Play and Mastery: A Structuralist View

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...no one has ever doubted that play is a major vehicle for learning and mental development.[1]
School is not 'work' - it is play![2]

There is something quite fascinating in these quotes, especially in their juxtaposition. On the one hand the second quote is but a logical extension of the first, and yet the second seems to go too far. To say that school is, or should be, play - not work - is to fly in the face of our cultural heritage. It is to say, in effect, that school should be centered around the frivolous, the non-serious, the permissive. Such is not consistent with our culture. Thus a paradox arises: play is recognized, even accepted, as a major vehicle for learning and development; play is not recognized, nor accepted, as a major component of the school curriculum. Children in school are admonished to work, not to play.

The root of this paradox lies, I believe, in our culture, particularly in the way industrial, technological and Puritan aspects of our culture have conceived of play, and of its counterpart, work. Within the framework of the Protestant ethic, an ethic that has done much to influence our conception of the goals and purposes of schooling, work is seen as the vehicle by which humans justify their existence in the sight of God and gain salvation for themselves. Play is seen as a frivolity, as a diversion from this sacred and serious mission, or worse yet, as an evil. One may play with the devil, but not with God.[3] The following quote makes this point quite nicely:

> ...we prohibit play in the strongest terms. The students shall be indulged with nothing which the world calls play. Let this rule be observed with the strictest nicety for those who play when they are young, will play when they are old.[4]

This is clearly a 19th century quote; it has certain pious overtones to it and implies that life is too serious to be indulged with play. As Johan Huizinga points out the 19th century was not a century of play. Dominated by the Protestant Ethic and the Industrial Revolution "work and production became the ideal, and then the idol, of the age."[5] It is in this century that schooling as an organized system designed to train the citizenry for useful and profitable occupations was born. Thus schools, quite naturally reflecting the culture in which they were born and nurtured, have not made play a major component of the curriculum. However, such has not always been the case, nor will such necessarily be the case in the future. Play is a cultural phenomenon and as the culture changes so will the conception of play.

Daniel Bell, looking at our contemporary civilization, argues that in America we are leaving an industrial era, with an emphasis on work and the production of goods, to enter a post-industrial era, with an emphasis on leisure, personal interaction, and the theoretic.[6] All three of these in one form or another reintroduce the concept of play, not in the same sense that Greek or Renaissance society used the concept, but nonetheless in a manner which will

contrast quite sharply with the Protestant and industrial conception. In short, the time may be right for a re-examination of play and of the role it could fulfill in a school curriculum.

In this paper I will begin such an re-examintion. Specifically I will focus on three issues: (1) the role and conception of play in various cultures, notably the ancient Greek and the 19th century industrial; (2) the nature of play, in and of itself, apart from its cultural or historical connections; and (3) an application of play to a school curriculum. Throughout all this I will argue that play, properly defined, guided and developed, is an important, possibly even necessary, component of mastery.[7]

Play and Culture

In the Christian culture, particularly in its Protestant manifestations, and more particularly in its Puritan sects, play is renounced. Play is here considered to lead one away from the serious business of salvation to the more frivolous and devilish aspects of life. Hence the quote recently given states that *"play is to be prohibited,"* for play is infectious and *"those who play when they are young will play when they are mature,"* a most undesirable trait. Yet Greek culture took just the opposite view. In his REPUBLIC, Plato states:

> *Our children from their earliest years must take part in all the more lawful forms of play, for it they are not surrounded with such an atmosphere they can never grow up to be well conducted and virtuous citizens.*[8]

In both quotes there is an ideal expressed, or at least implied, as to what constitutes a mature, well-rounded citizen: one ideal involves play as a necessary component of such citizen development; the other specifically repudiates such. Thus, historically, different cultures have held different views of play.

The ancient Greeks built their society on the notion of leisure; work was an abomination to be done by slaves and lower class citizens. In expressing the metaphor of the metals, that artisans were made of bronze while the guardians and the philosophers were made of silver and gold, Plato was representing the feeling of his culture. The role of the educated citizen was to use leisure in the proper way. The word for leisure was *schole,* the derivative of our present day school. However, as Huizinga notes, the word school has had a curious history - beginning with the Greek concept of leisure it has *"now acquired precisely the opposite sense,"* that *"of systematic work and training,"* towards the end of preparing one *"for utilitarian and profitable occupations."*[9] It was this notion of leisure and its proper use which formed both the means and the end (*telos*) of Greek education and culture. As Werner Jaeger has pointed out, the root of the Greek for education and cutlure (*paideia*) is the same as the root for play (*paidia*).[10] Thus culture, education, leisure and play were inextricably intertwined in the minds of the ancient Greeks, with work relegated to another and lower category.

A sense of play premeated all the Greeks did. This is shown not only in their suspension of internecine wars for the purpose of celebrating the Olympiads, but also in the fact that the dialogue form, used so frequently by Plato and others, was a combination of the playful and the dialectical. Plato, himself, was reputed to have based his dialogue form on that of Sophron, a writer of farces; while Aristotle calls the dialogue a form of *mimos* (imitation).[11]

Huizinga expands this notion of play in relation to culture and argues that play is not merely one element in culture, but is one of the essential characteristics defining culture. As he says:

Ritual grew up in play; poetry was born in play and nourished in play; music and dancing were pure play ....The rules of warfare ...were built up on play - patterns. We have to conclude, therefore, that civilization is, in its earliest forms, play. It does not come from play like a babe detaching itself from the womb: it arises in and as play, and never never leaves it. [12]

Huizinga finds play not only forming the basis for culture and civilization but dominating particular eras of a culture as well. The ancient Greek era was one, the Renaissance another. Of the latter he says: *"(T)he whole mental attitude of the Renaisssance was one of play."* [13]

Modern times, though, present a very different picture. As already noted, the 19th century was not a century of play, it was a century dominated by the Industrial Revolution with its emphasis on technology, efficiency, rationality. It was also a century which brought to its highest fruition the Protestant concept of work, that which is called the Protestant ethic. Unlike the Greeks the ancient Hebrews saw a certain spiritual value in work: it was accepted as expiation through which man might atone for his and his ancestors' sins, as well as cooperate with God. [14] Christianity, of course, adopted this view although it also adopted the Greek view that contemplation was a higher form of activity than manual work. Luther swept away this distinction between spiritual contemplation and worldly labor; he argued that the best way to serve God was to do perfectly the work of one's profession. [15] Work now became a "calling," and the path of religious salvation. Calvin emphasized the notion of man's innate sinfulness and added the predetermination of all activity. Idleness and play were to be abhored, not only as confirmation of man's sinfulness but also as an outward sign that one was not a member of the elect. Work and works were no guarantee of election, but surely God was not to save one who was idle. Therefore, the best course to pursue was to work hard but not to indulge oneself with the fruits of one's labors. This became the Protestant ethic - work for the sake of work and the abhorence of idleness and pleasure.

