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A CULTURAL-HISTORICAL VIEW OF HUMAN NATURE

For more than 20 years the authors have been seeking to understand and extend an approach to human nature that takes as its starting point the mediation of human experience through culture as a way to supersede the long-standing dichotomy between «nature» and «nurture» which continues to bedevil the human sciences. A crucial point of intersection in our respective inquiries was the Soviet psychologist, Alexander Luria, one of the originators of cultural-historical psychology in what was then the U. S. S. R. Although currently remembered largely for pioneering the discipline of neuropsychology, which might make it appear that culture was perhaps peripheral to his theory of brain functioning, Luria was steadfast in his insistence that «in order to explain the highly complex forms of human consciousness one must go beyond the human organism» to include the «external conditions of life» particularly human beings' life in society (Luria 1981, 25). In effect, Luria argued, the circuits of the brain are completed through the culturally organized environment, a position perfectly in line with current neuroscientific thinking (Edelman 1992).

In keeping with the bi-national authorship of this chapter and its focus on cultural-mediational processes, we want to highlight the strong affinities between Luria's view and the approach adopted by the American anthropologist, Clifford Geertz. In a widely quoted article, Geertz examined the mounting evidence that the human body, and most especially the human brain, has undergone a long (perhaps 3 million year) co-evolution with the basic ability to create and use artifacts. Consequently, he argued,

man's nervous system does not merely enable him to acquire culture, it positively demands that he do so if it is going to function at all. Rather than culture acting only to supplement, develop, and extend organically based

capacities logically and genetically prior to it, it would seem to be ingredient to those capacities themselves. A cultureless human being would probably turn out to be not an intrinsically talented, though unfulfilled ape, but a wholly mindless and consequently unworkable monstrosity (1973, 68).

In the pages to follow we want to illustrate the power of Luria and Geertz's common vision using examples drawn from both Russian and American research traditions. It is our belief that a judicious combining of the two national traditions provides rich resources for the development of a comprehensive, bio-social-cultural approach to human nature. Central to both traditions is the belief that human nature cannot be reduced to the socio-cultural environment or to biology. Rather, each views human beings as hybrids of the cultural, the phylogenetic, and the ontogenetic. Each of the examples we provide explores a different aspect of that hybridity.

The tripartite nature of consciousness

From the time of their earliest publications in the late 1920's and early 1930's, the Russian cultural historical psychologists emphasized the tripartite nature of human mental processes. They represented the basic structure of consciousness as the emergent process involving an active subject, an object, and the cultural medium, which they depicted as a triangle. Vygotsky (1929) referred to this set of relationships as «the cultural method of behavior». Conventionally, the base of the triangle represents «natural» (phylogenetically controlled) processes, while the apex of the triangle is a «stimulus means» (a sign or a tool), e. g., a cultural medium. It is possible to interpret this idea by saying that in the course of humanization, one form of psychological process, the «natural, direct» relation of subject to object is replaced by a «cultural, indirect» (e.g.

culturally mediated) process. However, Vygotsky makes a particular point of arguing that it is not the addition of a new element to the process of thinking that is essential, but rather, the new structure of behavior that arises. The cultural method of behavior, he wrote unites the natural and cultural lines of development in a structural, not a mechanical way: «... all processes forming part of that method form a complicated and structural unity» (Vygotsky 1929, 420).

Cole (1996) points out that a shortcoming of the triangular representation of the hybrid phylogenetic/cultural nature of human thinking is that it fails to represent the fact that a static figure is used to represent a dynamic process occurring over time. In place of a static triangle, he suggests that one think of a triangle with a gap where the «natural» and «cultural» lines intersect; according to this view, precise coincidence of the two sources of information about the object is rare and fleeting, so that the subject must actively engage in a process of constant reconciliation of discordant information. Consciousness, in this view, is that process of reconciliation, occurring over time in the course of human action. In the following sections we present several phenomena which support this view.

Stabilized images

Research which stabilizes the retinal image of an object on the retina, achieving the kind of rigid structural coupling embodied in the static triangle at the left of Figure 1, provides insight

into the hybrid nature of human psychological processes as a result of their dual phylogenetic and cultural natures. Under ordinary conditions, light reflected by objects in the visual field is kept constantly in flux with respect to the retina owing to saccadic eye movements, over which we have no control and concerning which we have no conscious awareness. These movements are not an epiphenomenon, they are essential to normal vision. It has long been known that if one creates perfect coordination between eye movements and objects in the visual field by use of an apparatus that fixes the image relative to the retina, one's image of the object disappears; the visual field is experienced as a uniform grey (Larbus 1957; Pritchard 1961; Zinchenko 1958).

