not a good comparison. A program would be something that had been laid down beforehand. If somebody had planned it out, but these conditioned reflexes, are built up through experiences. They are not pre-programmed. Nobody has put them in.

*These habits or reflexes become very strong and yet very subtle. Can you describe how they are built up in the system?*

For example, if you have the emotion of anger, this is induced by thought. If somebody keeps you waiting for a couple of hours and then suddenly comes in, you'll be getting more and more angry saying he has treated me badly, he doesn't have any respect for me and wastes my time. By thinking that way you can build up very powerful feelings of anger, the adrenaline can build up and all the neuro chemicals. But if he gives a good excuse then it suddenly goes, right? If he doesn't give a good excuse or if it's a false one it will get worse.

Similarly by thinking thoughts of things that are pleasant or things that appeal to you, could induce those feelings, that state of chemistry. And you can induce fear by thought, by thinking of things that are dangerous. So the thoughts and the emotions are not separate. Nor is the tension in the body, which is also part of the process.

*Studies have shown that what we call thoughts; emotions and physical sensations all arise in our perception as a unified experience. It is our language that fragments them into different categories.*

Thought goes a lot further than that because everything we see in the whole world, our whole world of society, was first thought about. Its form and as function were determined by thoughts. All the houses and cities and factories and farms and airplanes are profoundly affected by thought. They're really an extension of thought.

All our systems of organizing society are an extension of thought. There's hardly anything in the world that we see or experience that is not an organization of thought. So it's all part of the system. There's one system. It doesn't stop inside a human being. It goes from one person to another, all through society, all through history, all over the world. The ecological problem is the result of the way we have been thinking about the world, that it's something we can exploit indefinitely and we're still thinking that way.

Just as these patterns seem to be repeating themselves inside of each of us, there is a corresponding repetition of our outer patterns as well. It seems that today's young people are interacting more with information and technology than human beings or with nature, and I think that this might be compounding these reflexes you are describing.

The computer and information can create a reality. But they're only doing what's been done all the time by thought but more deeply and more generally. That, as you say it is quite dangerous, because we being to treat this as an independent reality. This is where the trouble with the system of thought is. It affects reality. It creates a certain kind of reality and then it loses track almost on purpose and says that this is an independent reality.

Then it creates problems and it says they are independent problems. While you're trying to solve those problems you're still creating the problem. That is the basic trouble with our process of thought. It does not distinguish that part of reality which is created by thought and that part of which is independent of thought, or those parts which are some mixture.

*How does thought create this impression of an independent reality?*

Thought creates a virtual reality and it also contributes to a genuine reality, the real reality. It clearly creates a virtual reality in so far as you see things which are attributed or projected. You experience them as if they came from something independent. The rainbow being a pretty simple example or the enemy, the hateful enemy, the evil empire and so on.

You experience your own emotions as that virtual reality, which seems to be an independent set of emotions. But there's also some real disturbance going on. The chemistry is very similar to what it would be from an emotion that was not primarily originating in thought. In seeing a sunset, for example, you will get a certain feeling which may not be just memory, or by seeing something beautiful. But if you see it several times, it will come up from memory and it is projected into the thing you see. You could call that something very similar to virtual reality. In virtual reality with the computer you don't have anything to project it into except information. All that information is experienced as if it were there.

In addition, thought has tremendous affects on genuine reality. It has produced all the buildings and factories and farms and governments and customs and pollution and all the good things, all the bad things, the ecological problems. It has improved our health medically.

It has produced all sorts of scientific and technical discoveries that have changed the face of the earth, in principle could change much more broadly through the solar system or the larger parts of the universe. So, thought affects reality as well as creating a virtual reality. The important point is not whether it's virtual or real, but whether we distinguish between the affects which originate independently of thought and those which have been produced, at least in part, by thought. We have to keep track of that. Now, thought does not do that. It never evolved to do that. That is its basic mistake.

*It seems that our ability to distinguish between perceptions which are generated by thought and those which originate independently is becoming increasingly difficult, now that technology is adding greater power to information in general.*

If we talk about information then we also must talk about mis-information. A tremendous amount of information is mis-information, which confuses things and makes things worse. Our tremendous ability to propagate information and spread it over the world is also the ability to propagate mis-information. That information becomes thought and that thought becomes dynamically active as a reflex, according to what people see on these programs, especially as they are repeated and people don't think about it when it's coming in, so they just accept it.

