

SESSION SIX - THE EVOLUTION OF CONSTRUCTIVE PRAXIS AND THE PRACTICAL TEACHING OF 'BRICK BUILDING'

Evolution of Constructive Praxis

The ability to understand the positional, spatial and orientational relationships existing between objects has, like all other human understanding, its main origins in the early bodily movements.

The young baby behaves in some ways as if it consisted of several only partially related departments connected loosely through the trunk. As the total amount of movement increases over the early weeks large proximal movements give rise to more distal ones, gross displacements to more refined actions, whilst densities, vigour and amplitudes increase until the spheres of activity of the several 'limbs' (head-eyes/ears/mouth, arm-hand, leg-foot) occupy or involve large volumes of bodily near-space and grossly overlap one with another. Overlap leads to interference, to interaction, to mutual stimulation and subsequently to 'co-operation' between 'limbs'.

Through such co-operative external loops the baby emerges from being a loosely associated collection of virtually unrelated parts to an integrated organism capable of channelling or 'focussing' the whole of its attention through any part of the body, the remainder augmenting, complementing or at the very least avoiding interference with the primary act.

Some bodily movements after giving rise to other more contingent and derivative movements, continue to mature as the basis of 'chassis' behaviours. These provide a stable base from which other behaviours can operate and move the environment-sampling apparatus bodily to where it is required. It is noticeable in the early weeks, that in a baby lying supine increasingly complex 'limb' (including head and eye) movements are very much the commonest activities, whilst when lying prone the trunk and limbs tend to be devoted to a unified rising or pushing up towards the vertical, and in opposition to gravitational forces. As the neutral or sitting position is attained, attention is divided alternately between maintaining and improving 'sitting balance' and utilising the 'limbs' from the balanced position, and in due course to a complementary partnership between them.

Extension of the arm (at first from supine lying and later from sitting) in co-operative liaison with the eyes, gives rise to active scansion or hunting movements, contact with an object or surface leading to active 'fixation' and controlled 'following' and, when coupled with grasping movements of the hands and fingers, to securing or 'getting hold of' things. In this way early simple 'reaching' is utilised in the general exploration of space even as it refines itself as a sophisticated apparatus for the precise focussing of attention and for operating on elements within the bodily near-space. From this time on, objects may be located, touched, moved, grasped, shaken¹, translocated and disposed of.

¹ In fact most advanced behaviours consist of picking things up, shaking them and putting them down again! The kind of activity involved depends on what is selected for picking up, how an object is shaken (i.e. in what tool capacity, if any, the object is to be used), where an object is put (i.e. with what, in what relationship to other objects etc), and on the sequential nature of the component acts.

In due course the child comes not only to be able to pick up an object neatly but also to dispose of it when and where he wishes. That is to say he eventually comes to be able deliberately to put an object down, to deliberately relinquish his hold on it, whether or not he subsequently re-secures it. Usually this class of action grows from the inadvertent loosening of a child's grip on shifting attention to the other hand; from the object's being inertially wrested from the hand during vigorous flailing of the arm; from his hooking the object over the edge or lip of something during the withdrawal of the hand; or from the 'reflexive' loosening of the grip when the hand or object is pressed against a firm surface.

Hence from almost unnoticed dropping, deliberate dislodging and 'throwing' arises the child's capacity for purposeful putting and, naturally, 'putting into' is likely to be the first finite representation of this class of acts.

Observation suggests that even considerably older (than the 12 months level children we are discussing – even up to 30 months) children need a clearly demarcated zone as a target for putting-type acts so that they may be sufficiently directed. 'Putting on' then, is usually at first onto the edge of or 'into' the corner of a flat surface and as putting is directed to relatively small surface areas the combination of fairly high control tolerance (natural 'clumsiness') at all levels produces a range of varying results most of them culminating in the 'missile' – object's not remaining on the 'target' object. This will tend to be interpreted by the indifferent observer as 'falling off' and as the child's having *failed to achieve* his purpose; however, as is likely in all teaching at this level such interpretations are misconceived on the basis of the adult-observer's projection of his own motivations etc. into the child-subject.

Indeed once an object has fallen from its target a few times it is likely that this produces a secondary (semi specific) reinforcement of the action so that in due course it is exercised to this end. That is to say the child acts in order to produce the secondary 'falling down' effects, and may be said to be motivated by it. As the action is repeated with different things and targets under differing sets of conditions and increasing 'praxic' control the missile-object will tend to be set more squarely so as to increase the delay before falling and to make falling off less likely. The delay may enhance the child's anticipation of the 'fall' event, which may then be precipitated by deliberate knocking off or by the addition of a further missile-object.