Pritchard's studies of fixed image phenomena are particularly relevant to our current topic, because he demonstrated the existence of two different kinds of objects on the basis of the dynamics of the process of image disintegration in the course of fixation and reappearance when the visual object was permitted to move relative to the retina. The first category of objects appears to be heavily constrained by human phylogeny, what Vygotsky would have termed, «natural processes». These included, for example, the profile of a human face; as the image disintegrated, the last of its features to disappear were those connected with areas of high contrast, such as the forehead/hairline, or the nose. These are precisely the kinds of features detected by newborn infants (Haith 1994).

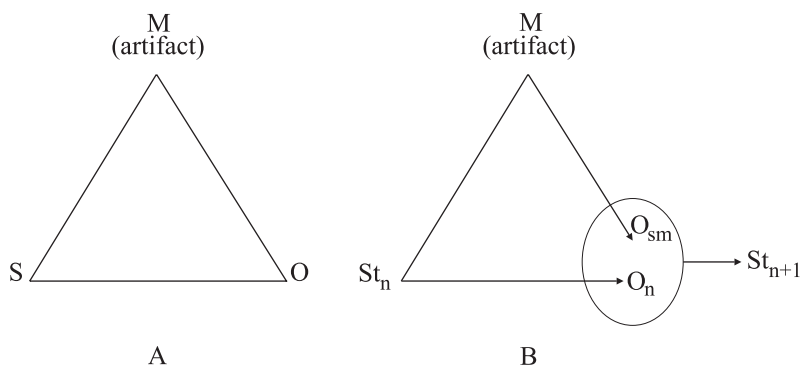


Fig. 1. A – The basic mediational triangle, in which subject and object are seen as not only «directly» connected, but simultaneously «indirectly» connected through a medium constituted of artifacts (culture). B – A dynamic representation of the basic mediational triangle that includes time in the unit of analysis. The fact of non-correspondence between mediated and unmediated (indirect and direct) subject-object relations is represented by the oval at the right, indicating the need for active cognitive resolution of the discrepancies by the subject, the process referred to in the text as *voobrazhenie*

The second category of objects were cultural in origin. While they retained the «natural» features such as points of high contrast, they had the added characteristic that the partial images that floated in and out of consciousness when the image was fixed or when slight movements occurred in the apparatus fixed on the retina were *meaningful patterns acquired in the course of prior culturally mediated activity*. A striking example is provided by a monogram made up of an H and a B, in which the right side of the H and the left side of the B share a single, common line. In principle, when this image began to disintegrate, any combination of elements involving high contrast might be expected to endure longer than others. However, what Pritchard found is that subjects report seeing only combinations of lines which have *cultural significance*, such as a 4 or a b. Pritchard interprets this result in terms of Donald Hebb's notion of a «cell assembly», a configuration of brain cells that fire in unison because they have been repeatedly experienced as a unique pattern. The adults upon whom this research was conducted, for example, had coordinated their interactions with the world through print for many years, starting from before the age of 7. Here we have excellent examples of the kinds of stimuli for which highly literate people would have formed cell assemblies. Whether one finds a Hebbian interpretation plausible or not, Pritchard's fixed image experiments established the co-existence of natural/ phylogenetic aspects and cultural/ontogenetic aspects in the process of forming visual images of the world.

The fixed image experiments also highlight the necessarily dynamic character of the underlying processes. Whether one uses stimuli associated with phylogenetic or cultural sources, a full image will not reappear *unless and until* the image is allowed to move freely across the eye. A complete image of the world is obtained only when *three* elements are present:

phylogenetic contributions arising from the history of our species, cultural contributions arising from repeated sense-making through cultural forms, and the active resolving actions of the human brain, which must construct a complete image from fluctuating light patterns sliding across the retina in microgenetic time. As Irwin (1998, 99) notes in a recent article, «the perception of stability across saccades appears to depend on a very local evaluation process centered on the saccade target object...» In other words, perception involves more than the physical response of the retina and central nervous system to direct stimulation, it requires an intervening process which is not strictly determined by external stimulation. How are we to conceive of that process?

Voobrazhenie

Several years ago, Alexander Suvorov (1983), published an article in the American journal, *Soviet Psychology* entitled «Formirovanie voobrazhenie u slepoglu-konemikh detei». Literally, this title should be translated «The formation of imagination in blind-deaf children» but as editor of the Journal, Cole decided to replace the word «imagination» with the word «representation» because the process Suvorov was describing seemed to him to correspond more closely to what English-speaking readers understand by the concept of representation. Subsequently, David Bakhurst and Carol Padden (1991, 202) commented that this substitution obscures Suvorov's point that «the formation of *any* image or representation of reality involves creative exercise of imagination».

