

**Supplement**

to

**TEACHING AS STORY TELLING**

by

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**This supplement has three main parts. First is an additional "chapter" or "article" - hard to decide on an appropriate name in this context - which includes some work and thinking on the topic of the book done since its publication. It is called 'Education and the mental life of young children'. Second is a set of further examples of applying the model given on p. 41 of the book in various curriculum areas. Third is an invitation for those of you with access to a modem to send me your comments or questions on the book or any part of it. I hope this makes the book a basis for more interaction, and perhaps informality, than has been the norm in a print based environment. This is an attempt to take advantage of the possibilities of electronic communications and perhaps experiment with Marshall MacLuhan's claims that such a medium returns us to kinds of communication and thinking not common in the Gutenberg galaxy, which we are rapidly leaving.**

# Part One

## Education and the mental life of young children

### Introduction

Education is generally conceived of as a straightforward progressive, cumulative process. It is characterized in terms of development, growth, accumulation of knowledge, skills, and experience; it is "hierarchical integrative," in which the earlier stages are ideally incorporated into more sophisticated later stages. It is a process in which some image of the ideal aim of educated adulthood guides practice constantly in the direction of that ideal. There have been varied images of the ideal aim, of course, and these have been the source of much dispute. But what has been generally common to these varied images is that the mental life of young children is seen as a starting point at which their knowledge is little, their experience is narrow, and they largely lack the desirable qualities the educational process is to bring about.

Most reflection on children's mental life has been conducted by people whose main interest is education. What I will argue in this essay is that the focus on education has tended towards the neglect of certain distinctive features of children's mental life. In particular, the roles and importance of what I will call children's "orality," which I will try to characterize below, have received relatively little or inappropriate attention. This has, I think, created two significant and related problems for educational practice.

First, the relative neglect of orality by the major theorists who have influenced our conceptions of education, and by the dominant empirical research tradition whose methods provide little grasp on such a phenomenon, has contributed to a somewhat disproportionate and imbalanced view of children's mental life. From this prevailing view a range of implications are fed into educational practice. Their effect is to focus on a limited set of children's intellectual capacities to the relative neglect of others. This is particularly unfortunate, I will argue, because the focus and implications for practice are directed to things young children tend to do least well and significantly neglect what they can do best. As these implications influence both curricula and methods of teaching, this is no small matter.

Second, the general conception of education as a cumulative, progressive, additive process tends to encourage blindness towards the losses that seem inevitably involved in educational gains. The focus on the various potential gains of education, and disputes about which are the more valuable to pursue, has further tended to deflect concern from potential losses. I will argue that while education is a process in which we properly seek to maximize gains, it is also a process in which we should attend equally carefully to minimizing losses. In the prevailing conceptions of education there seems very little sense of the intellectual losses involved in education, consequently little is done to minimize them, and consequently, I fear, we lose much more than is necessary.

In the first section below, then, I will sketch what seem to me the major influences that have shaped prevailing conceptions of children's mental life. I will try to show how the educational concerns of these theorists have inclined them to suppress or ignore children's orality. In section two I will turn to some characteristics of the mental lives of people who live in oral cultures

throughout the world. There are some interesting parallels between the forms of thinking in oral cultures and in young children in Western societies. These parallels are not coincidental, I will argue, but they need to be drawn cautiously, because there is certainly no general similarity to be asserted between the thinking of adults in oral cultures and young children in the West. In section three I will consider some characteristics of the oral culture of childhood in Western societies, focusing on empirically observable products of young children's mental lives. In the conclusion I will sketch what seem to me some implications of all this for the curriculum and for teaching in early childhood.

#### Conceptions of early childhood education

No-one has influenced Western conceptions of education more than Plato, and the literature about his educational ideas is, of course, enormous. Here I want only to touch briefly on how he so influentially represented the mental life of young children. Plato commonly summed up his arguments in those immensely vivid and powerful myths, analogies, parables, metaphors, and allegories that have retained their hold on people's imagination sometimes long after the arguments from which they were derived have been discounted. In the parable of the Line (Republic, VI. 509: Cornford, 1941) Plato sums up the stages of cognition through which one can progress from confusion to clarity in understanding reality. The first stage, eikasia, represents that condition in which the mind accepts as the full truth about reality whatever appears to the senses. It is consequently a state of mind full of illusions, confusions, and conventional beliefs based on nothing more substantial than current opinions. Inquiry goes no further than the superficial appearances of things. In the later parable of the Cave (Republic,

VII. 514), this mental condition is likened to the perception of reality of bound prisoners who see only the reflection of images on the cave wall. In Plato's educational scheme, eikasia is represented as the condition of mind of young children.

Because of the enormous influence of psychology on educational thinking during this century, there is perhaps a tendency for us to see Plato's reflection on the mental life of young children as a kind of precursor to Piaget's developmental theory — in which Plato's eikasia, pistis, dianoia, and noesis stages adumbrate Piaget's. But in Plato's scheme early childhood is an epistemological condition rather than a psychological stage. Development along Plato's Line is achieved by the accumulation of particular forms of knowledge in a particular sequence. This is not akin to some kind of psychological developmental process; it is achieved by mastery of specific knowledge.

In the Christian tradition, which has also played an influential role in forming our conceptions of education, the mental life of young children received no greater attention or higher valuation. Christ's own wonder at the distinctive qualities of childhood: "Suffer the little children to come unto me...for of such is the Kingdom of God," has to wait until Blake and Wordsworth before we hear it echoed and developed forcefully. St. Paul's message to the early Christians was to put off childish things as irrelevancies in dealing with the serious tasks of adulthood. St. Augustine later, and more influentially on education, represented childhood as a time of monstrous egotism, evil temper, violence, and a range of other vices: "I am loth, indeed, to count it as part of the life I lead in this world" (The Confessions, Sheed, 1944, p. 8). In Pauline and Augustinian Christianity the doctrine of original sin discouraged any attempt to find something valuable in the "natural"

mental life of young children. Our nature is corrupt from the beginning and childhood was represented as a time of unreason during which adults properly began the arduous task of controlling the evils and weaknesses of human nature so evident in children.

As a subject for careful study the mental life of young children fared little better from the Enlightenment. The philosophic insight that concluded Descartes' search for a bedrock of knowledge was "I think, therefore, I am." Rational thought was what distinguished humanity and allowed us to make secure sense of the world and of experience. But rational thought emerged only slowly through a difficult process of education. The mental life of young children was a froth of confusion to be blown away from the young mind in order that rationality might begin to be developed. "Only in its promise of humanity — that is, its potential of rationality, its eventual educability — was [childhood] in any way a subject worthy of interest, study, and attention" (Coe, 1984, p. 11).

These conceptions of education and notions about the mental life of young children are not simply of historical interest, of course. Their influence is felt powerfully today. What are commonly called "traditionalist" educators hold the view that the mind is formed by mastery of particular knowledge. In such a view young children clearly do not have much in the way of "mind," and as "mind" is what makes us distinctively human, then we are led to conclusions such as "nobody is born a human being" (Oakeshott, 1971, p. 46). Young children are "postulants to the human condition" and they achieve humanity, and mind, by being "initiated" into the "inheritance of human understandings" (Oakeshott, 1971, pp. 46, 47). Before this initiation, "in the morning twilight of childhood, where there is nothing that, at a given moment, a clever child may be said exactly to know or not to know," there is only

"inclination...casual encounters provoked by the contingencies of moods...fleeting wants and sudden enthusiasms tied to circumstances...current wants and 'interests' " (Oakeshott, 1971, pp. 47, 48).