Huizinga is quite right in saying that the 19th century was not a century of play, with both its industrial and Protestant conceptions of work. But Bell argues that now in the latter 20th century, we are rapidly moving from an industrial to a post-industrial era, and we are just as rapidly leaving behind the Protestant ethic which has influenced, if not dominated, our culture for the past three centuries. If Bell is right, and I believe him to be so, then the next decades should bring dramatic changes in our conception of both work and play. Such changes will and should have their effects on school curricula.

There are a number of ways to define post-industrialism and a number of elements which will comprise this coming era. Three that will influence the work-play issue and the structure of the school curriculum are: (1) leisure, (2) interpersonal relations, (3) the supremacy of the theoretic. Leisure time will certainly be a hallmark of the post-industrial society. In the past hundred years the average number of hours worked per week has declined from a bit over 70 to a bit under 40, and it is still falling. [16] Further, the percentage of people engaged in blue-collar work -- the heart of an industrial, production-oriented society - is also decreasing; 70% at the turn of the century, the number of blue-collar workers is now down to

30% of the labor force, and there are those who predict it will follow the pattern set by agriculture. Before industrialization became dominant almost all of the society was engaged in agriculture; now less than 4% of the United States labor force is so engaged. These two trends -- a reduction in work hours with a concomitant increase in leisure hours, and a switch from a blue-collar work force to a white-collar work force - will bring the need to redefine the role the schools have in relation to work, leisure and even education itself. No longer will it be possible, nor even now is it possible, for a U.S. Commissioner of Education to state that the four cardinal principles of schooling are: (1) order, (2) punctuality, (3) industry, (4) silence.[17] Such a statement might have been appropriate to an emerging industrial society still living the Protestant ethic, but it is not appropriate to a post-industrial society where individuals have more leisure hours per week than they have work, or production, hours. School curricula need to reflect this shift.

Along with more leisure time the post-industrial society will emphasize interpersonal relations. Bell calls this society a "communal" one, taking the form of *"a game between persons."*[18] By this he means that the group or social unit rather than the individual will become the arbiter of decisions. Hence people will have to interact more with one another, with decisions being influenced less by logic and rationality than by psychology and compromise. Obviously there is a sense of play here, in terms of a dynamic interaction between forces or a bargaining between people. So far the schools of America, unlike those of the ancient Sophists, have paid little attention to these skills. Yet the need is there.

However, the most important aspect of post-industrialism, that which Bell labels its "axial principle," is the centrality of theoretical knowledge.[19] Bell argues that the industrial era was a non-theoretical one; the great inventions of the time - the reaper, the telephone, the Bessemer furnace, the light bulb, the airplane -- those things which characterize and made the industrial age, were essentially simple products of "talented and gifted tinkers." In this framework knowledge becomes essentially information. But in a post-industrial society it is not knowledge as information that is primary; it is the structure and organization of knowledge that is primary. As Bell says:

> In the post-industrial society, what is crucial is *not just a shift from property or political criteria to knowledge as the base of new power, but a change in the character of knowledge itself. What has now become decisive for society is the new centrality of theoretical knowledge, the primacy of theory over empiricism,* and the codification of knowledge into abstract systems of symbols that can be translated into many different and varied circumstances. *Every society now lives by innovation and growth, and it is theoretical knowledge that has become the matrix of innovation.*[20]

The major difference between knowledge in an industrial and a post-industrial society is that the latter knowledge must be concerned with a high degree of symbol processing, for it is from such processing that future innovations and growth will occur. The challenge this presents to the schools is that the schools must go beyond the concept of knowledge as the acquisition or accumulation of information to a concept of knowledge that deals with the structures of a field and with the rules of transformation that allow operation within that field. All of this is symbol processing in its highest sense, and I shall argue that in order to process symbols in such a way that one is able to deal with the structural foundations underlying such processing, it is important, even necessay, to have a type of play built into the

curriculum - a type of play that allows, even encourages, a dynamic interaction between means and ends.

The Nature and Theory of Play

What I said at the beginning of the previous section I will repeat here: There is no way to deal with the vast complexity of that which is play in these few pages. The Oxford English Dictionary devotes 17 columns, covering seven pages and having 36 categorical entries to definitions of the word. Therefore I will limit myself to the remarks that John Dewey, Jean Piaget, and Jerome Bruner make about play and its pedagogical importance. These authors form the foundation of the structural-developmental curriculum model we are developing at Oswego.

Dewey

In writing in Paul Monroe's CYCLOPEDIA OF EDUCATION,[21] Dewey reviews two then-common theories of play--those of Herbert Spencer and of Karl Gross--and, rejecting each, puts forth his own. Dewey sees Spencer as an adherent of the then popular "surplus energy" theory, wherein "play" is defined as the excess energy an individual has after maintaining health and performing imposed tasks. Since children and youth were generally relieved of many of the imposed tasks adults performed, they had more "surplus energy," which translated itself into play. Dewey sees Gross in his scholarly PLAY OF ANIMALS (1898) and PLAY OF MAN (1901) concluding that in both species play gives preparatory exercise in functions that will later prove useful and necessary. More than three quarters of a century later these two works of Gross remain the most thorough written on play and maintain an influence all subsequent writers, including Piaget and Bruner, are forced to consider. Both Piaget and Bruner pay homage to Gross but fault him for not recognizing the symbolic functions of play, that which is so important to the higher, more civilized, forms of humanity.