In this way bringing object into apposition with target leads to secondary falling off which with increasing skill leads to increased anticipation time so that the child's recognition of the object's remaining on the target becomes associated with greater or more refined pleasure than its falling off.

Meanwhile increasing continuant capacity (see page 2 Session Two) allows of a tendency for piling to become more frequent and for piles to contain greater numbers of components.

Once piling is established the child has the opportunity to notice some of the basic properties (- its essentially linear nature and the consecutive arrangement of its components, both concepts much more fundamental [see Session Ten] and less obvious than an observer might think), and to recognise these in the horizontal plane. And so from nuclear groups of objects lying adjacent to one

another the child begins to produce 'chains' or 'trains', usually at first either across right/left or in the 'normal', away from or towards himself. Chains of objects deliberately oblique to the child are usually a very much later innovation.

Meanwhile as vertical piling progresses the centres of gravity come to be arranged nearly one over the other thus inevitably postponing the deliberate offset displacement of one object on another, and the praxic recognition of such a configuration. This in some way accounts for the normal lateness in a child's being able to synthesise a structure like the Gesell 'bridge' despite his being capable of discriminating it in the 'matching' sense (see later 'Matching' tool) and having entirely adequate manipulative skill. It is also easy to see how children with delayed development may not be able to advance beyond the vertical piling stage despite, or rather because of, becoming progressively more skilled in the narrow sense.

Active piling, particularly with variously sized and shaped objects, leads to re-arrangement and more deliberate selection of materials, actions which not only have great importance in the development of 'sequencing' concepts (see later), but which also tend to induce asymmetries and collapses with the accidental creation of unexpected configurations. Combined lateral and vertical building, facilitated and reinforced by the child's recognition of previously generated structures and sometimes by his identifying his productions with familiar environmental forms and things, leads to the creation of at first two-dimensional and then distinctly three – dimensional forms.

Gradually the child's experience and understanding of space and his manoeuvring things in space allows some anticipation of the outcome of his efforts so that in due course he sets out not just 'to build' but 'to build a ...'. At this stage the act of building commonly distracts him from his original purpose so that even a verbal intention to create a particular structure is perhaps usually forgotten, the final creation being subsequently labelled, within a social context as something quite different; however, his setting out to produce something, whether or not this intention happens to be verbalised, implies the existence of some sort of model to be reproduced; a model not necessarily complete as a structure and consisting of his interpretation of an act of construction by another, a concrete structure, a graphic representation, a verbal description or a private image. That a reproduction of this model may be rarely realised in the early stages of development is irrelevant to the importance of there being a model to initiate directed activity.

The child, having acquired a tendency (and hence an urge) to actually set out to reproduce the model, appears to use an area of space relative to him without any conscious decision. Elements are picked up using some measure of deliberate selection, although at this stage they may well turn out to be inappropriate to the particular task, brought together and set down in the most convenient place – probably that part of the most exhaustively explored region of space – readily accessible to the child's posture and the environmental topography of that moment. Later a particular region of space may be deliberately and consciously chosen, possibly allowing a deliberately convenient orientational relationship between model and copy.

The child who continues to give some of his attention to and to be in some way influenced by the model during his building, that is to say does not get wholly diverted into building his own thing without references to the model, will juggle his components according to his previous experience until, more or less by chance, he strikes some sort of resemblance between his production and the model. At such an early stage the resemblance may be superficial, as between cubes slightly offset one to another and cubes arranged in columns to form 'steps'.

With practice in the early use of 'copying tools', persistence in juggling the elements, coupled with experience, will lead in time to the actual reproduction of fairly simple structures; however this is a far cry from the later systematic synthesis which requires not only continual analysis of the model but also capacity for shifting attention from the whole model, to component structures (and local orientations and types of 'joint') and back again.

The child examining the model must see it in terms of his own experience and well into the fifth year this appears to be in terms of his own movement patterns. That is to say the child appears to still 'feel' the construction from the movements he has experienced in effecting such patterns rather than from the changes of position of the things moved. Hence a child may pre-fabricate a component pattern, secondarily transferring it to its position within the whole or afterwards turning it to its proper orientation, or a structure may be built from the top downwards or in other ways which may incur all sorts of engineering problems not met with in the building of the model.

From this time on (5 years) a child may adopt a very systematic approach to construction sometimes deliberately lining his up with the model in a manner analogous to tracing on paper. At first however, he may still have difficulty in attending to the overall appearance of the structure whilst simultaneously coping with the sub-structures. Bricks may be carefully selected and counted and yet the total pattern grossly distorted. Even in the 6th year children find themselves torn between the influence of the model and the inertial demands of their own copies so that in building 'steps' with columns of identical cubes the model 'demands' that a cube should be placed on top of a structure are frequently overridden by the even more imperative demand that the cube should be fitted into the notch so obviously 'prepared for it', with the result that the total form of the structure is suddenly changed.