The whole point of advertising is not to make a set of rational arguments that would make you justify your buying, but rather just to say any old thing at all. If you repeat the name enough times then you'll automatically reflex and think of that object when the time comes to buy. So you can have a program that has nothing to do with the object and it's just as good as one that does, if not better.

Advertisers have known about this thought as reflex for a long time and have made use of it. But it gets out of hand because everybody, including the advertising people are themselves functioning from reflex. You could say, why are they doing this? Because the whole society has made it necessary to make a living in a certain way and they've gradually picked up the reflexes as the infant does. That includes the desire to do it, the urge to do it, the intention to do it. These reflexes become you. You have a reflex of intention. However, you have another reflex which says it was a free choice. If it were a choice that was free then it would not have originated in thought or from the past. We don't realize that thought is a system. We don't realize how far it goes. We just use this system, which works in a certain area.

We don't notice there's an area where it's not adequate. At the very least thought is not adequate for dealing with those problems, which thought produces. Most of our problems are now produced by thought, most of our serious problems. Therefore, thought by itself, including information and technology, can never solve them.

*There seems to be an implied hope that we will be able to think our way out of the problems we have created or that science and technology can solve the problems that they have created. You are suggesting that this hope may be false or even a delusion?*

Let's say we have a nation. Nations were produced by thought. They don't arise naturally. If you cross from one country to another there's no big change at the border. The border is an abstraction. Even if you make a fence there it is the result of abstraction. But now you say there's a serious difference between the people and the two sides. They may start to talk differently and to behave differently and it builds up a whole set of different reflexes which they say is us. Inside the country they say we're all one, but we ignore the fact that we're not. There's just as much disunity inside the country as between the countries. So thought is making two mistakes. One is to make a false division based on a wrong abstraction and also a false unification. The point is that this nation has been given great value. It's very important and a lot of things now depend on it. People say that if this nation is attacked, it's the same as if I were attacked. So the thought is identified with yourself.

*In Science, Order and Creativity, you described how thought plays false with itself, which I assume is what you mean by this self-deception.*

The root of the word false is basically deceptive, and I would distinguish between something that's false and something that's incorrect. A thought or an idea may be correct or incorrect according to how it corresponds to reality. A thought process that's false is one that is aimed at deception. It's quite different isn't it? Something may be

correct but false. The information may be correct superficially but it's aimed, in the broader sense, at deception.

*So it's the intent that counts?*

It's the intent but also it leads to more subtle distortions outside the particular field of abstraction. It leads to perceptions that are false and to intentions that are false. For example, we have censorship, which are special government departments, aimed at giving false information to make people feel better about their country. This is accepted.

*But thought does that too.*

I'm saying it is thought that's doing it. Censorship is thought. The government department is thought. The whole system of government is the automatic reflex of thought. I'm trying to say that thought is working as a system. Thought thinks that there are people there to control it, but in fact, it controls the people who are suppose to control it. It forces them and tells them to defend those thoughts, which have high value.

*So we really must understand that thought is operating as one system, in all its manifestations, inside us and in the world.*

And its not something that anybody directly controls. Its built in. It creates intention and feeling and purpose. For example, people are exposed to songs about their country - all sorts of things about their country from childhood. They build up reflexes and they automatically have all the feelings associated with those reflexes. If somebody says something which makes the country look bad, they automatically get the feelings of hostility and want to suppress it. So, you have thought which is self-deceptive and clearly no amount of information is going to deal with self-deception because that information will also suddenly enter the self-deceptive system.

*Can we move from this national model to the individual?*

Yes, the individual and the national model and social are all essentially one system. But individually we have to have some thought of representing ourselves. The question is, how do we represent ourselves?

You may have drawings, you have names which symbolize us and descriptions which represent us, but inside we've got images representing us, and feelings. Feelings may be representations rather than direct feelings. An actor is using feelings almost indistinguishable from direct feelings just to represent a character. We use these representations inside to represent ourselves but we lose track of that. We begin to act out our character, but not on purpose.