Dewey rejects Spencer's theory as assuming ultimately that *"quiescence is the natural stage of organic beings,"* and quietly by-passes Gross' theories to form his own. For Dewey it is activity, not quiescence, that forms the essence of life and humanity. It is natural for the child to be active, curious, playful. Children do not play for the purpose of amusing themselves: they play because the nature of their being is activity -- *"activity which is not performed for the sake of any result beyond itself."* When activity is performed for the sake of a result beyond or ulterior to itself, than this activity acquires the label "work." Drudgery and labor, of course, are something quite apart from this concept of work. having their origins in external imposition not in internal development. As Dewey views work it is a natural extension of play, an outgrowth of play, and distinguished from play by the addition of ends, goals, purposes, plans -- all beyond the activity itself, but all developed by the individual being active. As Dewey says:

> But as action involving the idea of an end grows naturally out of spontaneous activity, so 'work' in this psychological sense is inevitably preceded by play and grows insensibly out of it.[22]

This notion of play as a forerunner of work helps in understanding why Dewey entitled one of his DEMOCRACY AND EDUCATION chapters, "Play and Work in the Curriculum," and in interpreting such statements as *"play passes into work when fairly remote results of a*

definite character are foreseen and enlist persistent efforts for their accomplishment."[23]
Further, this notion of play-work as the transformation of activity from a state spontaneous and impulsive to a state organized, controlled, purposeful and directed is a key element in Dewey's pedagogic theory. For as he says:

> *...the real problem of intellectual education is the* transformation *of natural powers into expert, tested powers: the transformation of more or less casual curiosity and sporadic suggestion into attitudes of alert, cautious, and thorough inquiry.*[24]

Even further, the play-work transformation is but an example of the more general notion of transformation which is central to those taking a structural-developmental view. It appears in Dewey not only here but in his more general distinction between primary and secondary levels of experience. It appears in Piaget as the distinction between practical and reflexive (gnostic) intelligence, and in Bruner as the difference between the particular and the generic. David Olson, makes much of this in terms of a *"transformation from implicit knowledge to explicit knowledge,"* calling the latter a *"second level of competence."*[25]

In forming this notion of play as an activity having no end beyond itself, but also as an activity that can quite easily and naturally be transformed into another activity more purposeful, goal-directed, and remote is a concept quite different from the 19th century one of play as a release from, and alternative to, work -- here defining work as definitely including labor and drudgery. In short, Dewey removes all theological considerations from his notion of play, and from his notion of work as well. He begins with the assumption that humans are active beings and that this activity can be expressed on a play level or on a work level. The transformation from one level to another is the task of the pedagogue,[26] and indeed if play is not so transformed then *"it changes to fooling and if habitually indulged in is demoralizing."*[27]

Piaget

One of the easiest connections to make between Dewey and Piaget - one that Piaget himself comments on [28] -- concerns the role activity plays in the formation of intelligence. Dewey was fond of railing against what he called the "spectator theory" or passive view of knowledge acquisition. In this view the learner receives passively that which comes to him from outside. Instead Dewey believed that knowledge was acquired by an individual actively doing. Knowledge acquisition is, he said, *"an active, personally conducted affair."*[29]

> *If we see that knowing is not the act of an outside spectator but of a participator inside the natural and social scene, then the true object of knowledge resides in the consequences of direct action.*[30]

This is, of course, the epistemological foundation of Dewey's famous "learning from doing" dictum.

Piaget agrees with Dewey that differing views of knowing will yield differing curricula, that pedagogical problems are ultimately epistemologocial and further that the best pedagogy is based on an active, participatory, constructive view of knowing. As he says:

> *The problem of intelligence, and with it the central problem of the pedagogy of teaching, has thus emerged as linked with the fundamental epistemological*

problem of the nature of knowledge: does the latter constitute a copy of reality or, on the contrary, an assimilation of reality into a structure of transformations?[31]

Piaget answers his own question by stating that:

...intelligence, at all levels, is an assimilation of the datum into structures of transformations...and these structurations consist in an organization of reality, whether in act or thought, and not in simply making a copy of it.[32]
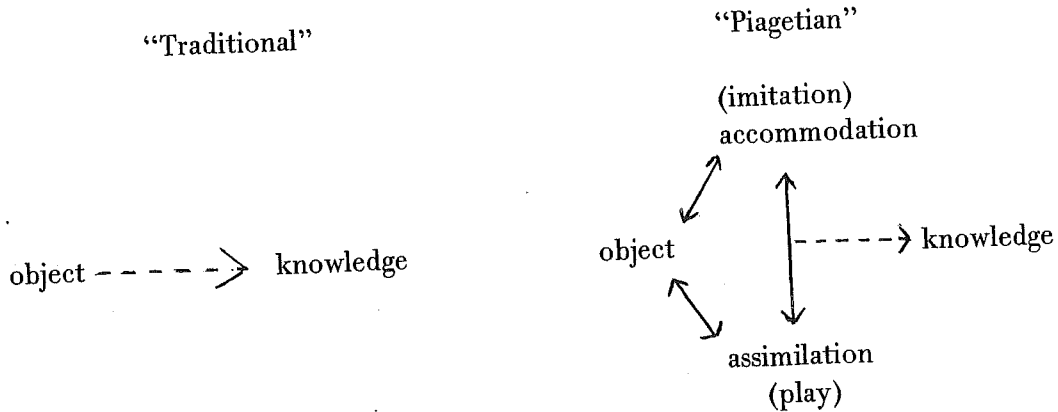
Moreover, *"the ideas behind the knowledge-copy concept have not been abandoned by everyone, far from it, and they continue to provide inspiration for many educational methods."* But as Piaget views his own research he sees that *"the essential fact that contradicts these survivals of associationist empiricism...is that knowledge is derived from action."* Thus,

To know an object is to act upon it and transform it, in order to grasp the mechanisms of that transformation as they function...[33]

Play is one of these transformative mechanisms.