During his 7th year the child comes to be able fairly competently to analyse and re-synthesise quite complicated three-dimensional structures, even when 'exploded' so that gaps play a major role in the patterns. Generally speaking the more unlike the component bricks the easier model copying is but the advantages due to dissimilarity may be offset by the problem of orientation of irregularly shaped components.

During this evolution and particularly from the 4th year onwards, the child's capacity for dealing sequentially in both one and two dimensions develops in a manner rather different from but related to the multifarious and sequentially less important approaches and routes of general praxis. This will be discussed under 'Sequencing and Seriation' (Session Ten).

The practical teaching of 'brick-building' As with the teaching of any other learning 'tool', the first objective is to establish a positive attitude in the child towards handling the materials in a satisfactory manner and thus to facilitate the accumulation of sufficient experience to form the basis of the learning 'tool'. Then as usual the child *learns to use the 'tool' before using the 'tool' to learn*.

Vulnerable children are commonly found either to 'not like' playing with bricks or to use them obsessively to construct precarious towers or to line up objects in extended ranks. None of these habits is compatible with developing the 'brick building' learning tool, but it must be recognised that such limiting forms of behaviour are due both to lack of experience and familiarity on one hand, the child's interests being diverted to presently more attractive activities, and on the other to active rejection of activities, with which the child may associate displeasure in virtue of their relative unfamiliarity. The obsessional behaviours will have an environment-ordering and therefore 'escape' or 'avoidance' function.

In practice it is necessary to cause the child to abandon himself to the act of piling, so that at first any and all continuant activities are valuable exercises – picking up and putting into containers, pushing through holes, putting rings onto sticks, threading beads etc., however simply, having him pick up components to dump them one after another onto a pile without special care is the main basic activity. If the child already moves things 'encouragement' may be enough, if necessary the child's hands may be held and guided by the teacher. It is vitally important that no attempt is made at first to do more than add to the pile for we are attempting to simulate conditions of the second year of development when a child's understanding of spatial relationships is very rudimentary. The components should be chosen both for their seeming suitability *and* for their seeming unsuitability for the activity! That is to say quite apart from the child's coming in due course to understand what can be done in making stable constructions, it is at least as important for him to discover the behaviours of objects apparently less conducive to structural stability. Hence in addition to various symmetrically shaped bricks, awkwardly shaped blocks, cans, balls, screwed up paper, skeins of rope, bean bags, books, jars, etc., should all be introduced into free piling.

Deliberate destruction of object-piles should be prohibited, but frequent, at first even continual, falls are essential if interesting accidental complexes are to arise and if the child is to become sufficiently uninhibited in his building. *After the early stages* grossly careless addition of 'bricks' is not to be encouraged but the very careful and precise putting on of elements is at least as initiative-destroying. It is often a good idea to encourage the child to drop or loosen his hold on the 'brick' when an eight of an inch or so above its intended resting-place.

From the beginning varying angles of approach to the pile are encouraged and once the child is beginning to add spontaneously to the pile, various ruses may be employed to force variations; e.g. the child's tendency to put always on top of the pile may be frustrated by physical obstruction; he may be deflected or directed by pointing out various points of entry; the teacher's own additions may invite the child's next brick or deliberately abort the child's pattern of building; the planned provision of certain elements will modify the child's behaviour etc.

Gradually the child can be caused to be more spontaneous in his 'free' piling, taking enjoyment in the act of adding to the pile and so facilitating this basic operation. As the game becomes associated both with pleasure and emotional security the child increases his capacity for both generating potential experience and for 'noticing' and 'transforming' it into realised or actual experience.

It should be noted that this early stage requires much time and effort (preferably for and from the child), often with little sign of change in the child's understanding; especially that of a chronologically older, learning delayed child. Hence the teacher's natural but irrational ambition to effect rapid changes in the child's behaviour must be held firmly in check and replaced by a patient almost nonchalant attitude.

'Brick Building' is very difficult to teach.

As the frequent, sometimes prolonged, piling sessions which have no particular end-point, take effect the child can be expected to pile on his own when offered 'bricks' and in due course to spontaneously get out his bricks to pile. Once he, at least during a 'lesson', is able to pile with a minimum of outside support and is not confined to vertical heaps it is reasonable to attempt to teach the 'brick building' tool.