The most powerful Romantic reaction to this view of childhood might have been expected to draw more respectful attention to children's mental life. But at the fountainhead of "progressive" educational ideas we find Rousseau expressing contempt for children's intellectual activity. Their ruin, he says, is in the

apparent ease with which they learn...you fail to see that this very facility proves that they are not learning. Their shining, polished, brain reflects, as in a mirror, the things you show them, but nothing sinks in. The child remembers the words and the ideas are reflected back; his hearers understand them, but to him they are meaningless (Emile, Foxley, 1911, p. 71)

Rousseau, of course, wanted nature — not "Words! Words! Words!" — to educate the child. His characterization of young children's mental life includes such observations as: "His ideas, if indeed he has any ideas at all, have neither order nor connection; there is nothing sure, nothing certain, in his thoughts" (Emile, Foxley, 1911, p. 70). The kinds of fairy-tales and fantasy that seem so engaging to young children, Rousseau, like Plato, wanted banned because they convey intellectual confusion and moral chaos. Rousseau takes his readers through La Fontaine's fable "The Fox and the Crow," showing line by line the confusions that it would sow in the child's mind. Most of the tale, he claims, is meaningless to young children, some of it is totally confusing, and the remainder perverts the truth of nature which should be the child's sole mentor. ("So foxes talk, do they!")

The influence of John Dewey and the various groups of progressivists who have claimed him as their source has been enormous in North America. As Cremin puts it, "by the 1950s the more fundamental tenets of the



progressives had become the conventional wisdom of American education" (Cremin, 1976, p. 19). It also seems generally true to claim that "whether or not we like Dewey and the progressives, we are heirs to their formulations, and the irony is that an age that has all but forgotten Dewey is still governed by his analytical categories" (Cremin, 1976, p. 8). Dewey's writings are notoriously hospitable to quite divergent interpretations, so the selection of particular quotations cannot capture the complexity of his vision. While I think that one cannot deny the liberating effect of Dewey's influence on modern conceptions of children's mental life, and that the influence of progressivism in general has led to more careful attention to children's intellectual activity, the urgent social concern that runs through Dewey's writings, and the narrower notions of the social utility of education in significant branches of progressivism (Kliebard, 1986), has tended to deflect attention from certain features and disproportionately onto others. If our conventional wisdom is drawn from such observations as: "The child lives in a somewhat narrow world of personal contacts" (Dewey, 1902, p. 5) and accepts "the necessity of an actual empirical situation as the initiating phase of thought" (Dewey, 1916, p. 153), and believes that the "subject matter of education consists primarily of the meanings which supply content to existing social life" (Dewey, 1916, p. 192), then the resulting image of children's mental life is of a rather limited kind, whose content is tied to the everyday features of the child's social experience. This image is instantiated in the subject that Dewey saw as central to the new twentieth century curriculum — the Social Studies. The content assumed to be intellectually accessible to young children in the elementary Social Studies curriculum — which has remained virtually unchanged from its inception early in the century — is the everyday experience of family, neighborhood, community, and so gradually outward along lines of

content associations, "expanding" the child's "horizons." It is a conception of young children's mental life that focuses intensely on its ability to learn about the social world and attends relatively little to its imaginative activities. This is not an attempt to convict the author of Art as Experience of having no interest in children's imagination, but rather to suggest that the progressivist heritage, while indeed generating an enlarged attention to children's intellectual activity, nevertheless carries also a significant degree of Rousseau's depreciatory opinion of the quality of that activity in comparison with adult achievements.

Psychological research has tended to focus on those features of young children's intellectual activity on which the dominant methodologies are able to gain some grasp, and consequently the great bulk of this has been on a range of logical skills whose performance can be assessed from specific, clearly designed tasks. Even Piaget's imaginative program of research has tended to focus very largely on a limited range of logico-mathematical structures. More recent post-Piagetian work in this tradition, however, particularly in the increasing convergence with Vygotsky's research, is beginning to engage a much wider range of young children's intellectual life. (This is ably described in Bruner's recent Actual Minds, Possible Worlds (1986).)

I should note two other influences, in this quick gallop through the centuries. First is evolutionary theory. The immense influence of evolutionary ideas came into education in a manner that supported developmental schemes that represented young children's mental life as equivalent to that of "primitives" or "savages." Herbert Spencer, for example, applauded certain forms of teaching because "a common trait of these methods is, that they carry each child's mind through a process like that which the mind of humanity at large has gone through" (Spencer, in Low-Beer, 1969, p. 70). In Spencer's

hands, and in those of G. Stanley Hall in the U.S.A., the recapitulationist theories of development held some promise, but tended in practice to degenerate into content-based organizational schemes in which children were presumed to be able to grasp only simple and concrete ideas and to have intellectual interests only in the kinds of things that "primitive" peoples were engaged by. Dewey, too, was initially influenced by such views: "There is a sort of natural recurrence in the child mind to the typical activities of primitive people; witness the hut which the boy likes to build in the yard, playing hunt, with bows, arrows, spears and so on" (Dewey, in Gould, 1977, p. 154).

The second influence is due to the fact that all the influencers I have mentioned were male. I don't want to make too much of this; indeed, I'm not sure what to make of it, or that I am the one to make it. But one cannot entirely neglect the fact that the people who have generated the ideas that have helped to form our conceptions of young children's mental life have usually been males, whose concerns have been very largely with the shaping of people to perform in particular ways as adults in society. Inevitably their conceptions of education are affected by presuppositions about making sense of experience that neglect features that might have been more to the fore had women been writing instead. Also, given the various norms of sexual roles in Western societies, males have typically been less involved with young children and less attentive to their spontaneous intellectual activity during the early years.

Well, this is perhaps a somewhat imbalanced picture of neglect of some of the more distinctive qualities of children's mental life. But not so much so that it is fundamentally false, I think. Because most of the thinking that has influenced our conceptions of the mental life of young children has taken place within the context of education there has been great attention given to what

one wants to educate children towards, and rather less to what they were being educated from. It is this latter I want to focus on here, and I will begin by considering some characteristics of mental life in oral cultures.

### Some characteristics of mental life in oral cultures

It is not, I think, coincidental that the study of children's thinking and that of people's in oral cultures has tended to proceed at about the same time with not dissimilar results. The presuppositions that determined the approaches to both are tied up in the Western conception of Rationality as providing a privileged access to reality. The problem, given this presupposition, is how to make sense of the accounts given about the natural world and its origins and the nature of human experience given by people in oral cultures in their myths. Francis Bacon (1609), even though having some "reverence for the primitive time," asks us to consider any myth story:

Jupiter took Metis to wife; as soon as he saw she was with child, he ate her up; whereupon he grew to be with child himself; and so brought forth out of his head Pallas in armour! Surely I think no man had ever a dream so monstrous and extravagant, and out of all natural ways of thinking. (Bacon, in Robertson, 1905, p. 823).

If one takes Rationality as the "natural" way of thinking, then clearly most of humanity most of the time have been involved in massive confusion. Myth, ubiquitous in all oral cultures and preceding the development of rationality in ancient Greece, was explained in terms of diseases of language, lies, infirmities of mind, and in general of "primitiveness." The evolutionary ideas of the nineteenth century tied this primitiveness with the intellectual condition of young children, in which were found echoes of the fantasy and illogic of myth. Thus we find oral cultures and pre-classical Greek cultures referred to commonly as "the childhood of the race."