The preceding ideas and quotes of Piaget can be represented diagrammatically, albeit somewhat simplistically, as follows:

Views of Knowing

"Traditional"

"Piagetian"

(imitation)
accommodation

object - - - - -> knowledge

object

- - - - -> knowledge

assimilation
(play)

The traditional view is the one Piaget labels the "knowledge-copy concept" and Dewey calls the "spectator view of knowing." It is grounded in the Lockean tradition of the mind as a "tabula rasa," or wax tablet, empty until external impressions are made upon it.[34] In behaviorist psychology this has appeared as the stimulus-response theory of learning, and in curriculum has shown up as the copy-model method of instruction -- one wherein the instructor shows the perfected form and the students copy, repeat, drill on that form.

The other view, Piaget's own, is the one he labels the "knowledge-construct concept" and is akin to Dewey's notion of the learner as an active participator in knowledge generation. For Piaget the heart of this view is the interactive relationship between the accommodative and assimilative structures, leading, over a period of years, to an adult, interactive and

equilibrium. These structures - levels or ways of operation - are not for Piaget either innate or copies; rather they are built up by the individual as the individual *acts* on the external environment. Such action, at both a practical and a reflective level, is the key for Piaget to all growth and development; particularly for the movement from one stage, or structure, to another.[35] Piaget's research with children has convinved him, and many others, that the child is different from the adult in that the child vacillates between accommodation and assimilation without, effectively, being able to coordinate the two into a harmonious and integrative relationship. As adults we have a definite hierarchy in the realities which constitute our world; empirical reality clearly takes precedence over a make-believe or fantasy reality. But for children, especially young children, this unity, this hierarchy, does not exist. Their world, as Piaget says, is bi-polar: *"at one moment they are believing, at the next they are playing."*[36] Such a dichotomy appears bothersome to adult, *"but that is because we have a desire for inner unity."* This desire, though, is rather late in appearing, occurring slowly as the child moves through his or her pre-pubescent years.

Play for Piaget has a very definite function within this framework: it is one pole of the assimilation-accommodation, interactive process; which, through its dialectic, will eventually result in the child moving from a bi-polar view of reality to an integrated, hierarchically structured one. This function of play means that school curricula should not emphasize *only* a copy-model methodology. For such does indeed pay attention to the imitative, or accommodative, structures where the child adapts himself to the requirements of an external world; but it totally neglects the play, or assimilative, structures where the child adapts, transforms, twists external reality to fit his or her needs or requirements. It is the integration of these two modes of operation that produces growth of thought. As Piaget says:

> *Thus the evolution of thought is shown to be the gradual achievement of equilibrium between assimilation and accommodation through successive stages, while play and imitation evolve correlatively towards their complementary integration.*[37]

While it is quite true that play, in an of itself, "deforms reality" - that is, external or "true" reality - it is also true that play by this very act creates in the individual *"a feeling of virtuosity or power."*[38] More than this, play is the transformative vehicle which continually challenges accomodation and thereby allows the individual to relate to the world, first on his terms (in a purely assimilative and often autistic manner), and then more and more on a social, group and rule-governed basis without destroying the uniqueness and personalness of the individual. As Piaget says:

> *Thus the evolution of play ... makes it possible to differentiate between the various types of symbols, from those which by their mechanism of mere egocentric assimilation are farthest removed from 'signs,' to those which, by the accommodating and assimilating character of their representation, converge on the conceptual sign, though without being identified with it.*[39]

Finally, if the individual is to go beyond a surface level of learning to a mastery level, based on the ability to manipulate and understand an object in a variety of situations - the sort of mastery a post-industrial society will require - then it is imperative that the individual have this sense of play, and that it be built into the school curriculum.[40]

Bruner

In his book on post-industrialism, Bell talks about a certain group of people, the inventors of the industrial era, as being "talented tinkerers." To me this phrase seems very appropriate and in no way demeaning in describing Jerome Bruner's relationship to Piaget. Piaget has devised a rather grand epistemology, a "genetic epistemology" he calls it. Within this epistemology, based on his fundamental conviction that knowledge is constructed not copied, Piaget has placed his theories of intelligence, learning, development and -- to the degree he has one -- education. Bruner is not interested in developing or even in critiquing such a grand scheme. But he is quite interested in taking the sort of "natural development" Piaget describes in his works on children and "tinkering" with various factors to make that development occur faster and better, without destroying too much of its naturalness. To quote Bruner:

> *Although from it earliest months of life the developing child is a 'natural' problem solver in his own right it is often the case that his efforts are assisted and fostered by others who are more skillful than he.*[41]

And again,

> *Our species, moreover, appears to be the only one in which any 'intentional' tutoring goes on. For although it is true that many of the higher primate species learn by observation of their elders there is no evidence that these elders do anything to instruct their charges. What distinguishes man as a species is not only his capacity for learning but for teaching as well.*[42]

It is this emphasis on the role of teaching, in theory and in practice, and its effect on learning in a developmental-structural framework that makes Bruner so important to us who are interested in the curricula implications of this framework. It is also one of the key distinctions between Piaget and Bruner, and thus it is important to read Bruner's pedagogical queries and suggestions in conjunction with, not apart from, Piaget's more formalized and comprehensive study of the child and its natural ways of operation.

It is this interest in, and emphasis on, the role that the artificial, the cultural, the intentional have on the "natural" development of learning which underlies Bruner's famous dictum *"that any subject can be taught effectively in some intellectually honest form to any child at any stage of development."*[43] This dictum has often been misinterpreted, usually in the form, *"Do you really think the calculus can be taught to six-year-olds?"* But as Bruner says, *"This is surely not the point."*[44] For Bruner as a structuralist, there are a number of "deep structures," "basic principles," "underlying axioms," and "pervasive themes" which underlie the formal expression of contemporary knowledge. Further, these structures, principles, axioms, and themes have simple as well as sophisticated forms. The "task of teaching" becomes one of translation, translating the sophisticated, logical forms that knowledge takes into simpler, more psychological forms that the learner -- particularly the elementary school learner -- can handle. Thus, while a six-year-old certainly could not handle the calculus in its logical, sophisticated form, Bruner does believe he can handle, and should handle, an introduction to the idea of limits.[45] The building of a curriculum then becomes a spiral affair -- and an integrative one -- increasing the sophistication of the form presented as the maturing learning increases his level of sophistication and development.