Taken in conjunction with research on fixed images, Bakhurst and Padden's point takes on additional importance. The Russian word, *voobrazhenie* is made up of three parts: *vo* (into), *obraz* (image), and *(z)henie* (a gerund indicating process). So, literally translated into English, *vo-obraz-(z)henie* means «into-im-age-making» or



Fig. 2. The HB monogram at the left hand side of the figure is what the subject sees when the image is allowed to slide freely across the retina during normal saccadic eye movements. The H, B, 3 and 4 to the right of the monogram represent the elements that appear as the initial image fades or when there is a brief, slight movement of the image after it has faded

«the process of making an image». Suvorov's metaphor for the process in question is «to rise up from the earth and return again». We were struck by how closely Suvorov's metaphorical description of *voobrazhenie* parallels the process the process of «centering on the target object», looking away and then re-centering on the object (the saccadic movement of the eye). It is our belief that Suvorov, Bakhurst, and Padden are precisely correct. Every act of «seeing the world» is a process that requires a creative synthesis of information at time T and at time T+1. These two sources of input can *never* completely coincide with each other; consequently, the continuity of daily conscious experience is imagined; the literal physical interactions involve, of necessity, discontinuity (owing to saccadic and other bodily movements). Alternatively, we can say that *discoordinating* with that world is constitutive of the *illusion* of continuity in consciousness, of the feeling that we are coordinating with the world.

From what we have said so far we can conclude the following: consciousness, our «image of the world», is a dynamic process emerging from three sets of constraints: phylogenetic constraints, cultural constraints, and a process of *voobrazhenie*, or in Irwin's terms, «evaluation». The need for *voobrazhenie* (the term we prefer because it indexes the ineluctably *creative, productive* nature of the process) arises because of a gap caused by the time it takes the eye to «lift up» off the fixated object and return to it again, now in a different relationship, owing to movements of the person, and perhaps the object, in the intervening «blink of an eye». Animals, other than human beings, share a great deal of the basic properties of their brain organization and functioning with human beings and as in humans, their retinas are in constant motion. At this level of organization, humans are likely to have a primitive form of consciousness in common with higher primates. Put differently, phylogenesis plays an obvious and important role in *voobrazhenie*.

However, both the structure and content of human consciousness are distinctive among species. With respect to both structure and content, from early infancy onward human conscious is «de-formed» by the need and ability to mediate action, including the acts involved in comprehending what is going on, *through* culture. By culture, here, we are referring to the product of the ways in which human beings have evolved a means of accumulating

the experience of prior generations extra-corporally, as part of their «social inheritance». Culture is like «history in the present», creating an essential level of constraints upon the constitution of consciousness. Moreover, as Pritchard's experiments demonstrate, extensive coordination with the world through culture feeds back on biology, creating a kind of «cultural firmware» in the form of cell assemblies, sensitized patterns of neurons tuned to the cultural world.

A seemingly inevitable next question now emerges. How does the cultural world, initially exterior to the individual, come to be incorporated in our bodies so deeply that it becomes, second nature?»?

There are many approaches to answering this question which fall under the broad umbrella of «cultural psychology» (See Shweder et al 1997, for a recent review). Our own approach, as indicated earlier, follows in the tradition of cultural-historical psychology, initiated by Vygotsy and his colleagues, and elaborated by their students (Vygotsky 1978, 1987).

A brief set of principles

From our perspective, the following brief set of principles characterizes adherents of the cultural-historical clan among cultural psychologists.

1. The basic premise of a cultural-historical approach to mind is that human beings have the need and ability to mediate their interactions with each other and the non-human world through culture.

2. Culture is conceived of as human beings' «social inheritance». This social inheritance is embodied in artifacts, aspects of the environment that have been transformed by their participation in the successful goal-directed activities of prior generations. They have acquired value.

3. Artifacts, the constituents of culture are *simultaneously* material and ideal/ symbolic. They are materialized in the form of objects, words, rituals and other cultural practices that mediate human life. They are ideal in that their form has evolved to achieve pre-scribed means to pre-scribed goals, and these have survived to be our tools for our use in the present, Tomasello (1998) refers to them as «intentional artifacts» to capture these properties. Consequently, in an important sense, culture is created from the process of exteriorizing mind, while mind is the product of interiorizing culture.

4. The «effective environments» of mental life are taken to be the different practices or forms of activity in which people engage. That is, human psychological processes are acquired in the course of joint-mediated activity.