More than a century of intensive research on myth has helped to make some headway in sorting out the puzzle of some of the distinctive forms of mental life in oral cultures. In particular, this research has helped to reconceive rationality as not the "natural" way to think for human beings, but as a particularly effective way if one wants to have certain practical controls over the world. Recently it has been argued that it is largely a consequence of, particularly, the technology of writing. Without writing, other forms of thinking are effective for making sense of the world and of experience. The difficulty of making headway in understanding myth was in seeing it as an unsuccessful or incompetent attempt to be what we understand as rational. This was equivalent, in Walter Ong's phrase, to trying to make sense of horses as automobiles without wheels. One tends to focus on those aspects of the horse that are like and unlike "natural" automobiles, and consequently one tends to get a disproportionate, and very odd, view of what a horse is. Something like this has happened in our attempts to understand the mental life of oral cultures and that of children in ours.

If, instead of seeing myth and other expressions of oral cultures as failed attempts to be rational, we consider them as a set of positive and powerful techniques for making sense of the world and of experience in the absence of writing, we might get a more proportionate sense of them. Thus we will get an image of what is coming to be called "positive orality." Indeed, in light of the achievements of oral cultures in providing intellectual coherence and security and a sense of participation in the natural world, we might even begin to question the presupposed superiority of Western rationality, or at least overcome the evolutionary sense of an historical movement from "primitive" to "rational" thinking. They are appropriate forms of thought in different environments for different purposes.

Among the significant differences which have received a considerable amount of attention recently are those due to writing. In oral cultures there are no ways of maintaining the kind of artificial or cumulative "memory," and associated forms of thought, common in literate cultures. In oral cultures the lore of the social group has to be preserved in living memories. This places a high social value on those techniques which aid the preservation of knowledge in memories. So such techniques as rhyme and rhythm are important in communicating the culture's lore, because they aid the effectiveness of its memorization. Next formulae also play an important role. But perhaps the most important of all the techniques developed in oral cultures is the story. If one can encode the lore to be remembered into a story, it has been found universally, then one can more securely fix it into other minds. This is because the story can attach emotional orientations to the elements that make it up; that is, the story can not only convey the lore of the culture but can do so in a way that encourages emotional commitments to it. If the encoding of the lore can be achieved metaphorically in terms of vivid and dramatic events, with weird creatures performing outlandish acts, then the memorability is even further increased. These are some of the typical characteristics found in myth stories around the world.

So rhyme, rhythm, meter, formulae, metaphor, and story are techniques of considerable social importance for the preservation of the memory and sense of identity, and also social relationships, economic activities, and so on, of oral cultures. It is not my intention to elaborate on these here in the context of oral cultures (see e.g., Havelock, 1963, 1986; Ong, 1982; Goody, 1977, 1987). But one of the earliest insights into how thinking in oral cultures differed from ours was that of Giambattista Vico (1744), who argued with great originality that

myth is a product of the human mind working in its "poetic" mode. The early peoples who generated myths, he argued, were

poets who spoke in poetic characters. This discovery, which is the master key of this Science has cost us the persistent research of almost all our literary life because with our civilized natures we cannot at all imagine and can understand only by great toil the poetic nature of these first men. (Vico, 1970, p. 5).

It seems we might reasonably apply this same insight to our own childhood in Western cultures. Vico's "discovery" was that rational prose, so central a part of our "civilized natures," was a late achievement in human thinking, and that it grew from, and on, our "poetic natures." That is, the development of rationality, in cultural history and in individuals' education, might be better understood if it is seen to grow out of, and on, our "poetic natures," or our orality. What is important to note, however, is that this process is not well understood if seen simply as a displacement of a confused, ineffective form of thinking with a "natural," effective rationality. Rather we need to see more clearly the positive features of orality and try to ensure that they are not suppressed in the development of literate rationality. Let us then consider a few characteristics of young children's mental life in Western cultures and see whether focusing on the positive features of their orality might help us reformulate some of the prevailing principles that tend to dominate early childhood education at present.

#### Some characteristics of the oral culture of childhood

In contrast to the image of children's mental life as confusion and Oakeshott's "morning twilight" where nothing is clear, Wordsworth characterized the world of childhood as full of "celestial light"; children are able to see the world with a glory and freshness that at length, as we mature, fades "into the light of

common day." This sense of childhood perception being bright and vivid, and childhood intellectual life being equivalently vivid and dramatic, is now a commonplace recognition in autobiographers of childhood (Coe, 1984). Those autobiographers, mostly poets, who have recalled their early years with most precision unanimously describe it in terms of vividness, brightness, and a sense of abundance. In Thomas Traherne's (c.1670) words: "Then did I dwell within a world of light" (Coe, 1984, p. 255). Panstovsky reminds us that "everything was different. Everything was more vivid — the sun brighter, the smell of the fields sharper, the thunder was louder, the rain more abundant and the grass taller" (Coe, 1984, p. 285). The commonest metaphor for childhood among autobiographers in the West is Eden, and growing up is represented commonly as leaving Eden (see S. Egan, 1984, esp. Ch. 2).

The educational problem that Wordsworth recognized so vividly was the danger, in initiating the child into the inheritance of human understandings, of losing touch with the vivid freshness of childhood perception. If it is lost touch with, the "shades of the prison-house" quickly envelop the growing mind. Wordsworth's optimistic conclusion is that, while we must indeed lose that vivid immediacy — "the radiance which was once so bright" — we can nevertheless carry it forward in our memories through "the years that bring the philosophic mind"; we can, in the embers of our later years, remember "What was so fugitive" in our brief but vital childhoods. That is, for Wordsworth, early childhood mental life is not something to be left behind but is a vital constituent of adult educated consciousness. (All quotations from "Intimations of Immortality from Recollections of Early Childhood.") "He kept till the end of his life a sense that the ordinary can be transformed by the imagination..." (Sturrock, 1988, p. 62).

What I would like to do now is focus briefly on just a few of the features of young children's mental life where we can see the results of their everyday



imaginative activity in their own oral culture. Perhaps easiest might be to consider the kinds of stories that children find so readily engaging.

If we examine the structure of the classical fairy stories their most evident feature is that they are built on simple but powerful abstract concepts like good/bad, security/fear, courage/cowardice, and so on. The content of such stories is often quite remote from anything the child has experienced, but that content is made accessible and meaningful by being articulated on basic abstract concepts to which young children have direct access. This simple observation seems to be largely ignored due to the prevailing belief that children can grasp only the concrete and the familiar. Arthur Applebee notes, for example:

...the sort of familiarity which a child demands in a story is often a social one, a doing of things which the child expects to have done. Thus Peter Rabbit is a manageable story for Carol at two years eight months because of its familiar setting. (Applebee, 1978, p. 75).

If the familiarity of the story setting is the crucial element in the story's power to engage young children what are we to make of the fact that Peter is a rabbit? And what about the wild wood, which is safe, and the cultivated garden, which is dangerous, and the closeness of death, and so on? Clearly the engaging power of Peter Rabbit's adventure is also in some profound ways tied in with features of the story that are remote from children's everyday experience. Indeed, that seems a part of their point. Something crucial is being missed if we assume that access to such stories, and to knowledge and experience in general, is achieved by connections with familiar everyday experience.

What seems to be crucial in making the classic fairy tales accessible and engaging to young children is that their contents are articulated on powerful abstract concepts that children already understand. If we tell the

story of Robin Hood and the Sheriff of Nottingham to young children or take them to see the film Star Wars, we presuppose that they understand concepts of oppression, resentment, and revolt. Without such understanding the stories would be meaningless; it is such abstract concepts that provide their coherence and meaning. During our later education we learn a language for articulating and reflecting on such abstractions, but it is clearly a mistake to assume that because young children do not readily articulate abstract concepts that they have not already by ages four or five grasped the most powerful and abstract concepts we ever learn — like good/bad, security/fear, courage/cowardice, and so on. Indeed, it seems a condition of making any content meaningful to young children that it be articulated on some such powerful abstract concepts; otherwise it remains just "Words! Words! Words!" This is not to argue that we go from the abstract to the concrete, rather than the other way round, but to stress the interaction of the two at the earliest level and to counter the common assumption that young children have access only to the concrete and everyday.