This pedagogical framework of Bruner's is quite different from that which Piaget would present.[46] For Bruner has essentially inserted a "foreign object" (a skilled performer, a tutor, a teacher) into a "natural" process of development, with the avowed intent of changing that process.[47] It is quite easy to interpret this intervention, not in a developmental-structural way, but in a behaviorist way, where the teacher presents the subject in its logical form and the student copies that form. Such reversion to the knowledge-copy concept of learning is a criticism that has often been made of Bruner. While this criticism is definitely wrong, it is understandable. Introducing an external agent, the tutor or teacher with knowledge of a 'right way,' into a process that is essentially internal is very risky. But Bruner believes the rewards in terms of growth and development, in terms of increased levels of competence, are worth the risks; and the adroit use of play is designed to keep the pedagogical process true to a knowledge-construct theory of development.

Where Piaget sees symbol processing proceeding through a series of set stages -- with an appropriate type of play at each stage -- Bruner sees symbol processing occurring through the integration (coordination and conflict) of three modes of representation which individuals use to deal with their world. To quote Bruner:

> *There are three kinds of representational systems that are operative during the growth of human intellect and whose interaction is central to all growth. All of them are amenable to specification in fairly precise terms, all can be shown to be affected and shaped by linkage with tool or instrumental systems, all of them are within important limits affected by cultural conditioning and by man's evolution. They are enactive representation, iconic representation, and symbolic representation - knowing something through doing it, through a picture or image of it, and through some such symbolic means as language.*[49]

And

> *I am convinced that we shall do better to conceive of growth as an empowering of the individual by multiple means for representing his world, multiple means that often conflict and create the dilemmas that stimulate growth.*[50]

This coordination and conflict among the three representational systems forms, for Bruner, the vehicle or process by which an individual moves from one level of competence to another. Thus, the iconic form of representation is more powerful than the enactive and carries with it a competence set quite different from the enactive; likewise the symbolic form is more powerful than the iconic and carries with it still another competence set. While these forms are definitely hierarchically arranged, one level does not supersede the other, as in Piaget, but rather one form, or level, complements the other and offers yet another way of viewing the object, and of asking another set of questions about the object. It is the integration of these forms of knowing that provides insight, Bruner believes, into the structure of that being studied.

The role of instruction in this theory of growth or development is not only to aid and encourage the individual to move from one form of representation to another, but also to help the individual to "scaffold" the structures built that a superordinate, more generic, structural network will be built. This structural network enables the individual to interconnect many particular skills or learnings and hence to have a more economical way of

dealing with the myriad of phenomena which surround all of us.[51] To build such a structural network, though, it is necessary to make certain that goal direction is not too rigid, to all-consuming, too specialized. As Bruner says:

> *There is good evidence that too strong an incentive for learning narrows the learning and renders it less generic ... Where learning is dominated by strong extrinsic rewards and punishments, it becomes specific to the requirements of the particular learning task.*[52]

To counterbalance this excessive drive towards the "efficient" completion of narrow and specific goals -- a drive easily visible in the current competency based educational movement, and a drive which many read into Bruner's own writings -- Bruner posits a theory of play. To quote him again:

> *Play is able to reduce or neutralize the pressure of goal-directed action, the "push" to successful completion of an act. There is a well-known rule in the psychology of learning, the Yerkes-Dodson law, that states that the more complex a skill to be learned, the lower the optimum motivational level required for fastest learning. Play, then, provides the means for reducing excessive drive...*[53]

Such reduction, in order to balance the internal and the external, is necessary for generic learning or structural scaffolding to take place.

The foregoing serves as an introduction to, and framework for, Bruner's theory of play. He posits five characteristics of play:

> *FIRST - The essence of play is in the dominance of means over ends. Freed from the tyranny of a tightly held goal, the player can substitute, elaborate, invent.*
> *SECOND - The risk of failure is lessened.*
> *THIRD - Because process is favored over product, there is a moratorium on frustration.*
> *FOURTH - Play issues an invitation to explore the possibilities inherent in things and events. There is a freedom to notice seemingly irrelevant details.*
> *FIFTH - Play is voluntary, it is self-initiated.*[54]
>
> *The fruits of play stem from its characteristics outlined above. The person who plays with objects and actions gains practice in assembling them in unusual ways. He pays attention to their details and possibilities. Because play's 'low risk' nature allows for experiment and reduces frustration, he sustains activity over a long period of time... He is able to solve the problems he encounters in both an organized and flexible way.*[55]

While all five aspects are interesting in regard to curriculum development it is the first aspect I find the most interesting. Most curriculum work is predicated on the separation of ends and means. This is the heart of the Tyler Rationale which Mager, Popham and others have developed so fully in behavioral objectives and competency based education.[56] The hidden assumption seems to be that one learns best when the goals and the means to the goals are clearly outlined before the learner sets about his learning task. However, as Dewey pointed out so often, this assumption is just too simple; and as Bruner and Olson have demonstrated in a number of experiments[57] the efficiency gained in learning a set task is lost

in the inefficiency acquired in transferring that learning to another task. Thus, if the purpose of learning is to move beyond the specific to the generic then play seems a necessary prerequisite; for in play an individual can combine various means to a set end, and can devise different ends from the same means. In short, through play an individual seems to explore the parameters of the situation before him, seems to understand better the structure of that situation, and is more versatile and imaginative in his manipulation of that situation. In an experiment where children were allowed to play with materials they would eventually use in solving a problem, and contrasted to another group who were only shown how to use the materials, Bruner says:

> *Although there were no differences in total responses made...the play children engaged in were more goal-directed ones. Play children, moreover, tended to begin with simple means but progressed systematically towards complex ones. In other words, a failed attempt did not frustrate them. They neither persevered nor gave up. Used to playing, they more often used the information from a failure to arrive at the next hypothesis... But play produced more than enthusiasm; the play children were productive and organized...*[58]

It is this last point which is the most dramatic. Summing up play and problem solving, Bruner says: *"a playful experience prior to problem-solving encourages children towards more goal-directed behavior."*[59] Why this is so is not known, but it seems reasonable to hypothesize that pedagogical situations where play is absent, where the learner is shown a procedure and asked or required to copy that procedure, *"creates a rather monolithic view of the procedure - with the means-end structure appearing too fixed for easy adaptation to later tasks."*[60]

The Application of Play to Classroom Situations

So far the attempt in this paper has been: (1) to point out that the attitude a culture has towards play varies with the culture, with our present culture possibly entering an era when the current conception of play, based as it is on Protestant and industrial notions, will need to be re-evaluated, re-formulated, or even replaced; and (2) to show that play, as a concept in and of itself, has pedagogic value, especially in a curriculum committed to moving beyond surface learnings to a deeper understanding of the structure underlying any field or operation. In this section I should like to apply the concept of play to particular classroom situations. I will choose the situations I know best, those that are part of the Oswego-Sodus Structural Arithmetic Project.