The actor knows what he is doing, but we don't. There are all sorts of things which we call the self-image, which is that sort of representation. There are all sorts of qualities attributed to the self by other people, by your experience, by what you would like to be and so on. You experience it as if it were that way or as if it should be that way. You experience a self-image.

*What does the word "self" really mean?*

DB: The word self has a root. One of its basic meanings is the quintessence, the thing, it's very self. There were four essences in ancient times, like the four elements, and then they took the fifth essence, the quintessence, which was the essence of all essence, and called it the self. So we say the self is my most essential being. We have three words, which express the self. They're really, as children say, "me, myself and I." "Me" is the self as object and "I" is the self as subject. I is the self which is active, which is suppose to be the one that does the thinking, makes the choices, has the desires and urges and has the power. Its full of power and glory. It's essentially God like.

Me is the self to whom things happen. Everything happens to me. That self is limited. But the self represented by I is, in principle, unlimited. The great I am. A child must begin regarding himself as the great I am because he sees himself as the center of the universe from which all action flows. Then he learns from society he's only little me. They say, "Who do you think you are?" "The great I am." That's part of the conditioning process by which the notion of the self is built up.

Now this self, if it were the quintessence, clearly has tremendous value and importance. The whole content is whatever is thought about it or said about it, whatever is put on the reflexes. If you put something bad on the reflexes, it's going to disturb the whole system chemically and physically. The body itself will demand that this disturbance stop. There's a pressure impelling these reflexes to make a search for other reflexes which will produce a better state of the body. Therefore the thought is not being used by the reality principle, guided by a correct representation of reality, but rather by the pleasure principle, the pleasure pain principle, to avoid pain and make it a more pleasant state, which is chemically more harmonious. There's an intrinsic tendency to self-deception built into this thought process because there's no intelligence in it. It's just a system of reflexes.

*How can you say that there is no intelligence in the image we have about ourselves?*

There may have been originally but once it gets on the reflexes there's no intelligence. An intelligent idea, once it goes on the reflexes it's no longer intelligent. Whatever is present in thinking will eventually become thought.

You may have an intelligent idea in thinking but it becomes thought, then there's no particular intelligence in it. It requires something beyond that to see whether the abstractions are relevant and valid.

*Can you give me an example?*

Let's say it requires a certain perception beyond thought to see whether the whole thing is coherent or not, whether it holds together. For example, it may be incoherent if there's contradiction, if there's conflict or confusion. If you're getting results that you don't intend and don't want, that's a sign of incoherence, that these reflexes somehow must be stopped and examined.

*It seems as if we are locked in a closed system which prevents this quality of perception.*

The system may be open, but the system of thought, as it has developed, tends to reject the kind of perception of evidence which would question fundamental notions about the self, or whatever the self is identified with, like the family, the money, the country, and so on. It rejects or defends itself against perception of incoherence.

*It seems as though this self-deception may be inevitable, or is there some way out?*

This is the way thought has evolved. I don't say it's absolutely necessary. The way thought has evolved from very early civilization, from very early times until now, has tended to build up this feature.

*Can we explore how the system of thought has evolved in this way?*

With very early societies, the hunter-gatherer type with only a small number of people, thought was very simple. It could probably keep track of most of the ways in which thought was affecting things. Even then, in some tribes they say that the word for human being is the same as the word for "member of the tribe." So when they see somebody else they have no word for it, no thought for it, automatically they're thrown into another category. Then the foundation is laid for trouble. It was not serious at that time. The further thought developed with more and more people, bigger units and also more and more technology, the more difficult it became to keep track of what originated in thought and what didn't, especially around the self, which has such powerful emotions. That thought is too powerful.

*Which is where we stand today?*

Yes. With the growth of civilization, I think the problem has gotten steadily more difficult, so that it's no longer viable. The other point is that technology is giving us more and more power. We have a greater and greater need for coherent thought.

It's more and more dangerous when it is incoherent, and yet, there is a greater and greater tendency to make our thoughts incoherent. Television, as you have explained, is conditioning us with all sorts of incoherent, meaningless thoughts and feelings which affect us in a random way.