A second immediately obvious feature of the kinds of stories young children are readily engaged by is the peculiar nature of their characters. Why are the classic fairy tales full of talking middle-class bears, witches, giants, fairies, and so on? These are hardly the stuff of their everyday experience. There are various psychoanalytic answers to this question, but I would like to focus on only a partial explanation that has, I think, some implications for early childhood education. The underlying abstract structures of children's stories tend to come in binary oppositions — such as good/bad, big/little, and so on. (For a detailed discussion of binary opposites in children's thinking see K. Egan, 1988, Ch. 4.) These are typically not opposites in any logical or empirical sense, but they serve as opposites for our structuring of meaning.

For example, children tend first to grasp the temperature concepts "hot" and "cold," perhaps simply because "hot" is initially the sensation of hotter than one's body temperature and "cold" of whatever is colder than one's body. A very common way in which we elaborate our conceptual grasp over empirical phenomena is by first forming such binary opposites and then by mediating between them. Mediating between "hot" and "cold" we learn the concept "warm." Then mediating between "warm" and "cold" we learn "cool." By this opposition/ mediation process we conceptually elaborate our grasp over a large range of the phenomena in the world that impinge on our senses. One need not claim, as does for example Lévi-Strauss (1966), that this is a natural process, due to structural characteristics of our minds, nor to claim, as does Ogden (1967), that it is a logically necessary process in sense-making. It is enough for present purposes to observe that it is very common.

If we observe the world through the eyes of a child some simple oppositions are evident. Perhaps one of the most profound, though young children would not articulate it in such terms, is between nature and culture, or as a sub-set of this, between human and animal. However much one talks to the cat or the rabbit it will never talk back. Humans are different from other animals in some way. If we treat nature/culture or human/animal as binary opposites and then seek to mediate between them, using the process that is so good at elaborating our grasp over so much of the world and experience, what do we get? We get creatures like talking middle-class bears. That is, we generate that category of creatures who fill the kinds of stories that children find so engaging. A talking middle-class bear is both cultural and natural, or human and animal, just as warm is both hot and cold.

Another prominent distinction children learn early is between living and dead. If we mediate between the living and the dead we get ghosts and spirits

and that whole realm of creatures who are alive and dead as warm is hot and cold and talking middle-class bears are natural and cultural. That is, a whole range of the contents of children's imaginative lives is made up of creatures far from their everyday experience and generated by a conceptual process. A feature of young children's mental life that is commonly asserted as an implication of research on their logico-mathematical thinking is that their thought is perception-dominated. If we focus instead on their imaginative lives we see rather an enormously energetic realm of intellectual activity that is conception-driven.

That these kinds of contents of young children's stories — talking bears and witches, and ghosts — are not simply foisted on them by adult storytellers seems obvious because of the consistent response children make to such stories, because of the fact that such creatures play so prominent a part in children's spontaneous play, and because of their basic similarity to the contents of myth stories from oral cultures throughout the world. That is, whatever is going on to produce this interest in such creatures in young children's mental lives it is not some causal and insignificant process.

A part of the educational process, of course, is learning that there are a number of discrete categories we need to understand in making sense of the world, and that therefore there are no mediating creatures between life and death or between nature and culture. The power of the polarizing/mediating process is indicated by the difficulty many people have had, today and historically, in giving up the belief in imaginary creatures generated as mediations between discrete empirical categories. We retain, for example, the wish to find Yetis or Sasquatches inheriting a mediating niche between human beings and other animals — creatures, that is, who combine the qualities of both. Such prominent features of children's imaginative lives, however, should

make us recognize that conceptions of young children's thinking as perception-dominated, as requiring active manipulation of concrete materials as starting points for thought, and as being tied to everyday experience, are clearly inadequate characterizations. Or are an adequate characterization of only a small range of children's mental life.

A third prominent feature of children's mental life concerns the role of the story form in general. Why are stories so engaging to young children, and how is it that they recognize, and begin to generate their own, stories so very early — commonly as young as two or three years old? (Ames, 1966; Applebee, 1978). This question leads to many sticky areas of inquiry, which we can perhaps evade here by simply observing the uncontentious ubiquitousness of the story. We can evade, in particular, what Chomsky, referring to young children's early ability to recognize and use certain grammatical structures, calls the "paradox of the poverty of the stimulus." Children seem to grasp what a story is from too few examples for us to consider it a casual matter of simple learning. Consider the problems involved in getting a computer to recognize a story. Whether or not we want to posit some kind of predisposition to recognize stories, due to structural characteristics of the mind, is a problem happily ignored here. What I do not want to ignore, however, are some implications about the engaging power of stories.

What is a story? A compact answer is to say that it is a narrative unit that can fix the affective meaning of the elements that compose it. That is, a story is a unit of some particular kind; it has a beginning that sets up a conflict or expectation, a middle that complicates it, and an end that resolves it. The defining feature of stories, as distinct from other kinds of narratives — like arguments, histories, scientific reports — is that they orient our feelings about their contents. The stories that most engage young children have some

characteristics that are commonly different from those that engage adults, but the form of the story seems one of those very rare cultural universals. The engaging quality of stories seems tied up with the fact that they end. Unlike history or our lives, in which succeeding events compel us constantly to reassess our feelings about earlier events, the story fixes how we should feel, and this provides us with a rare security and satisfaction. Particularly for young children, it seems, this security of knowing how to feel about what is being learned is an important component in making things meaningful; what is learned within a story, to repeat the phrase used above, is "affectively meaningful."

A fourth element of young children's oral cultural life is their easy use and understanding of metaphor: "I wanted to play after dinner but mom killed that idea." Gardiner et al. (1975) report that nursery school children are much more likely than older children to complete with a metaphor a sentence of the form "He looks as gigantic as \_\_\_\_\_." This ready and early grasp of metaphor, and punning, is prerequisite to, and an essential part of, understanding the kinds of jokes that are a vivid part of young children's oral culture: "What did the dentist say when his wife baked a pie?" "Can I do the filling?" "What is green, curly, and religious?" "Lettuce pray." "Why was the farmer cross?" "Because someone trod on his corn." "How do you make a potato puff?" "Chase it around the garden" "Where do you find chili beans?" "At the North Pole." "Knock, Knock." "Who's there?" "Beets." "Beets who?" "Beets me, I just forgot the joke." "Why was the red tomato in such a hurry?" "It wanted to ketchup." "What colours would you paint the sun and the wind?" "The sun rose and the wind blew."

It seems important to recognize the centrality of metaphor in children's intellectual lives, because so much research on children's thinking deals only

with those logical tasks which are more easily grasped by currently dominant research methods. It is those logical tasks which children deal with least well, but early on they show remarkable ease, facility, and flexibility in dealing with the more complex logic of metaphor. We can program computers to deal with the most sophisticated logical operations, but cannot make much progress at all in programming them to recognize or deal with metaphors. This ease with metaphor is also important because it seems tied to the active, generative, imaginative core of human intellectual life. There is in metaphor a logic that eludes our analytic grasp. Metaphor does not reflect the world, but is crucial to generating novel conceptions of it. In Max Black's words, "it would be more illuminating...to say that metaphor creates the similarity than to say it formulates some similarity antecedently existing" (Black, 1962, p. 83).