5. Consequently, it is by analyzing what people do in culturally organized activity, people - acting through mediational means - in a context, that one comes to understand the process of becoming and being human. Mediation of action through culture in social interaction is the essential precondition for normal human development. It is the process by which phylogenetically given constraints on mental activity are supplemented by cultural constraints, making the process of specifically human forms of *voobrazhenie* possible.

6. The historical origins of the cultural medium lead directly to the conclusion that all culturally mediated behaviors are social in their essence, and social in the dynamics of their origin and change in the course of a single human life. Vygotsky expressed this idea (which can also be found in the French sociogenetic tradition) in what he called «the general law of cultural development»:

Any function in children's cultural development appears twice, or on two planes. First it appears on the social plane and then on the psychological plane. First it appears between people as an interpsychological category and then within the individual child as an intrapsychological category ... but it goes without saying that internalization transforms the process itself and changes its structure and function. Social relations or relations among people genetically underlie all higher functions and their relationships (Vygotsky 1981, 163).

This view of social origins requires that special attention be paid to the power of adults to arrange the environments of children so as to optimize their development. This effect can only be achieved by coordinating them through cultural artifacts in meaningful human practices, through which they can then acquire the cultural heritage essential to adult thought processes. Methodologically, it urges on the research a strategy which traces the process of enculturation over time.

A great many research programs could serve as examples for the application of this strategy (see, for example, Cole 1996; Tomasello 1998; Wertsch 1997).

However, we have chosen to highlight a remarkable program of research undertaken in the

then-Soviet Union by Alexander Meshcheryakov with children who were blind and deaf. Our choice is motivated by both personal and methodological considerations. First of all, the authors have first-hand knowledge of this research, which is little known outside of Russia: Levitin has had extensive personal experience with both the researchers and subjects in the Soviet research, including a number of blind-deaf psychologists; Meshcheryakov was a student of A. R. Luria's, providing a direct connection between his research on the blind-deaf and the wellsprings of cultural-historical psychology; and both authors had a long, personal relationship with Luria, who made sure we appreciated the significance of this line of research. Less personally, the blind-deaf offer a unique set of circumstances for tracing in detail the process by which adults arrange for children to appropriate their cultural heritage, and therefore, the process by which the tripartite structure of consciousness underlying higher psychological functions come into being.

The Predicament of the Blind-deaf

First, consider the cognitive predicament of being blind and deaf for an adult. The blind-deaf have lost the two major senses by which one can obtain information about the environment «at a distance». While the sense of smell can, in some conditions, provide information from a source that is not physically in contact with the body (the smell of onions frying on the stove), the two remaining senses, touch and taste require one to come directly in contact with the physical environment.

For the blind-deaf, in the most physical and concrete fashion, the task of encountering the world at a distance, the creation of a gap that allows anticipation and adjustment of experiences to come, is an absolutely essential precondition of freeing themselves from the tyranny of direct environmental pressure in order to be able to think ¹.

Thought of from this perspective, it becomes clear that the world extends beyond the body

¹ It might seem that the same is not true of the sighted-hearing person, for whom the senses of hearing and seeing appear to provide direct access to the «world at a distance». However, as the fixed image experiments demonstrate, this phenomenological experience of directness is an illusion. The sighted-hearing, no less than the blind-deaf, require a gap between themselves and the world in order to be conscious of (imagine) it, the gap provided by saccadic eye movements.

only to the extent that one can create a medium of interaction that enables the individual to encounter the world at a distance, temporally as well as physically. At the same time, it is necessary to fill the gap thus created in a manner that allows the individual to anticipate the world on ego's own terms.

This point is illustrated by considering the circumstances of another sensorially deprived group, the blind, using the famous thought-experiment of the blind man and his stick. The following example is from Gregory Bateson: «Suppose I am a blind man, and I use a stick. I go tap, tap, tap. Where do I start? Is my mental system bounded at the hand of the stick? Is it bounded by my skin? Does it start halfway up the stick? Does it start at the tip of the stick?» (1972, 459) The answer, for purposes of connecting to the predicament of the blind-deaf, is that the mind begins at that furthestmost point where the organism is coordinated sufficiently well with the environment to be able to move within it confidently, that is, the point at which the environment yields an interpretable image. In so far as the stick is coordinated with the person using it, acting as a medium through which the blind man can *imagine* his environment satisfactorily, that medium becomes transparent. When initially handed a strange stick, the blind person feels it with his hands, «takes its measure». At this point, the mind's furthest reach is the hand which is exploring the stick. As the stick becomes familiar, the man takes it and begins to use it to explore the environment at a distance, mediated by the stick. With practice, the mind, so to speak, moves outward to the tip of the stick, which ceases to be consciously felt, it becomes, so to speak, transparent, and now the mind terminates at its point of contact with the sidewalk. When walking in a familiar place, the mind extends beyond the stick, to that furthest point where man, stick, and environment are sufficiently coordinated to allow the stick to remain the invisible medium of interaction-at-a-distance. It might be, for example, that the process of *voobrazhenie* extends through the stick and down the street to the restaurant where the man's friend is waiting for lunch. But should there be an unexpected obstacle, the mind, as it were, «comes closer» receding to the tip of the stick. And when the man sits down to eat his lunch, «the context changes». Now it is forks and knives that become relevant and through which mind constantly fills in the needed gaps relating person to world.