*All the feelings and impressions which are constantly being recycled obviously consume a great deal of attention, and this attention is exactly what we need to really bring our lives into some kind of order.*

First of all we said thought introduces divisions between nations and it also introduces divisions between individuals. It says that there is a sharp division, that they end at their skin and we experience it that way. If, in fact, they don't end at their skin and thought treats them as ending their skin, they'll see it that way and they will act accordingly and problems are created which then thought tries to solve independently. So it builds up more and more confusion. Confused, incoherent thought leads to confused, incoherent emotions, to confused a confused chemistry and to a breakdown of the brain. You could say it leads, in the synapses, to all sorts of inappropriate combinations of chemicals. It's just something that I'd like to call electro-chemical smog. The brain is in that state and it's continually getting more and more confused and breaking down.

We need a quality, which I call proprioception, really self-perception. In the body this seems to be built in. If you move your hand, you know that you're moving it. Your intention or impulse to move is aware simultaneously with the movement. You can tell the difference between moving your hand and letting it drop using gravity to move it. If you couldn't tell that difference you wouldn't survive.

There was a case of a woman, I think Oliver Sacks reported her, who lost proprioception and suddenly woke up without it. You need proprioception just to be able to sit up. She was totally incapacitated, but gradually learned to replace proprioception with vision so that by watching carefully she was able finally to get along.

There was also the case of a woman we know who apparently had a stroke in the middle of the night. When the light was turned on she was seen hitting herself and then she stopped. What happened was that her sensory nerves were destroyed but her motor nerves worked. She moved her hand and didn't know she was moving it. It hit her forehead and the assumption of the brain was that somebody else was doing it so she fought that person. The more she fought the more it hit.

But as soon as the light was turned on proprioception was re-established. So there are two things, one is that the body has built-in proprioception, and two, that even if it doesn't work, it could be replaced by some other sense. That's the possibility.

*Can we take this one step further?*

Yes, let's apply it to thought. Thought apparently doesn't have this proprioception. We do things and all sorts of things occur, emotions occur and we don't see that our thinking has produced them. Nations are built. All of society is produced. Endless consequences are produced and the next thought abstracts them as independent. That's an inappropriate abstraction. Then later it makes the wrong abstraction of the unity in order to compensate. It goes on and on.

The question is, why shouldn't thought be proprioceptive? It's part of the body process too. It's a more subtle set of reflexes. There was no reason why it should have developed proprioceptively. It was not built into our genetic structure, the way we think. This was open to culture. In fact, thought, as we know it would hardly be possible without culture.

*I don't understand. Thought as we know it would not be possible without culture?*

Most of our thoughts are based on language and language has got to be a social cultural structure. The higher degrees of abstraction can only be produced socially. The thought of all never, ever, forever, these are very powerful thoughts.

*Can we develop this idea that thinking and language are closely related?*

Evidently there is a kind of thinking, as I said, which is pre-verbal which the child learns in various ways, by imitation and certain kinds of reasoning. But language could only occur when people talk together. They must establish common representations and common symbols. The symbol stands in for the thing and it also has a tremendous flexibility, a relation between them. This could only arise in the actual act of using language together.

As a matter of fact, early thoughts may be based on images, simplified images that could constitute a kind of language which was more private and personal, but then they get connected with words and eventually words mostly supersede them.

*We were talking about the proprioception and the possibility of developing this same awareness with the movement of our thoughts. But I am still not clear why we have not already developed this in much the way that we have within our body?*

Thought is the response of memory, whether it's the memory of intellect or the memory of emotions, the memory of physical states, the memory of this society, the language, your country, yourself, all of that is in one soup. Everything gets connected. Memory is the one thing that you're not aware of, you see, the actual memory. You are only aware of its response.

There's a connection that you cannot be directly aware of. Even if there were, and there probably is a way by which the emotional and intellectual centers could intelligently be related to each other, but once it gets into this soup then there's no way they can relate clearly. Suppose there's an inadequate emotion coming from memory and the intellectual center says that's an inadequate emotion and sends a message to the emotional center, but the emotional center is not producing it. It only gets muddled and asks, "what shall I do?" And that goes into the memory as well.