I think, for a brief fifth element of children's oral culture, we have greatly underestimated the importance of the joke in young children's intellectual life. With our serious educational concerns, it has tended to be seen as a part of the froth that is peripheral to education. Elsewhere (Egan, 1988) I argue that the joke, or certain forms of jokes, are better seen as expressing a range of children's most active intellectual abilities, and is the proper foundation for the development of logic and a richer rationality. (In this I think I can claim the support of Lewis Carroll, among others.) Perhaps indeed our educational aim might be the development of a sense of irony, but irony will not grow unless we attend to the early stimulation and development of metaphor-facile verbal wit.

In the oral culture of children's games, jokes, stories, abuse, and so on, that are passed on from generation to generation in school yards and city streets, charted by people like the Opies in Great Britain (1959, 1969, 1985) and the Knapps (1976) in the United States, we find many of the prominent

characteristics noted in oral cultures throughout the world — the use of rhyme, rhythm, meter, formulae, stories, metaphor, and so on. That is, we find those elements we consider central to human poetic imaginativeness. If we consider children's mental life in terms of positive orality, with a vividness and vitality that has been very largely ignored in educational theorizing and research, we are driven to reconsider what we are about when we educate them into the literate and rational norms of our culture.

### Conclusion

The prevailing conceptions of young children's mental life derived from educational theorists and researchers has tended to represent children's thinking as confused and lacking in the skills of Western rationality. Their illiteracy is conceived as the first hurdle to overcome in the lengthy and difficult process of education. While the image of young children as tabulae rasae, or empty vessels waiting to be filled with knowledge, is not any longer prominent in educational discourse, we continue to characterize young children's mental life in terms of the absence of those developments and knowledge that constitute the mature condition. Even in Piaget's scheme, young children are characterized as pre-operational.

If we were instead to consider young children's mental life in terms of positive orality we would be compelled to see education as involving something of a trade-off, and we might also be persuaded to give serious thought to how we might preserve the skills of orality as far as possible; that is, to lose as little as possible in the trade-off of literacy for orality. Illiteracy, we might see as the condition in which the skills of positive orality are suppressed while those of literacy are not achieved in their place.



We might, indeed, at this late date, conclude that we need a New Science of early childhood based on the insight that led Vico towards a better understanding of the "irrational" thinking of peoples in oral cultures. If we begin to see children in command of a positive orality, a poetic imaginativeness, that has been historically, and can be developmentally, the foundation on which Western rationality grows, then we will also begin to reconceive what might be the most important educational tasks for early childhood.

First would be the stimulation and development of their orality, because this is the foundation on which literate rationality is to grow. The firmer and richer the foundation, the more elaborate is the possible growth. This means focusing on the stimulation of such intellectual activities as we have considered above as constituents of orality — strong senses of rhyme, rhythm, meter, mastery of proverbs and formulae, flexibility and ease in the comprehension and use of metaphor, familiarity and practice with the varieties of the story form. And, in general, much more respect for children's intellectual abilities. We tend to measure intelligence very largely in terms of a limited range of logical skills. We might do well to keep in mind Wordsworth's keen insight, and consider what the normal developmental profile might look like if we were to measure intelligence in terms of imaginative power. I fear we might note gradual decline from about age seven or eight. Wordsworth's hope was that we need not lose the vividness of early perception and mental life, but we will surely not retain and develop it if we very largely ignore it and fail to recognize its power.

Second, because orality — like critical thinking and problem solving — cannot exist apart from content, we might reconsider what kind of early curriculum would best help stimulate children's orality. I need to make a

couple of preliminary points here. First, while literacy and orality are sometimes seen as mutually exclusive sets of capacities, my argument is that the capacities typically developed in oral cultures are important and powerful ways of making sense of the world and of experience that we ignore to our impoverishment, and that we need not obliterate them in developing literate rationality. A young child may learn to write and read while still developing capacities of orality. For a trivial example, a child may read a rhyming game and then go out and introduce it to friends and play it. In such a case literacy can support the development of some capacity of orality. Second, we are indeed not preparing children for an oral culture, but it is important to remember that we are preparing them for a literate-and-oral culture.

The general shape of the early childhood curriculum then might be characterized as constituted of the great stories of the world. The world they are to make sense of has a vivid and dramatic history, and I think we can relatively easily reconceive our primary curriculum in terms of telling children the story of science and technology, the story of mathematics, the story of history, the story of art, and the stories of all our ways of sense-making. This requires our reconceiving these areas of sense-making in terms of those oral capacities children have already most highly developed, rather than, as we tend to do, in some logical scheme beginning with what seems to us the simplest logical components and working "up" from there.

Third, we reconceive teachers, not as increasingly de-skilled purveyors of prepared texts, worksheets, and tests, but rather as our culture's story-tellers. The stories that constitute our culture are significantly unlike those of most oral cultures. They are the stories of our science, mathematics, history, and so on. These are — we tend to forget under the depressing schemes of typical texts — terrific and dramatic stories. If we reconceive teaching as story telling,

we might begin to devise planning techniques that offer alternatives to the technological models currently available (see, e.g., Egan, 1986). So instead of thinking of a lesson or unit as embodying a set of objectives to be attained, we might enable teachers to think of it as a good story to be told.

In our cultural history rationality did not displace myth but rather grew out of it and on it. If we wish to develop or preserve a rich rationality, we might attend more keenly to this historical development, and see that it can be sensibly reflected in our individual development. We can preserve the vividness and meaning of experience, and the sense of participation in nature that oral cultures were so good at stimulating, and that we seem predisposed to develop in early childhood, if we become more sensitive to positive orality. The light of common day, as Wordsworth pointed out, can be enriched by the imagination. But we have to be careful that our educational schemes do not obliterate it, but rather set themselves first to evoke, stimulate, and develop it as the foundation of education.

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## Part Two

### Further examples of lesson/unit plans using the story-form framework

(A variety of examples using the framework are now in print. One source is obviously Teaching as Story Telling. A second is in K. Egan, Primary Understanding (New York and London: Routledge, 1988). As increasing numbers of teachers use and adapt the framework much more interesting and elaborate examples are becoming available. I am building up a library of these and will look for some format whereby they might be made generally available — perhaps through a newsletter, or some such means.)

Here is the story form framework as it appears in Teaching as Story Telling:

### **The Story Form Model**

#### **1. Identifying importance:**

**What is most important about this topic?**

**Why should it matter to children?**

**What is affectively engaging about it?**

#### **2. Finding binary opposites:**

**What powerful binary opposites best catch the importance of the topic?**

#### **3. Organizing content into story form:**

**3.1 What content most dramatically embodies the binary opposites, in order to provide access to the topic?**

**3.2 What content best articulates the topic into a developing story form?**

#### 4. Conclusion

**What is the best way of resolving the dramatic conflict inherent in the binary opposites?**

**What degree of mediation of those opposites is it appropriate to seek?**

#### 5. Evaluation:

**How can one know whether the topic has been understood, its importance grasped, and the content learned?**

Area: Science

Topic: Properties of the Air

##### 1. Identifying importance:

An important function of education is to enrich our everyday environment with meaning. In the case of air, we tend to take it for granted as a kind of emptiness through which we move. One of the delights of education is the discovery of wonder in what is commonly taken for granted. This topic should matter to children because it can enlarge and enrich their perception of the world and their understanding of their experience. It can be affectively engaging through its power to evoke, stimulate, and develop the sense of wonder and engage it with reality.

##### 2. Finding binary opposites:

One usable binary set for a unit on the properties of the air is empty/full. This may seem a bit simple, with no evident affective "pull." But I think we can invest emptiness with the affective components of starkness, nothingness, uselessness to life, and fullness with the opposites — varied richness, complexity, and supportive of life.