In short, because what we call mind works through artifacts, it cannot be unconditionally bounded by the head nor even by the body, but must be seen as distributed in the artifacts which are woven together and which weave together individual human actions in concert with other parts of the permeable, changing contexts of action.

The principles we are summarizing here apply universally, but just as they apply differently to the sighted person and the blind person, so they differ between the blind and the blind-deaf. The attendant complexities are informative. Blind-deaf people, like blind people, often walk with the aid of a cane. But if they encounter a difficulty walking along the street, they cannot verbally ask a passerby for help. What sort of artifact, in addition to a cane, would suffice for a blind-deaf person? One effective tool used in the Russian blind-deaf community is a small dactylic alphabet card with Russian printed above each dactylic letter. At the top of the card, in printed Russian, it explains that the person holding the card is blind and deaf. It goes on to ask the person to whom this card is shown (perhaps a passing pedestrian at a street corner) to watch as the blind-deaf holder of the card spells out a message. Its use of both a dactylic representation of the letters of the Russian alphabet and conventional printed letters of the alphabet enables a form of speech transformed into writing. Using two tools, a cane as a prosthetic device for locomotion through space and the card, as a prosthetic replacement for hearing, blind-deaf people can achieve a remarkable level of mobility and independence (as described by S. Cole 1986).

Describing the accomplishments of adult blind-deaf people in this way raises the key challenge that we wish to concentrate on in the remainder of this paper. That challenge can be phrased as a question: By what process do children deprived of sight and sound come to mediate their interactions with fellow human beings through an alphabet representing an aural language to which they have no access?

It is this question, embedded in the ethos of *Soviet* psychology of the time, that made the study of the education of the blind-deaf one of the most interesting programs of research within the cultural-historical framework. This work is particularly interesting within the context of this collection of essays on human nature because cultural-historical philosophers

and psychologists saw the challenge of fully educating blind-deaf children to be a kind of «crucial experiment» demonstrating their views about human nature.

This challenge is also an unusual opportunity. Here is how Alexander Zaporozhets, a colleague of Meshcheryakov, described the special scientific importance of studies of the development of the blind-deaf:

...blind-deafness represents a truly unique phenomenon of nature providing unparalleled opportunities for the study of the conditions necessary for the formation of human personality and the patterns to be found in that formative process. All the processes which occur at breakneck speed in the course of a normal child's development, intricately interwoven one with another and shaped by a whole host of spontaneous influences that are most difficult to assess, are easy to distinguish in the deaf-blind child since they unfold slowly, and what is particularly important, do not arise naturally, but are engendered with the help of special teaching methods that can easily be ascertained. It is this factor which provides unique conditions for experimental research into the dialectics of human mental development (Zaporozhets 1974, 6).

With these goals in mind, the Soviet Academy of Pedagogical Sciences opened a special school in Zagorsk, a small city not far from Moscow in 1955. In 1963 a special home for deaf-blind children was opened associated with the school. The school was initially directed by Ivan Sokolyansky. In 1960 Alexander Meshcheryakov, who began his academic career as a philosopher and then obtained his graduate training in psychology, became director of the school. Under his direction, a corps of teachers and teachers' aides were instructed in principles for enculturating blind-deaf children motivated by the cultural-historical psychologists who then played a prominent role at Moscow University – A. R. Luria, A. N. Leontiev, P. Ya. Galperin, A. V. Zaporozhets and others. Resources were provided to create as rich an environment as possible to promote the intellectual and social development of the students. The Utopian goal of this research was to demonstrate that if sufficient care is taken to arrange the experiences of blind-deaf children, they can become fully functioning human beings, capable of living independently and earning a decent living. The crowning achievement of this work occurred

when four graduates of Meshcheryakov's school went on to receive degrees in psychology from Moscow State University.