*So it gets a little messy in there.*

Essentially we could say the human brain does not have a genetic structure which allows the response of memory to be aware of itself. In fact you can see how difficult it would be to get such a genetic structure. If we don't use much memory then we're all right, but when we build up very complex levels of abstraction depending on memory, emotionally and physically and every other way, then we are creating a problem.

I'm saying the further civilization develops, the more strain it is producing in the system. Unless we find a way of dealing with this it's going to break down, as it is already doing. How can we get proprioception of the response of memory? There may even be some built in proprioception between all the emotions and thoughts in the body or you could learn it, but memory is the problem. Can we establish a way of replacing, not replacing, but just as this woman when her proprioception failed she was able to use her vision. Is there something we can use instead?

The question is, how are we going to regard the response of memory as a reflection of the process of thought? We have to be aware of the intention to think or of the impulse to think and it's connection. If there is an impulse you can sense it's connection to the result in a way which is non-verbal.

It's like trying to use a mirror. If you have a mirror and you want to shave and regarded the image in the mirror as reality you would try to shave the image. Immediately the incoherence would lead you to stop. You have to learn to shave yourself but that requires some learning because anything you see in the image must be translated into a motion relative to the body and that is not automatic. You learn in a non-verbal way that when you want to shave a certain part of the body you direct yourself by the image by moving your hand toward the face.

The point is, if there's an emotion that's inappropriate, it's no use directing attention at the emotional center, which is only an image of the memory. The response has to be directed at the thought process itself.

*So how do we get out of this enchantment?*

I'm suggesting that if we're more attentive and become aware of the act of thinking, of thought itself, first on purpose by finding the words which express your thought, not for the sake of thinking them but just for the sake of getting the thing moving, by treating this as a machine and moving slowly.

*It seems that this is something that children could learn quite easily if adults were able to develop first within themselves.*

I think they could. You were saying once before that the adults have got to do this first. I think once the adults do it the children will find it very easy because they don't have this tremendous conditioning. The whole way we use thought is against this because it implicitly tells you not to worry about the thought process, that thought does nothing except give you information therefore, it doesn't have to be looked at.

It's an elementary form of free play. Gradually you hone in on learning the right movement. At that stage it gradually becomes learned, it becomes a set of reflexes, then you're able to shave yourself without having to think very much or observe very much. That's a very simple case of this element of free play and learning. Your mind has to be exploring this way and that and being aware of the impulse or intent to move and the result. The purpose of the operation is not to get a desired result but to learn, that's the difference. It's not idle play as it were.

*Is there such a thing as idle play?*

There isn't, but people have that in mind when they think that it's not serious.

*So the purpose of play is to learn?*

Yes. Proprioception depends on an attitude of learning, of being aware of the impulse to move and the results reflected back at the same time, without having to think about it. In proprioception you're not aware of a separate observer who's observing. The awareness is there without thinking there's a self who's observing. Once you begin to think of a self who is learning you have introduced a division. You have introduced this confusion between the result of thought and the process of thought. Therefore, you're not able to learn because you can't keep straight what is independent reality and what is not.

If you think of learning to use the mirror, you need an element of free play to get started. I think that's the kind of thing that would be in the learning situation of the child. If you have a free play you can't learn anything from it unless you are aware that play has originated in you, in your intention or in your impulse. That enables you to establish a feedback in which you can learn. Learning beyond rote or beyond programming or beyond conditioning must always involve that.

*I think people really want to enter into this state of creative or imaginative play, but they have a difficult time doing it.*

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I'd put it the other way - that people are conditioned to stay in the repetitive reflex system. The reflex system, as I explained, already has a tendency to defend itself and to keep you in it. It has certain rewards and pleasures and sense of security. The first intent to move out of that will create a sense of insecurity in the reflex system, so the reflex system will start to defend itself against free creative play.