### 3. Organizing content into story form:

The first sub-section here calls us to organize our opening teaching event. In this we must show dramatically that the air, which is taken as largely empty, is in fact full. We could begin with a single dramatic instance. If we have a lab available we might start with some bangs and flashes with test tubes and oxygen and hydrogen. After the children have agreed that the test tubes are empty, we can use the usual pyrotechnics to point out that they were indeed full of something. But in the ordinary classroom we can also demonstrate that the air is full. A beam of bright light in a darkened room can display a million dust particles calmly moving around. Where did they come from? Where will they go to? Or we might turn on a battery-powered radio. How does the signal reach the radio? Switch it off and move to another part of the room and change radio stations. How many signals are there? Are they all in the room all the time? Having established these kinds of things in the air, we might go on to things that are less easy to demonstrate directly. One might show enormously enlarged pictures of the microbes that inhabit the air. We breathe in gases, of which the air is made up. Huge planets such as Jupiter and Saturn are gases, some liquified, swirling around. They have no surface. If we think of the air as empty then Saturn and Jupiter are not there.

We think of the air as moving in the wind, and it carries clouds along, rustles leaves and shakes branches of trees, holds aloft kites when it moves, lifts flags, and so on. But it itself is taken usually as empty. We can quickly establish, then, that the "empty" air through which we walk is teeming with life, particles of matter, radiation of various kinds, gases, etc. That we cannot see many of these things does not mean that they are not there. Depending on teachers' knowledge and interests one can enrich the view of

full air by adding the various particles of matter that stream through the air, and through us and the earth, from the sun and from the stars. If we looked out the classroom window not with human eyes but with various particle sensors or the "eyes" of a radio, or life-detecting receptors then our view of the air would be very different. Far from empty! This then is the impression we must impart dramatically at the beginning of our unit — a sense of the air as full, and wonder-full.

The second sub-section under 3 is where we organize the content into the developing story form we want to stretch between the poles of empty and full. If a teacher chose to use only one dramatic example of the air not being empty, then the other examples I mentioned might form the basis for this section. If a teacher decided to touch on each quickly to build a sense of just how packed with varied things the air may be (which I think is probably better), then under this sub-section we might work out how to explore each of those topics in more detail.

One could organize these varied contents of the "full" air into a story form in a variety of ways. This is one of those cases where one might build one's exploration on a fictional element. One can tie together all the different kinds of fullness by inventing a brother and sister who "know" that the air is empty and scoff at the idea that it is full of all kinds of things. The brother and sister then can meet creatures who introduce them to various constituents of the air. Each lesson, or segment, may begin with our empty-air pair meeting a new character — Mr. Radio, Mrs. Neutrino, Miss Microbe, Master Gas, and so on, or perhaps better might be Science Fiction kinds of creatures. One can build up zany characteristics for these as one feels inclined. Each invites our skeptical pair to come with them, and put on special glasses or earphones, or whatever, that will allow them to see the air

differently or hear it differently — perhaps colors for the gases and different sounds for wavelengths, etc. Our hero and heroine can be taken on a journey through the wonders, mysteries, and terrors of the "empty" air. The Microbe might take them on a journey through the year. In winter the air might be fairly clear, but in late spring and summer the winter microbes are blotted out in a teeming fog of pollen, microorganisms, seeds and pullulating life.

#### **4. Conclusion:**

What is dust? Where does it come from? Where does it go? Children will have some grasp on the elements that fill the air by this time.

Mediation is not so appropriate here, given the choice of binary opposites.

The resolution is rather the discovery that what was thought to be empty is in fact full. The fullness is one of massive forces, tiny delicate organisms, the endless "dust." Given the fictional element, we might conclude with the brother and sister returning to tell their friends and family how crowded the air is, what wonders it holds unseen. (An imaginative teacher might think up a better fictional story line than this!)

#### **5. Evaluation:**

One may use any of a range of traditional evaluation procedures to see whether children understood the variety of things that fill the air. One might additionally or alternatively ask them to write and/or draw an image of the air from the perspective of one or more of the creatures who gave the brother and sister their guided tour. Also they might be encouraged to gather data about what their parents or neighbours know about the thronging contents of the air we breathe.

\* \* \*

Area: Social Studies

Topic: Maps

### **1. Identifying importance:**

I will assume that this is a unit for a third year group, after some basic map skills are developed. We need to hunt around under the everyday routineness of maps in our experience to whatever is affectively engaging and of fundamental importance about our topic. This, of course, is always necessary for teaching in elementary school. Only when we have located the most fundamentally important feature of our topic will we have discovered the place to begin teaching it. And what is most important about mapping? I don't want to make this seem too outrageous, but I think at base it is a moral matter. A map is a representation of places relative to each other. Cultures without maps see themselves as unique and at the centre of the world, as special. Their conceptions of the world typically involve the belief that their local area received special treatment at the hands of gods or sacred ancestors "in the beginning." What the map does is locate us and our place as one among many equivalents. Maps represent one of the more important conceptual revolutions in human cultural history. The history of maps, of earth and sky, go hand in hand with our discovery of our place in the universe, and with the reduction in ego- and ethno-centrism. This is why they are important, and this therefore is where we must begin.

### **2. Finding binary opposites:**

How then can we catch this importance in binary terms? Perhaps one way might be through the binary opposites self/other. This is not to be likened to the sense in which in the "expanding horizons" kind of curriculum

it is assumed that children know themselves and can therefore "expand" their understanding from concepts of the "self." This seems to build on a superficial logical scheme that ignores completely some important psychological truths. Young children view the world from the "self," as do adults, but this does not mean they have available some concept of their individual identity that is somehow a secure starting point for conceptual exploration of the world. A complex truth about our understanding of our "selves" is that it seems to grow through our understanding of "others." Our selves become defined only as we define the distinctiveness of others. Those who as adults we recognize as most "egocentric," most tied up with themselves, are usually those who are least sensitive to the distinctiveness of others. So the sense of self/other here is not to be seen as a move from one to the other, but is an attempt to introduce mapping in its cultural role of helping to give some further definition to both together.

### **3. Organizing content into story form**

The first sub-section of 3 invites us to look for the most dramatic way of catching the importance of the topic using the binary opposites on which we will build our lesson or unit. Maps are graphic means of making easily visible various kinds of data about the world. They are selective and abstract representations, as distinct from unselective and specific photographs. There are many kinds of maps and our unit will explore a number of them. A vivid portrayal of our theme might be possible by starting with maps of the sky. One might begin by showing a picture of an ancient or medieval sky map, or by representing a simplified version on the chalk board or on a hand-out sheet. In this the earth will be in the centre, the planets and moon and sun travelling around the earth and a backdrop of

the sky on which the stars are fixed and which turns around the earth as a great sphere, at the centre of which is the Earth. (Archimedes calculated this sphere's diameter to be equal to 10,000 earth diameters.)

The teacher might begin by pointing out how well this map represents what we can see in the sky. Emphasis should be put on the observational care that was required to trace the paths of the planets as different from the stars. And what a puzzle the whole canopy of the heavens was to people without telescopes, spectrometers, and other such instruments.

Then the teacher might introduce the anomaly of the planets' motions. The planets were so called by the Greeks because, compared to the smooth regularity of the stars, they seemed to be "wanderers" around the heavens. Their paths were irregular, going round the earth smoothly for a while but then suddenly reversing their courses, then moving forward again faster. (The more detail the teacher knows about the movement of the other planets relative to the earth — i.e., what we see of them — the better. An hour's reading will provide quite enough information for present purposes.) What was the solution? How was the anomaly of the planet's movements explained? Why was their movement the key to one of the most profound conceptual revolutions in Western cultural history? No doubt most children will know the answer, but in this case have very little idea what the question was. The dramatic element here is the question, and the ingenuity and courage required to find it, and for others to accept it.