The initial state of the children

There has been a great deal of argumentation focused on the initial state of blind-deaf children who underwent instruction at Meshcheryakov's institute. (See Bakhurst, 1991; Bakhurst and Padden, 1991). From a purely logical point of view, research on the mechanisms of development among such children would be simplified if all the children were born blind and deaf, with no other problems. However, children are very rarely born blind and deaf and even when they are, blindness may be caused by cataracts which leave residual vision of light or there may be some retention of partial hearing. As a rule, the sensory deficits are suffered early in life owing to disease; hence, it is impossible to exclude the possibility that successful instruction depends, at least in part, on learning that took place before they entered Meshcheryakov's specially designed home at Zagorsk.

However, we do not demand a mythical «blank slate» in order to be able to learn a great deal from research on the enculturation of the blind-deaf. From myriad descriptions of individual cases, it seems clear that, although some of the children may have had sight or hearing for a few years when they lost sight and sound, the general character of their interactions with the world soon lapsed into one of extreme lack of responsivity. Meshcheryakov (1974) cites both an extensive prior literature and his own observations in claiming that the blind-deaf, deprived of instruction, can spend many years in bed, or in the corner of a room fenced off from others, making no efforts to make contact with objects or people, appearing to achieve no mental development, and failing to learn to walk, eat, drink, etc.

Meshcheryakov (1974, 83) succinctly characterized the very limited repertoire of the young people brought to his special school in Zagorsk:

The whole of these children's mental activity is confined to the perception of the most elementary physical needs and the experience of elementary pleasure at the satisfaction of those needs or displeasure if the needs are not satisfied. Essential elements of human behavior are for all intents and purposes missing altogether. In its place we find stereotyped motor activity that allows children to expend their energy.

According to Meshcheryakov, in many cases parents attempt to care for their children in the earliest years of life by keeping them constantly «to hand»: mothers may spend the first two years of a such a child's life constantly in contact with their offspring, but eventually the burden becomes too great, and they are forced to separate themselves in order to be able to provide food and shelter. Left alone for long periods of time, as a consequence of their isolation from the world, such children developed a kind of extreme «learned helplessness» and stop orienting to the world, except when another person directly touches them for purposes of feeding or cleaning them. Meshcheryakov reports that «a completely unfamiliar object placed in the hands of a deaf-blind child does not stimulate any tactile investigation on the latter's part; a pen, a box of matches or a pencil will be dropped or thrown away by the child» (1974, 89). He noted that it is only when the object is part of a practical activity that satisfies a basic, biological need that one sees elementary forms of exploratory actions, especially if the object interferes in some way with satisfaction of that need. «If it emerges that the stimulus is not linked to the boy in a practical relationship», he reports, «the orientative reaction to it does not evolve» (ibid.).

Initiating Enculturation

Meshcheryakov notes that the first impulse of many psychologists when they encounter the blind-deaf is to develop their linguistic skills, on the premise that language is the central medium through which their intellectual functions can be awakened. This idea has been propagated through famous cases, such as that of Helen Keller's well-publicized «breakthrough», when she realized that the feel of water, and the feel of her teacher's hand making a particular pattern of movement on her hand were connected, such that the pattern of movement «re-presented» water.

Meshcheryakov explicitly rejects this idea. While acknowledging that language acquisition is crucial to the development of blind-deaf children, he argues that «fostering speech skills in such children is not and indeed cannot be tackled as the *first* objective in nurturing of a human mind» (1974, 84). Instead, basing himself on the tenets of cultural-historical he argues that the inclusion of the children in socially organized, culturally mediated, joint

activity is *the* essential precondition for their development. In his words,

A child's mind takes shape and develops as a result of its interaction with the world of things and the world of people. The things with which a child interacts are the products of human labor. The essence of interaction with things and people consists in the fact that in both cases this is interaction with a human factor. Expressing this idea in somewhat paradoxical terms we may say that the individual's relationships with other people are realized through things and his relationship to things through his relationship to other people (1974, 86).

Initially these interactions are focused on mundane self-care activities that satisfy essential biological needs: eating, staying warm, elimination. These intensely practical activities serve as the foundation on which non-practical activities, such as play, are developed. These non-practical activities in turn create the foundations for the further development of practical activities.

Of the dozens of detailed examples provided by Meshcheryakov, we can present only a few fragments which illustrate the basic principles at work.

Rita was two years, eight months old when she entered the special school in Zagorsk. She had congenital cataracts that allowed her to distinguish light and dark, but she could not distinguish objects and she was totally deaf. She had been carried around by her mother almost constantly and had developed no self-care skills. She could walk on an even surface holding an adult's hand, and drink from a cup that was held to her lips while she sat on her mother's lap, but she ate with her fingers, was not toilet trained, and her only communicative gesture was to stretch out her arms to be picked up when she felt an adult nearby and to shout when she wanted attention. She did not imitate adults actions and showed no interest in objects, pushing them away from her if she encountered them.