This requires a developmental maturity of 30 months which may be judged by the child's capacity for confidently separating three sets, each of identical elements (see 'Sorting' activities) or for deliberately pairing simple objects (to be discussed later under 'Matching' activities). Three or four pairs of objects (e.g. a pair of small beer cans, a pair of Ladybird books, a pair of shrimp paste jars (or torch batteries), and a pair of small cardboard boxes (perhaps custard powder sellotaped to make a rough cube), or alternatively using wooden bricks, cubes 1½ - 2 ins, two elongated bricks, two triangular (or half circular bricks) and two cylinders are first used for free piling and then, once the child is familiar with their properties used as the elements of simple pairing. This will be discussed more fully later under 'Matching' activities but here may be said to consist in the child's being able to select the twin of any element the teacher picks up.

With the child seated at the table with the teacher behind and slightly to the side opposite to the child's preferred hand, one set of objects is put on a plate or book or tray etc. on his preferred side. Now the teacher picks up an element, from wherever she decides to keep her set, and having ensured that the child has visualised it causes him to acquire the partner. Then the model is placed on the table followed by the child's being caused to place his in a position suitably displaced from the model. It will be noted that having made certain that the child is able to pair the elements he is actually helped or caused to make the selection. This is to ensure the momentum of the game and to prevent delay and confusion due to his inadvertently picking up the wrong brick or his prematurely acquiring one.

Whether the child is learning to build or utilising the building tool, his experience derives from the activity itself, so that unless the child has reached the relatively mature stage of actively examining, (not to be confused with 'admiring'), his own construction or it is to be used in some other game, it should be taken to pieces immediately. This is best done by providing the child at each building

session with a receptacle (a plate, box, saucepan, book etc. different on different occasions and placed in varying positions) into or onto which he can dismantle his construction piece by piece *as soon as it is completed*.

As always the aim is to cause the child to gain experience and to abstract principles from numerous examples of their application. Hence causing the child to actively produce a wide range of constructions (with a variety of materials) utilising the available space as fully as possible is the approach best calculated to encourage the development of the 'brick building' tool. Rapid successions of constructions and disassemblings during the early stages not only increase the available potential experience but also diminish the child's opportunities for becoming anxious, for it is important to recall that before a basic learning tool is established the child cannot be aware of its existence (see Sessions 1 & 8), so that clumsy attempts to draw his attention to the 'purpose' of his activities before such a purpose is naturally derived from understanding will simply confuse the child and delay, if not prevent, his acquiring the true skill.

In due course the separation of each act, to be reproduced by the child, into pairing and placement may be superseded by their coalescence into immediate placement requiring the child to select and place in one continuous phase. At this stage the child's losing track of the game or having positional or orientational difficulty may be helped by the teacher's elaborately displacing and replacing the appropriate element(s) of the model.

Certain structures may from a fairly early stage be created by selecting and placing two identical (later different) elements, one in each hand, simultaneously. (It will be seen that such a procedure is entirely different from the two selection-and-placements being made sequentially, when the first placement will alter the appearance of the structure so as to disrupt the 'logical sequence' of actions of the less mature child attempting to follow a model).

As the child comes to follow the teacher's actions closely the process can be speeded up so that the teacher's placements are roughly simultaneous with those of the child but (at first) one step ahead.

It is necessary to decide, for any stage, time or event, how much tolerance or leeway is to be allowed; whether effort is to be made to cause the child's structure to fairly closely resemble the model or any effortful action, in which the child appears to be attempting to copy the model, is to be accepted. During the early stages of practical building some symmetries (particularly mirror images) may be meaningless or mutually equivalent for the child so that a mirror image should be entirely acceptable to the teacher, although once the mirror image is established the rest of the model needs to be in keeping, if it has been decided that the emphasis is to be on fair accuracy of reproduction.

It must be remembered that the object of 'brick building' as a 'lesson' activity is not primarily the teaching of a child to be able to make accurate copies of models but encouraging him in approaching praxic analysis and synthesis in an effective manner so as perpetually to increase his experience and understanding. Clearly a capacity for being able to reproduce models satisfactorily tends to be an inevitable outcome of this.

With practice under the conditions of the 'asocial lesson', where he derives his 'rewards' from doing and trying to do, only secondarily from what he values as success and not at all from the responses of others, the child may be given more time and opportunity for 'spontaneous' variation and hence for possible breakdown of the activity flow; however, for the child well accustomed to the conditions this should present no problem, surreptitious manipulation of materials and immediate conditions by the teacher being sufficient to maintain the child's security in activity.

Complex models may be copied, diagrams and three-dimensional drawings used as models and even written instructions employed when appropriate.

The models must be varied maximally from the start so that the child gets little opportunity for learning a particular structure by rote; however there are clearly a number of important assemblies which must recur with increasing frequency – wall, tower, T-piece, 'bridge' (or cross piece) above two uprights, 'cantilever', 'buttress', 'key stone' etc. – and far from deliberately avoiding them these can be encouraged as long as the location, orientation, form of the components and function of the whole, is varied as much as possible.

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1976