*So there is this defense, but it seems that if children are going to develop this quality, they must be around adults that understand and encourage this sense of play.*

Yes, it follows that this free play has to be encouraged and situations have to be created where it's possible, rather than the other type of situation where the child is encouraged to be repetitive and mechanical. The question rewards and punishments is crucial. If the child is rewarded for producing a desired result, this will automatically throw him into the reflex system. It gives a very powerful emotional pressure to continue there. This whole system of rewarding children will throw them into the mechanical reflex system. If the child is doing the free creative play then it is its own reward. He or she doesn't need to be especially told "you're very good, you're better than somebody else" or given prizes.

*I hope you feel that this area of play is useful. I think it really is a critical issue not only for early childhood, but also for industry for science, and for education.*

You have to have this free creative play to establish proprioception. To carry it further into other areas we have to bring in imagination.

The poet Coleridge defines several kinds of imagination. He calls perception *primary imagination*. There's no fundamental difference between the way in which we perceive something and the way in which we freely imagine it. The way we see the whole world has been created by the function of the brain. The kind of illusions that are possible shows that. In perceiving something unknown there has to be a freedom to feel it out, in the same way as we have to learn to use the mirror.

Then he says there's *secondary imagination*. This is the creation of forms that never existed, that are not coming from the perception of things but rather are the creation of new forms which could then guide you to actually find them or to produce them.

Then he established a third quality of imagination, which he called *fancy* or *fantasy*, which is based on the reflex of memory. It also produces the same sort of perception and images as the other two but it produces them from memory. Fantasy can produce a sense of reality as in *The Secret Life of Walter Mitty*. The sense of reality is built when you have something, which is fantasized as stable and resistant to change, as if it were just there. Imagination in a way is central. In order to see something that you've never seen before you need some sort of creative play.

*A child's first few years seem filled with this playful exploration, with the joy of learning and discovery. I think it is important to find ways to encourage this beyond early childhood.*

The first point is not to discourage it. We have this tremendous system, which is always discouraging it. The system of thought, the way it's developed, is highly discouraging to imagination. Secondly, we need to give positive encouragement.

*You have often said that we need to encourage this creative capacity in order to solve the monumental problems that we are facing. How do we bring this about?*

The primary awareness comes from the way people are living all the time. If we're living by formula and by reflexes that's what the child will learn. It's only natural that a child using the creative process will start to learn from it. If that is what the adults around the child are doing, that's what the child will learn. As you were saying, the child's relations with his parents and to his or her mother is a very crucial point, the bonding, the sensitive proprioception, which is destroyed by treating the child as something which you manipulate. I think that is the first stage.

*One example you used to illustrate how creative play is crushed, was a study involving chimpanzees and painting.*

Yes. Desmond Morris once gave a television program in which he showed what happened to chimpanzees. These chimpanzees were given paint and canvas and they started to paint abstract patterns with some balance and they were fascinated by it and could not stop. It was more interesting than anything else and they would go at it endlessly. They looked very alert and they showed children doing the same thing. Then they began to reward the chimpanzees which produced good paintings and soon the quality of the work went down. They were only interested in the reward. The painting was perfunctory.

Then the whole thing died out. With human beings it may not go quite that far. If you establish a situation where reward is the main point, then you're going to go into the reflexes. They're going to keep their mind on the reward and try to find a system of reflexes that gets the reward unflinchingly.

*Let's go back to imagination and define it as the mind's ability to create mental images.*

Or do more to, even to create images in feeling, as well as in vision or in sound, or to create something, which is similar to what could be perceived, since it's the same process. Images suggest imitations - the same root. In some sense that's inadequate. The mind's ability for creative perception of things which have been seen and things which have not been seen.

*The very act of perception involves this creative free play of imagination.*

I'd say this imaginative perception, first of all, is sensitive to failure of coherence. It does not hold to something, which is incoherent. Thought holds too long, it defends it. Imagination does not defend what is incoherent so it keeps the play moving. If it finds something, which is not coherent, it drops it and tries something else. That also might be the right scientific attitude, but scientists are limited in their ability to follow that. This is a key feature of intelligence. The ability, through play, is to discover new relationships, new structures, which will ultimately cohere because they're based on the ability to detect incoherence and therefore what remains is coherent.