Instruction began with establishing a regular daily schedule in a highly ordered environment. At first she would cry when put down to sleep, and throw all the bedclothes on the floor. The teacher would take Rita's hands in her own and lead her over to where other children were taking their naps, allowing her to feel the other children, to learn that they had undressed and lain down to sleep. Then she would place Rita's

hands together in the gesture used to mean «sleep». This routine was repeated daily, along with regularly sitting her on a potty, taking her to wash her hands and face, and helping her to get dressed. Care was taken to be sure that the potty seat was not cold and that the water was warm so that Rita would come to find the experiences pleasurable. All the while the teacher remained in physical contact with Rita as she was led through these routines, often holding the child's hands in her own as she went through such mundane actions as putting on a dress or washing her face,

Initially, Rita resisted these activities so that, in effect, she was being «carried through» them by the adult. But the adults were trained to give as little help as necessary. Within a few months, Rita began to take an active role in parts of various actions, and the teacher's role correspondingly decreased.

As was true for all the children, the bed where Rita slept was the «home base» from which she gradually began to expand her world. Initially, extreme care was taken to make sure that every object in the room had its specified place: her towel was folded over the head of the bed, a chair was placed next to her bed, always in the same place. Her clothing was placed in a neat stack in an invariant order. Together, the establishment of repetitive routines of self-care in spatially predictable environment constituted the initial conditions to allow the child to begin to anticipate the order and location of events. In Meshcheryakov's terms, «The stability of the deaf-blind child's tangible environment is essential if he is to develop proper skills in spatial orientation. It helps him to create an integral picture made up of images of the objects around him, a picture which reflects the external world» (1974, 131).

Only after the child has learned to orient in this environment does the teacher begin to vary the location of objects or the order of routines. Such variation, introduced gradually, creates active orientation on the part of the child, so that it becomes routine for it to explore the environment without become overly fearful and lapsing into a state of learned helplessness again.

Although new skills are introduced by the teacher literally leading the child through them, teachers are trained to be sensitive to even the slightest evidence of active behavior on the part of the child. Such activities are the seeds of

future independent action and they are used by the teachers as guides to the gradual withdrawal of their supporting/leading behaviors,

A deliberate effort was made to orient Rita to what the children and adults around her were doing, accompanied and guided by her teacher. An especially important activity was play, which was initially entirely absent. The teacher introduced her to play by leading her to other children as they played, allowing her to feel their movements and the objects they were playing with: how they built and took apart a block pyramid, or assembled and disassembled a set of nested matryoshka dolls. The teacher would also engage Rita in interaction with a doll, indicating how parts of the doll's body corresponded to parts of Rita's body, how items of the doll's clothing corresponded to items of Rita's clothing.

As a part of these engagements, the teacher would make a point of introducing each new activity by making a manual sign indicating the name of the activity they were about to engage in. For example, her hand would be moved up her leg from her foot to her knee, after which the teacher would put on her stocking. For a long time, Rita did not comprehend such signs. The effective signal for dressing was the feel of the teacher starting to pull Rita's sock on. A little later, Rita would help the teacher put the sock on and eventually, would put it on herself. Only later did she begin to pull on her socks in response to the manual sign. Production of signs lagged well behind their comprehension.

These same procedures were repeated with dozens, then hundreds of mundane actions; predictable sequences were initiated by the teacher who «carried» Rita through them. As she began to be able to anticipate next steps in the sequence, she began to co-operate with the teacher, and then began to engage in the actions in response to a manual sign.

Meshcheryakov repeatedly emphasizes that it is not the isolated sequences by themselves that are important. Speaking of another child, Lena, whose story is similar in all essential respects to Rita's, Meshcheryakov writes,

In this activity (self-care) one movement followed on from another, and the end of each action provided the signal for the next one to begin. All these actions taken together constituted an integrated, uninterrupted stream of human behavior. In this way all Lena's behavioral skills, the progress achieved in orientation, play and self-care

developed not separately from each other but as parts of an indivisible whole. As a result, the images of objects which took shape in the child's mind, as she came to master them and their functions in order to satisfy her needs, did not constitute a haphazard selection of separate disconnected images, but made up a connected system of images linked together in an integrated «vision» of the external world (1974, 124).

It is in the context of such joint activity in a meaningful world that the initial manual signs used by the teachers begin to take on meaning and come to be actively appropriated by the children. Meshcheryakov describes, for example, how children, once they began to play with other children, began to show an interest in the dactylic signs that they made by tracing movements on each other's hands. They would «inspect» other children's hands while they were conversing through patterns of touch on the palms of each other's hands, at the same time that they engaged in play with objects. In the course of this activity, they came to acquire the rudiments of finger-spelling simple words such as ball or doll, precursors to the acquisition of the use of braille that would give them access, once they began formal instruction, to the Russian language and the storehouse of the social inheritance of the larger society of which they were a part.