For the past two years, five primary school teachers (K-3) and I have been reading extensively in the writings of John Dewey, Jean Piaget, Jerome Bruner and David Olson. The school is the only primary school in a small, semi-rural, upstate New York town. This past summer we chose mathematics, really arithmetic, as the field we wished to develop, and so began preliminary work on the development of a structural curriculum. Our assumptions are that structures do underlie both the field being studied (here arithmetic) and the operations of those doing the studying (here primary school children, ages five to nine); that the art, or science, of teaching is the "melding" together, as Bruner points out, of the structures of the field with the structures of the learner;[61] and further that this "melding" will require a new pedagogic methodology; for the present methodology is based on, or at least tacitly

assumes, a knowledge-copy view of learning, not a knowledge-construct view. So far we have identified five pedagogic principles and are in the process of building a curriculum and teaching methodology around these five. They are: (1) the practical and intellectual use of activity, (2) the integration of skills with structures, (3) the controlled use of diversity in training, (4) the use of play for the purpose of a broader and deeper mastery, (5) the development of experience from a personal level to a reflective level.

Play enters the curriculum not only in the sense of playing with objects or games - checkers, cuisenaire rods, unifex cubes, pattern boards, etc. - but more importantly as an attitude that extols the means over the end, thus encouraging the learner to *"substitute, elaborate, invent."* In particular the learner is encouraged to approach the problem he is working on in yet another way, not to stop with one solution, but to explore the nature, parameters, and relationships of that before him. Some examples might help here:

ONE -- Children are shown or make up simple line patterns -0-0-0. These patterns are dealt with enactively -- the children forming into groups to represent the pattern, or doing a snap, clap, snap, clap, snap, clap rhythm; iconically via demonstrating the pattern with cuisenaire rods, unifex cubes, peg boards, geo-boards, and symbolically by translating the line pattern into a numerical or alphabetical pattern. Throughout all this (and not all children can easily make these translations from the enactive to the iconic to the symbolic) the children work in groups, look at each other's "translations," and are asked to comment on how their peg board illustration of the pattern is both similar to and different from the cuisenaire rod illustration of another child. The intent here is to build a framework that will encourage, but not force, the child to move from the particular to the generic. The child does this by "playing with" different concrete combinations. The "critical choice points," or "critical attributes" which Olson makes so much of in his book, COGNITIVE DEVELOPMENT,[62] also come out in this process.

TWO - Children are asked to equate a numeral, say 9, with a variety of different groupings.

3 (3's)
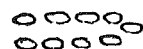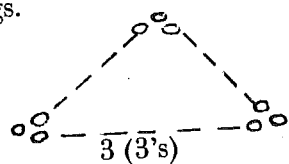
4 (2's) + 1
3 (2's) + 3

Here the intent is to explore the nature of the number being studied by determining the parameters of the combinations which form that number. This "combinatorial play" is very useful in helping the child realize (at a later age, and via Bruner's spiral curriculum) that 101 - 49 is easily transferred to 102 - 50, and that 6 x 19 is easily transferred to (6 x 20) - 6. Skills put into such a structured context cannot only be developed more efficiently, but will actually lead to new structurations. For example, the following pattern, when continued shows the need for negative or irrational numbers -

$$6 - 4 = 2$$
$$5 - 3 = 2$$
$$4 - 2 = 2$$
$$3 - 1 = 2$$
$$2 - 0 = 2$$
$$1 - = 2$$

THREE - Children are asked to pick any two single-digit numerals, say 4 and 8, and perform as many of the four arithmetical operations on them as they can -

$$4 + 8 = 12 \qquad\qquad 8 - 4 = 4$$
$$8 + 4 = 12 \qquad\qquad 4 - 8 =$$

$$4 \times 8 = 32 \qquad\qquad 8 \div 4 = 2$$
$$8 \times 4 = 32 \qquad\qquad 4 \div 8 =$$

Here the student is not only receiving drill in numerical combinations, he is also beginning to learn about the nature of the four arithmetical operations, and their interrelationships, as well as acquiring an intuitive insight into reciprocity, commutation, the nature of division, and the need for a new set of symbols - those to represent 4 - 8, and 4 ÷ 8.

All the above examples carry with them, in one way or another, a sense of play. This is especially so if play is defined as Erik Erikson has as *"the creation of a leeway of mastery,"* or *"free movement within prescribed limits."*[63] This attitude of leeway for mastery translates itself into actions the teacher takes to help the child acquire the mastery he does not now have. At Sodus we are careful not to cut off the student's development by two early pronouncing answers "right" or "wrong." We constantly encourage the student to try another means to his end, to compare his two results, his process, his way, his interpretation with another. In this manner the developing child, or any learner, is encouraged to build on the information he has gathered from both successes and failures for the construction of yet more insightful and complex structures.

Whether we will be successful in Sodus with our structural approach remains an open question. We need to find more ways of translating our principles into practice, and, just as important, we need to find ways of evaluating what we have done. Such competency evaluation which is aimed at understanding, mastery, depth, and transfer is not easily found. In fact, we have found no such vehicle to evaluate primary school children in the area of arithmetic. We would appreciate help on this. However, we are quite convinced that the acceptance of a knowledge-construct view of knowing will lead to a quite different pedagogic methodology than the acceptance of a knowledge-copy view of knowing. A knowledge-copy view of knowing leads to a rather mechanistic way of processing symbols, while a knowledge construct view leads to a structural or constructivist approach. Play, especially a play attitude, seems to be an integral and most necessary part of this approach.