Now the teacher might show a similar map but with the Earth as a wanderer like others around the sun. What a disturbance was this discovery! We've really never been the same since. The teacher might move on from the map of the Solar System to smaller scale maps of our sun's place among our local group of stars, whose names the children should know.

The names of our arm of the Milky Way galaxy and the other arms around ours should be known too, as should the contents of the globular cluster halo that surrounds our galaxy be known, and the names of our local group of galaxies — even if they are no more exciting than M32 and M33. I think maps of the neighbourhood make more sense when integrated with maps of our local stars and galaxies.

An alternative opening might be to provide the children with a local street map and a map of the solar system, and consider how neither looks like what you can see if you look at the neighbourhood or the sky. Or this could begin the extension of the unit in the second part of 3, where we are invited to use the guiding theme and its binary opposites to select the content that articulates the topic into a developing story form.

Given our theme, it would seem useful to consider a wide array of different kinds of maps, and see how they can establish a sense of the other as equivalent to the self. The local road map can be investigated in terms of its emotional characteristics for the individual students. They might be asked to mark in one color the places that are happiest for them; in another color, the saddest; in another color, the safest; in another color, the scariest. They might then explain each. Then they could be asked to do the same from the perspective of their parents, or the mayor, or a policeman, or whomever. They might similarly consider our solar system from the perspective of creatures from planets more like Mars or one of Jupiter's moons.

One might use this unit to extend the common activity in which children are asked to compose a kind of map of their parents, grandparents, and other ancestors as far back as possible. A slight problem with that kind of map is that it presents the child with a visual image of lots of

predecessors and a few siblings all focused on the child. We might augment such maps to include not just the ancestors of the child but a more general map of family relationships, to include cousins, etc. We will thus represent visually a tracery of relations with, in most cases, more people in the child's generation than in predecessors' generations. Research for this might take some time, phone calls to grandma and cousin Jake, and some letters to Hong Kong or Scotland, but the charts could be gradually filled out as the unit progresses.

Other visual representations of relationships between self and other might include categories of animals and forms of life in general, and kinds of material. One would want to avoid the "evolutionary" sense of progressive evolution from monkey thugs to gleaming humans, culminating in the child. Rather it might be better represented as a network of related animal forms, of which humans are one; networks of living forms, of which mammals are one; and networks of materials, and their major concentrations — a map in which humans might take a slight and incidental role. The child might compose such networks as a result of instruction, of inquiry, and individual research.

#### **4. Conclusion**

We might conclude such a unit by combining the lessons of the various maps giving definition to the child's relationships to other things, places, and life forms. This is achieved with a certain dramatic flair by Carl Sagan in one of the widely available parts of his Cosmos series. In the context of considering the life of stars he concludes that we are made of "star stuff," we are parts of the Cosmos, not separate observers of it. Showing a videotape of this might make an excellent conclusion. Lacking that resource one might



look for a way of bringing home the same message; that we are intimately related to the natural and material world (while we might also be unusual or different in some significant ways). The mediation between self and other can be made in terms of what we share. We could conclude with lists of each feature of ourselves that we can name, and then list as many "others" as we can that share features similar to each one. So we might have a list beginning "hair on our heads," "nails," "carbon," "exhale carbon dioxide," "like temperatures between 15° and 30° C.," "grow for approximately 16-20 years," etc. etc.

## 5. Evaluation

Again, the traditional forms of evaluation may be used to assess the degree to which the basic content of the unit has been grasped. What we should additionally look for in this scheme is evidence of greater definition of "self" and "other," and perhaps greater sympathy for "others" as extensions of "self." This is in part a moral matter, bordering on what might be called mystical experience. It might be observed informally in children's sensitivity to their environment, but I cannot think of any way of getting a precise reading of it. That one cannot evaluate it precisely in no way effects its value as an educational goal, of course.

\* \* \*

Area: Mathematics

Topic: Multiplication of double digit numbers

### 1. Identifying importance:

Multiplication involves manipulation of numbers which are abstracted from any things in the real world to which they might refer. But

when the manipulation is completed and referred back to concrete elements of the world, the world is found to conform with the results. Mathematics is a kind of magic, a set of rules removed from the concrete stuff of reality but which yet catches something seemingly invariable about the shifting concrete stuff of the world.

## **2. Finding binary opposites:**

To catch this sense of importance one might choose opposites such as concrete/abstract, seeing the bases of multiplication in the gradual abstraction of mathematics from concrete elements of the everyday world

## **3. Organizing content into story form:**

We might begin by emphasizing how mathematics became both increasingly sophisticated and easy as it removed itself from concrete kinds of calculation. We might begin with the techniques that laid the foundation for this increasing abstraction. We can point out to the children that for thousands of years in the early human civilizations, while art, literature, and philosophy made great strides, only the very crudest developments took place in arithmetic. The ancient Greeks, who achieved great things in geometry, contributed little of significance to arithmetic. After this short unit, the teacher might announce, they will be superior to Plato and Aristotle in their arithmetical abilities.

Two simple but immensely important discoveries or inventions were required before multiplication could be easily performed. These were the discovery of place or positional setting (such that 4 has a different value in 42 from in 24) and the second was the invention of the zero. On these all our hugely complex technological civilization relies.

On ancient counting boards a number such as 42 would be represented by two columns with four marks in one and two in the other: e.g.

		—	—
		—	—
		—	
		—	

The problem was that 420 or 4002 would also look like that. One could not transcribe numbers and manipulate them abstractly until one had a symbol for zero.

The solution came from a Hindu early in the Common Era. Sunya, meaning "void" or "nothing" was used to take the place where no other number symbol fitted, and thus allowed the development of an unambiguous way of representing place value. Around the tenth century the Arabs translated sunya into the Arab sifr, which meant "empty." When this concept reached Italy about the beginning of the thirteenth century, it was Latinized to zephirum. Over the next hundred years zephirum became the Italian zero. (In Latin, however, the term cifra was used for centuries thereafter. This has come into English as cipher, as in "a mere cipher," suggesting no power or significance. For some, however, the number cifra had some mystical significance, so we have also the word decipher, meaning to resolve a puzzle or break a code. I think, incidentally, that this kind of etymology should form a part of the story we are telling about multiplication.)

After this introduction we might tell the children about the fifteenth century German merchant who wanted his son to learn all the tools necessary to run a sophisticated business. He asked a professor at the local

university where was the best place to send the boy. The professor said that if he wanted to learn addition and subtraction, beyond what the fingers could accommodate, it would be enough to send him to the local university. But if he wanted the boy to learn also how to do the most sophisticated forms of multiplication and division, he would have to send him to an Italian university, where such advanced knowledge had been recently developed. So the son was sent to Padua, and there he learned how to do multiplication. And this is how he learned how to multiply 46 by 13: (actually it was even more complicated than this, but we can use modern notation)

First multiply 46 by 2. Answer = 92

Next multiply 46 by 4, which is equal to  $92 \times 2$ . Answer = 184

Next multiply 46 by 8, which is equal to  $184 \times 2$ . Answer = 368.

Next add  $368 + 184 + 46$ . Answer = 598.

This fifteenth century breakthrough to multiplication, it will be evident, was a slightly modified addition. The children might enjoy performing a multiplications using this method. Then ask them how they would use it to multiply  $9,387 \times 6,221$ ? How long would it take? This can lead to a demonstration of the much simpler techniques of multiplication invented since. We can with these perform in minutes what used to take days and even weeks of laborious calculating. The more abstracted from the counting board, and from the things the numbers represent, the more easily arithmetical operations work.