Once the children are part of the community, having mastered its routines and having acquired a rudimentary set of manual signs, and perhaps a few finger-spelled simple words, the foundations are set for the acquisition of verbal speech, which, for the blind-deaf, means the acquisition of finger spelling. Meshcheryakov summarizes the process as follows:

Learning verbal language starts not with letter but with words, and not simply with words as such but with words as part of a connected, meaningful text. The sense context for the child's first words are signs. The child's first dactylic words are incorporated into a story that is transmitted by means of mime. Only after a child has mastered several dozen words denoting concrete objects can it come to grips with the dactylic alphabet, which in practical terms it has already learnt. Once it has mastered finger spelling it can be taught any word, providing a correlation between the object and the corresponding sign is made clear. ... After learning the dactylic alphabet by heart, the child is acquainted with Braille signs for the letters. Each Braille letter is associated in the child's mind with the manual designation of that letter, with which he is already familiar (1974, 213).

Working their way from a core vocabulary based on the everyday routines that they have already mastered, the children are introduced to more and more complex language forms. No effort is made to teach grammar because Meshcheryakov understood that hearing/sighted children acquire grammar as they extend their vocabularies, without explicit tuition. However, the teachers gradually expand the complexity and range of the dactylic finger-spelled vocabulary that children are exposed to and, along with it, the range of grammatical forms that they become acquainted with. Later they will be taught to read braille rapidly and to write using a specially designed typewriter with braille characters that produce either braille or printed Cyrillic symbols.

Some Concluding Remarks

A chapter such as this is too brief to permit us to do more than provoke the reader into considering our main thesis: that the mediation of human action through culture is constitutive of human consciousness and the human form of life. We have attempted to show this at two vastly different levels of analysis. First, we have drawn upon evidence concerning the microgenesis of images among enculturated adults, arguing that cultural constraints merge with and supplement phylogenetic properties of the eye in the generation of our image of the world. Second, we have argued that the constraints provided by phylogeny and ontogeny are insufficient for the production of meaningful images; rather, images are processes, not things. Central to the process of image-making (*voobrazhenie*) is the active striving of the individual to reconcile the disparate information emerging from the convergence of information in successive moments of time. For eye movements, this means moments of coordination/fixation separated by discoordinating saccadic eye movements. For everyday activity, it means the moments of coordination in joint activity are interspersed with the ineluctable moments of discoordination that arise from the loosely coupled transactions of human beings with each other and their physical-sociocultural environments. In both cases, the creating of meaningful images of the world requires the active, purposeful, actions of human beings, who must resolve the uncertainties that arise from the discoordinations that are a necessary part of all human experience.

The two different levels of analysis in this paper are brought together in a poignant way by the experience of Alexander Suvorov. Although we did not mention it above, Suvorov, who suggested the «metaphor» of *rising off of the world and returning to it* as the basic cognitive act, *voobrazhenie*, has himself been blind and deaf from early childhood. He entered Meshcheryakov's school as a young child and underwent the course of enculturation that we have described here. So, when he characterized *voobrazhenie* as one of «rising off the earth and returning to it», he was not really speaking entirely metaphorically. Rather, he was communicating the phenomenology of a person who, at one point in his life, could not separate himself from his environment in the delicate balance of culturally mediated coordination and discoordination necessary to create a meaningful image of the world, but who acquired this ability through the painstaking efforts of Alexander Meshcheryakov and his staff.

The accomplishments of Suvorov and his fellow students gave rise to the natural question: how could someone who is blind and deaf, seemingly cut off from culture and all but the most proximal of environmental stimulation, acquire the ability to read and write Russian, to matriculate from Moscow University, and to live as an independent citizen in a his nation's capital? We found the answer in the role that cultural mediation, self-consciously organized by socializing adults, plays in the development of mind. It is by being incorporated in the meaningful, culturally organized, coordinated, joint activities of a human community that human infants come to acquire higher psychological functions. This cannot be accomplished without the active, exploratory, information-seeking activity of the child, nor without the tolerance, if not willingness, of the community to facilitate this process.

Alexander Meshcheryakov liked to emphasize that «one is not born a full personality». His research enormously enriched our understanding of the complex sociocultural process by which the mature personality is constructed from the raw materials provided by nature. Were he alive today, he would almost certainly approve of the way that David Plath, an American psychologist, expressed the same idea: «The mature person is one of the most remarkable products that any society can bring forth. He or she is a living cathedral, the handiwork of many individuals over many years» (1980, 6).

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