FOOTNOTES

1.   John Flavell, COGNITIVE DEVELOPMENT (Englewood Cliffs, New Jersey: Prentice-Hall, 1977), p. 32.

2.   Max Wartofsky, "Art and Technology: Conflicting Models of Education?" in Feinberg and Rosemont, eds., WORK, TECHNOLOGY, AND EDUCATION (Urbana, Illinois: University of Illinois Press, 1975), p. 178. Wartofsky's point is not that school is, or should be, play, but that this quote is a slogan for one camp which separates art from technology. Wartofsky believes such a separation is false, education should be art and technology, play and work. This view is akin to the one expressed in the title of this paper : Play and Mastery.

3.   John Huizinga in his masterful HOMO LUDENS (Boston: Beacon Press, 1955) points out (p. 212) that play is mentioned twice in the Book of Proverbs (ch. 3, lines 30-31); but that such is found only in the Douay version, based on the Vulgate. The King James version changes this section so the notion of playing with or before God is expurgated.

4.   Quoted in William H. Kilpatrick, SOURCE BOOK IN THE PHILOSOPHY OF EDUCATION (New York: The Macmillan Company, 1925), pp. 4-5;

5.   Huizinga, OP. CIT., p. 192.

6.   For Bell's views on post-industrialism and the disappearance of the Protestant ethic see his THE COMING OF POST-INDUSTRIAL SOCIETY (New York: Basic Books, 1973), and his THE CULTURAL CONTRADICTIONS OF CAPITALISM (New York: Basic Books, 1976). For my views on how this can affect the schools in the coming decades see my "Schooling in a Post-Industrial Society," in THE HIGH SCHOOL JOURNAL (Vol. 61, No. 8, May, 1978).

7.   My argument is not that mastery cannot occur without play, but rather that the quality or type of mastery achieved is directly related to the absence or presence of certain aspects of play. That is, for the achievement of a mastery, or a competence, emphasizing inventiveness, structural understanding, and transferability of certain elements of play, particularly those involving the relationship between means and ends, are necessary.

8.   Quoted in Frank and Theresa Caplan, THE POWER OF PLAY (New York: Anchor Press/Doubleday, 1974), p. 256.

9.   Huizinga, OP. CIT., pp. 147-148.

10.   Werner Jaeger, PAIDEIA: THE IDEALS OF GREEK CULTURE, trans. by Gilbert Highet (New York: Oxford University Press, 1943), Vol. II, p. 317. Jaeger notes that while paideia (education and culture) and paidia (play) have the same root the Greeks, especially Plato, wanted to distinguish between the play activity of the child and the intellectual activity of the cultured person. Thus while paideia and paidia have the same root they are, themselves, not the same. The former arises from the latter, but through the dialectical process attains heights that categorically distinguish it from its origins.

11.   Huizinga, OP. CIT., p. 149.

12.   IBID., p. 173.

13.   IBID., p. 180.

14.   Much of this paragraph is based on the first part of the third chapter of Stanley Parker's THE FUTURE OF WORK AND LEISURE (New York: Praeger Publishers, 1971), pp. 33-39.

15. IBID., Marx, of course, argued a quite different position. Namely that work, especially industrial work, was not a form of salvation but a form of alienation. These two opposing concepts clashed strongly in the 19th century, but only one had its effect on the school curricula. See for example the McGuffey Readers.

16. Parker, OP. CIT., p. 37.

17. Henry Perkinson, THE IMPERFECT PANACEA (New York: Random House, 1977), p. 170.

18. Bell, THE COMING POST-INDUSTRIAL SOCIETY, pp. 128, 159, and 364-365.

19. IBID., pp. 9-12, 112-116.

20. IBID., pp. 343-344.

21. John Dewey, "Play", in Paul Monroe. A CYCLOPEDIA OF EDUCATION (New York: The Macmillan Company, 1913), Vol. 4, pp. 725-727.

22. IBID., p. 726.

23. John Dewey, DEMOCRACY AND EDUCATION (New York: The Free Press, 1916, 1944), p. 204.

24. John Dewey, "The Process and Product of Reflective Activity," in R.D. Anchambault, ed., JOHN DEWEY ON EDUCATION: SELECTED WRITINGS (Chicago: The University of Chicago Press, 1974), p. 253.

25. David Olson, THE ARTS AND EDUCATION paper presented to the Terman Memorial Conference, Stanford University, October 1978, pp. 5-8, and 19.

26. The term pedagogue has a long and somewhat demeaning history. Since the ancient Greeks and Romans first used slaves to look after the young boys attending the gymnasium, the word has acquired the connotation of referring to those who attend to the rudimentary upbringing of young children. Ichabod Crane is a fine example of the stereotype of American literature. However, the enormous work of Jean Piaget has raised the awareness level of all who read him in regard to the extreme complexity of the emerging mind. Thus, I believe, the time is right to reintroduce this word, having it refer to one who studies and practices the science and art of teaching children. At Oswego in the Elementary Education Department we are committed to turning out pedagogues.

27. Dewey, DEMOCRACY AND EDUCATION, p. 203.

28. Jean Piaget, SCIENCE OF EDUCATION AND THE PSYCHOLOGY OF THE CHILD (New York: Grossman Publishers, 1971), Part II, PASSIM.

29. Dewey, DEMOCRACY AND EDUCATION, p. 335.

30. John Dewey, THE QUEST FOR CERTAINTY (New York: Capricorn Books, 1929, 1960), p. 196.

31. Piaget, SCIENCE OF EDUCATION, p. 28.

32. IBID., p. 29.

33. IBID., pp. 28-29.

34. Dewey, DEMOCRACY AND EDUCATION, p. 268. As Dewey points out the Lockean tradition of the "tabula rasa" being inactive and hence purely receptive was developed by Locke's followers not by Locke himself.