*You described the direct perception people have when a chord is struck on the piano, how the harmony of the sound seems to resonate with some innate inner structure, which we are drawn to. I think that the reverse is also true, that we are repulsed by discord.*

Yes, or else just by simply using words, whether they have meaning or not. The word *meaning* has three meanings; significance, value and purpose. Not only do they signify something coherent but also they can be sensed as having a high value and will generate strong intentions and impulses. The whole thing goes together.

It's not merely the content of the imagination. They're all tied together. The word intelligence as the root *interlegere*. *Inter* means between and *legere* could mean to read or to choose or to pick. If you took it to mean, to read between the lines, this might help. The reflexes enable you to read what is on the lines but when you read between the lines you have to have a certain quality of *free play* and *imagination*. Intelligence must be of that nature.

*Now you're bringing intelligence and creative imaginative together. I think we should develop this further.*

I want to also make a distinction between *intelligence* and *intellect*. Intellect is the past participle of *interlegere*. It's what has been read. It's more or less the same as thought, highly organized thought aimed at logic and coherence and so on, and it's more or less the level at which a computer could work. A computer can duplicate anything the intellect can do, but it will not duplicate creative imagination and intelligence. We can easily see how imagination will bring in harmony, order, and beauty and a sense of coherence, but why should I bring in intelligence?

This has to do with reason. The word reason is based on a Latin *ratio* and you can see that ratio is a basic quality that you have to perceive. Ratio is qualitative as well as quantitative. As two objects are related in reality so they are related in thought. That's a qualitative ratio and it's extended into quantitative ratio. That ratio, once it's learned, becomes part of the reflex system. That's highly organized reflexes aimed at coherence. No ratio can be coherent, no matter where it's applied because new situations arise where it's not relevant, where the abstractions are used are not appropriate.

That's the picture. To say intellect is merely the residue of perceptive intelligence. The major point is intelligence and not intellect. But the way things are going now, there is a tendency to say the result is the major point.

*You have suggested in many ways that the brain which may include the mind is literally infinite. How can you say this?*

Whatever we say about the structure of matter, is an abstraction. We may abstract this table. It looks like a rather strange shape but we know it's actually a rectangle. It looks more complicated when it's projected onto the eye. It's always changing as you move around it. Then you say it's really a rectangle. But if you look more carefully, through physics, you say it's made of atoms and it's mostly an empty space with a cloudy sort of abstraction. Then even the atoms which were suppose to be indivisible are themselves made up of smaller constituents, which in turn are mostly empty space and it goes on into quarks and also into fields and many other things. At least experience thus far has said that you will not find an ultimate structure, although there is a search for one now.

Many physicists believe they're going to find what they call *the theory of everything*. I would like to suggest that there's no limit to the subtlety of the possible structure of matter. It might shade off into what we call mind. It's really just an assumption to say that the brain is limited.

If you look at the general evidence, you'll see there's no basis for that and it would be better to say it's not limited. It is a better assumption. At least it remains open. Otherwise it will close the whole system, which will be one of the factors which turns it into a set of reflexes.

*It seems like our whole educational system is based on a false model of this creative intelligence we have been talking about?*

The first point is to realize that intellect is not intelligence. The rules of formal logic are not the same as intelligence. They're a product of intelligence which has crystallized. You get this picture that there is perceptive intelligence and intelligence which has crystallized as intellect. We have to say that when people have had some new idea, then what they do is they find new categories of reason, new relationships, new ratios which I think have to be perceived. We have to get across the notion of perceiving ratio. I think all the great discoveries were of that nature.

I'd say that intelligence is basically one faculty, the same in every area. Not merely intellect but also art, perception, action and it acts creatively through free play. This creative intelligence has to permeate life in general, whereas intellect should come out as the special case. We need it in certain cases. Intelligence should be able to use intellect, but it won't work the other way. Intellect cannot control and use intelligence. This intelligence is present as much in the work of the artist as in the work of a scientist or person who writes a book or sets up a practical industry. Whatever you're doing, we need this intelligence. It has one universal origin, which branches out into different areas. It's only in so far as you apply the intellect that you'll get this branching out. Intellect creates the divisions, which may have some relevance up to a point. But even then, in these divisions intelligence must be the primary movement, which makes use of the structures of the intellect.

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