One may develop this point by demonstrating how it is the positioning of the numbers that enable more sophisticated, and easy, methods of multiplication to develop. The role of the zero in setting positions can be seen to be crucial. When multiplying  $46 \times 13$ , for example, we can easily

establish the numerical value of the 4 and the 6 by holding them in their appropriate place by the use of the zero ( $46 \times 10 = 460$ ).

The abstraction is important, but equally important is to make clear to the children what the abstractions are abstractions from. One of the best ways to do this, I find, is through the history of mathematics, showing the concrete context in which certain techniques were developed and the practical problems they helped to resolve. (For which Tobias Danzig's Number: The language of science, New York: Free Press, 1954, is useful. It is from this source that I have taken much of the above. A math text book for children designed on such principles would seem most desirable.)

Practice with the modern techniques would then be useful. Once in the context of multiple addition, and having seen other techniques for doing this, the regular practice with modern techniques should be more meaningful.

#### 4. Conclusion:

After the technique is mastered, one might conclude with some playful exploration of the abstraction of multiplication — play that exposes some of the curious features of mathematics. The teacher can show alternative ways of multiplying. For example, to multiply by 5, 25, or 125 one can multiply by 10, 100, or 1000 and then divide by 2, 4, or 8. Do some examples of this and see if the class can see why they work.

If one wants to multiply two numbers between 10 and 20, try this method. Add the first number to the second digit of the second number, then multiply that number by 10, then multiply the second digits of both numbers, and add the two answers: e.g.,

- |           |                         |
|-----------|-------------------------|
| 13 x 18 — | 1. $13 + 8 = 21$        |
|           | 2. $21 \times 10 = 210$ |
|           | 3. $3 \times 8 = 24$    |
|           | 4. Add $210 + 24 = 234$ |

(For other techniques and tricks and games that will add to the sense of mathematics as an abstract magical playground see Gyles Brandreth, Number-Play, New York: Rawson Associates, 1984).

#### 5. Evaluation:

One might use the usual means of evaluating whether children have mastered the basic techniques of multiplication with examples for them to work out. In addition one might provide a problem and ask them to multiply the numbers using as many different techniques as possible. Whether or not they cheerfully engage in number games, "magic squares," tricks and puzzles using numbers, will provide evidence of how successful one has been in trying to inculcate a sense of the magical abstract playground of mathematics.

\* \* \*

Area: Language Arts

Topic: Jokes

For reasons I have given in Primary Understanding: Education in early childhood (New York: Routledge, 1988, pp. 222-25), the form of the story that can play an important role in the early development of logic is the joke. The joke remains, despite books of jokes, primarily an oral form. Certain jokes pass from generation to generation of school children, surviving sometimes with only superficial changes through decades and even centuries.

### **1. Identifying importance:**

Jokes work by establishing a, usually metaphoric, connection between things otherwise not connected. They don't simply reflect connections already there, but they make the connection. The degree to which the connection is incongruous or unexpected or asserts a logic that is thinkable but absurd, the more likely we are to respond with an explosive laugh. The laugh seems a result of our holding for a moment categories or images of the world that suggest a world working quite differently from the way we are convinced reality works. This applies at least to certain kinds of jokes; those that create deliberate confusion usually by insisting on the wrong interpretation of a homonym. Lewis Carroll was a master of this kind of joke. In their simplest form they can appear as those question and answer jokes: "When is a door not a door?" "When it's ajar." Lewis Carroll takes the deliberately confused answer "seriously," and explores the worlds built on a sliding logic of metaphor ricocheting off the wrong side of homonyms. Playing with such jokes encourages flexibility in the use of metaphor, and so in a foundation of

our mental lives, introduces us to logic, and can give us practice with the composition of narratives.

## **2. Finding binary opposites:**

A useful structuring pair might be congruity/incongruity. At the heart of many jokes is the contrast between what things go together in our expectations and what things don't, and the sudden intrusion of something that does not fit, but yet makes a kind of sense. It is a kind of sense that threatens the categories of our expectations. The incongruity often serves to reassert the normal course of events by its craziness, but in the moment of the joke it creates a wild, new, different world.

## **3. Organizing content into story form:**

The first part of this section invites us to think of a dramatic embodiment of the binary opposites that catch the importance of the topic. One way of getting at this might be to begin with a set of the children's favorite jokes. Such as:

"How do you make a Venetian blind?"

"Put a bag over his head."

\* \*

"Why did the chicken cross the soccer field?"

"The referee called foul (fowl)."

\* \*

"How do you stop a herd of gooseberries from charging?"

"Take away their credit cards."

\* \*

"How can you tell a gooseberry from an elephant?"



"Pick them up. The elephant is usually the heavier one."

\* \*

"Why does a mouse when it spins?"

"The higher it gets the fewer."

\* \*

Teachers might begin with a brief analysis of these. The first two are cases of deliberate misunderstanding of a homonym. The second, third, fourth and fifth also get some of their humor from being parodies of joke forms as well as using the form they parody. The third involves another homonym confusion. The fourth is based on a double incongruity; the expectation of the usual joke-ending being undercut by a "serious" response. The final example is for connoisseurs/eusses of incongruity. If the teacher and many children are simply bewildered by it, they should be prepared for a few children unable to unwrap themselves from rolling on the floor with laughter.

This analysis should be quite brief. The teacher might then take the jokes further, Lewis Carroll style, by asking the children, perhaps in groups, to take their favorite joke, and continue the narrative further. The teacher might prepare a few examples, perhaps including one directly from Lewis Carroll. The teacher might do some extempore in funny voices — the T.V. commentator-style of high-seriousness might continue — "having hoisted the elephant onto my back, however, the animal showed much reluctance to dismount. This required my taking it home with me. Fortunately I drive a convertible car, but some awkwardness ensued at the front door of my house, where my wife said ..." (The teacher might invite the children to supply the wife's response, and the next step in the narrative.

The lesson might continue by getting the children, possibly in groups, to write or make notes about their favorite jokes. Each group might choose one for

telling to the class. After a brief analysis, the class might be invited to take the world of the joke seriously, and explore it further.

#### **4. Conclusion:**

A concluding activity might be to take a homonym at random and get the children to invent a joke, based on deliberate confusion of the meanings of the homonym. Take, for example, channel, as in narrow passages of water and as in T.V. The task is to invent a question whose answer is wildly incongruous, but coherent in the metaphoric slippage between meanings of the homonym. Immediately children will suggest confusions between "crossing the channel" in a boat or on T.V. Or questions such as "What channel is the wettest?" or "What channel shows most boats?" will emerge. Keep at it long enough for a good joke to emerge, and then extend it à la Lewis Carroll into a weird-world narrative.

#### **5. Evaluation**

The amount of laughter might form a unique evaluation instrument to such a lesson. The degree of engagement should also provide an index of success. If children are invited to write their favorite joke and extend the incongruous world created by the joke, then teachers might evaluate their ability to generate metaphoric connections and imaginatively pursue their products.

\* \* \*

## Part Three

You are invited to send by electronic mail your questions or comments about Teaching as Story Telling, or about your experience using the technique, difficulties or limitations you have found, or whatever. I will respond to your question or comment. In addition I will send you the set of questions, comments, and responses that have resulted from the communications of other readers. I will try to up-date these at regular intervals, especially for those who are among the first to send and receive e-mail. The idea is that this supplementary disk may serve as an interactive extension of the book. This is something of an experiment, so let us see how it works out.

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