35. Piaget's four stages, each with its own structures, are: (1) the sensory-motor, (2) the pre-operational, (3) the concrete operational, (4) the formal operational. Stage one is characterized by activity, the origin of all intelligence; stage two is characterized by the use of symbols; stage three by the beginnings of adult logic; and stage four by full adult logic with the use of hypotheses and logical necessity.

36. Jean Piaget, JUDGMENT AND REASONING IN THE CHILD (Totowa, New Jersey: Littlefield, Adams and Co., 1928, 1976), p. 245.

37. Jean Piaget, PLAY, DREAMS AND IMITATION IN CHILDHOOD (New York: W.W. Norton and Company, 1962), pp. 289-290.

38. IBID., p. 89.

39. IBID., p. 88.

40. It is interesting to note that Richard Hofstadter, in his ANTI-INTELLECTUALISM IN AMERICAN LIFE (New York: Alfred A. Knopf, 1963), Ch. II, pp. 29ff, defines an intellectual as one who "plays with ideas." It is also interesting to note Neils Behr's famous comment that *"there are some things so important that one can only joke about them."* Quoted in "On Coping and Defending," in Jerome S. Bruner, TOWARD A THEORY OF INSTRUCTION (Cambridge: The Belknap Press, 1966, 1975), p. 135.

41. David Wood, Jerome S. Bruner, Gail Ross, "The Role of Tutoring in Problem Solving," JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY, Vol. 17, 1976, p. 89.

42. IBID., italics mine.

43. Jerome S. Bruner, THE PROCESS OF EDUCATION, (Cambridge: Harvard University Press, 1960, 1977), p. 33.

44. IBID., p. X.

45. IBID., pp. IX-X.

46. While Piaget says that he "is not an educator," he does offer educational advice a number of times. Each time he offers admonitions against the very intervention Bruner advocates. See for example, Piaget's "Development and Learning," in PIAGET REDISCOVERED, R. Ripple and V. Rockcastle, eds., (Ithaca, N.Y.: Cornell University Press, 1964); and Piaget's own TO UNDERSTAND IS TO INVENT (New York: Viking Press, 1973), Part I.

47. I am using the word "natural" not in the Roussellean sense of devoid of environment, especially civilized enrionment, but in the biologoical sense of occurring through non-forced interaction. This difference between Piaget and Bruner reflects their different personal backgrounds--Piaget was trained as a zoologist, Bruner as an American psychologist.

48. What makes this interpretation wrong is Bruner's insistence on the activity of the individual learner, an activity that precedes any formal giving of logical structure. Without the individual being actively engaged in the nature of the problem he is solving or skills he is developing, then the giving to him of the formal structure or correct method will be fruitless. As Bruner says: *"...the learner cannot benefit from such assistance (that of teaching or tutoring) unless one paramount condition is fulfilled."* Comprehension must precede production. The learner must recognize the nature of the problem or skill he is dealing with before he can produce results unassisted. This comprehension or recognition results from the individual being actively engaged in what he is learning. See Wood, Bruner, Ross, "The Role of Tutoring in Problem Solving," OP. CIT., p. 90.

49. Jerome S. Bruner, "Representational Processes in Childhood," in BEYOND THE INFORMATION GIVEN, J. Anglin, editor (New York: W.W. Norton and Co., 1973), p. 316.

50. IBID., p. 323.

51. It is on this point that Bruner has posited some of his most interesting instructional theories. Working with both animals and children Bruner has shown that the type of learning which ensues when one is concentrating on each object or skill as a discrete entitity is quite

different from the type of learning which ensues when one is concentrating on the "scaffolding" of skills or structures. See, for example, his "The Role of Overlearning and Drive Level in Reversal Learning," and his "Going Beyond the Information Given," in Bruner, BEYOND THE INFORMATION GIVEN, Chs. 10 and 13.

52.   Bruner, "On Coping and Defending," OP. CIT., p. 136.

53.   Jerome S. Bruner, Alison Jolly, Kathy Sylva, PLAY--ITS ROLE IN DEVELOPMENT AND EVOLUTION (New York: Basic Books, 1976), p. 15.

54.   These five come from the Sylva, Bruner and Genova essay, "The Role of Play in the Problem-Solving of Children 3-5 Years Old," in the Bruner, et al book, PLAY--ITS ROLE IN DEVELOPMENT AND EVOLUTION, pp. 244-257.

55.   IBID., p. 245.

56.   For a critical perspective on this movement see: William E. Doll, Jr., "A Methodology of Experience: An Alternative to Behavioral Objectives," in EDUCATIONAL THEORY, Vol. 22, No. 3, (Summer 1973), Eliot W. Eisner, "Educational Objectives: Help or Hindrance?" in SCHOOL REVIEW, Vol. 75, No. 3 (Summer 1967); and Torstein Harbo, "The Means-End Model in Curriculum Development and Research--A Cautionary Note," in METHODO-LOGICAL PROBLEMS IN RESEARCH AND DEVELOPMENT IN HIGHER EDUCATION, W.A. Verreck, ed., (Amsterdam: Swets and Zeitlinger, B.V., 1974).

57.   See footnote number 51 and David R. Olson. COGNITIVE DEVELOPMENT (New York: Academic Press, 1970). Olson does a magnificent job in showing that the type of instruction children have--specific or structural--makes a huge difference in the type of knowledge they acquire, and the type of learning they develop.

58.   Sylva, Bruner, and Genova, OP. CIT., p. 256.

59.   IBID., p. 250.

60.   IBID., p. 256. Again, the Olson book adds support to this hypothesis.

61.   Bruner's statement is:

> ...at each stage of development the child has a characteristic way of viewing the world and explaining it to himself. The task of teaching a subject to a child at any particular age is one of representing the structure of that subject in terms of the child's way of viewing things.
> See his THE PROCESS OF EDUCATION, OP. CIT., p. 33.

62.   Olson, COGNITIVE DEVELOPMENT, OP. CIT., PASSIM, especially chs. 6, 8, 10.

63.   Erik H. Erikson, "Play and Actuality," in Marie Piers, ed., PLAY AND DEVELOP-MENT (New York: W.W. Norton and B., 1972), p. 133.