Poleidoblocs: How to Begin

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The first boxes of Poleidoblocs G and A were available for purchase from the beginning of 1958, and then only a small quantity. They were mostly acquired by Universities for research purposes in Great Britain and the U.S.A. and by Child Guidance Clinics. But from 1959 they began to find their way into British schools, teachers having in one way or another, often by chance, come to hear of their existence and wishing to try them out in their schools.

From 1968 Poleidoblocs were purchased and distributed over a large area of Great Britain, from Edinburgh to Sussex, from Essex to Bristol and Cheltenham. On several occasions we were asked to send samples of the boxes with display instructions to teachers' study group meetings and on a few occasions we were asked to come and demonstrate the Poleidoblocs ourselves.

There were at that time no specific instructions as to the use of Poleidoblocs. Each purchaser experimented with them in his own way and for his own purpose, whether in research or teaching. When the grant from the British Association for the Advancement of Science was given at the end of 1960 for a two year period to introduce the material into British schools, it became necessary to work out a specific standard way of introducing the blocks to children and also a way of recording what was done, for later comparison and discussion.

Until then we had used them ourselves only in the therapeutic setting at the Institute of Child Psychology, that is to say – one adult with one child, the therapist watching what the child was doing and discussing it with him. The child had free use of the material, could make whatever he wished, could discuss his construction with his therapist and its various points could be made clear to him. Also the child could get help and advice if he was faced with a problem he could not solve himself.

From this, to introducing the material into a school setting with up to 40 children in one class, and with only one teacher available, called for quite a lot of thinking and planning.

As the investigation of the use of Poleidoblocs in British schools, sponsored by the British Association, was to take place in Leicestershire, it was a great help to be taken round to several schools in this county by the County Educational Schools Adviser for some days, and to be permitted to sit and watch in various classes how a day at school went for the children and their teachers. What was needed was to find a way and a time during school hours which would give the child an opportunity to work with the blocks as freely as possible, and to make his own experiments with them without interference or direction from the teacher. The main aim was that each child in school should have the same opportunity as far as possible, as a child in a clinical setting to become familiar with the blocks, their sizes, shapes and colours (G box) and their interrelation, by what we then chose to use as a technical term “Free Construction” periods in the ordinary school setting.

It was of course not possible to isolate each child for a certain period with his teacher’s full attention to what he did. But as we knew from years of personal experience with Poleidoblocs that the material itself evoked a certain fascination in children, so they often spontaneously asked for it, we felt it would be sufficient to organise periods during school hours for each child to occupy himself with the blocks and to make with them what he liked. Then he should have an opportunity to tell his teacher about his construction (s) and perhaps ask questions.

We had to find a way to achieve this, and it could only be done by trial and error.

As the classes were pretty full and the teachers very busy, we did not venture to suggest that the children should work individually, as it would have taken too much time to get through a class of children and to collect evidence of how they accepted this new tool. So we suggested that the children worked in groups of four to six at a time, seated round a large table (composed of smaller tables put together) but so that each child could easily reach the blocks. The contents of two boxes of Poleidoblocs G were then disposed in a casual way in the middle of the table, and the boxes removed. The group should preferably consist of boys and girls, should be altered in composition when the next turn came, so that no group should be dominated by an individual child.

Each child should, if possible, have the opportunity to work with the blocks once a week. This we found later was too often, so the intervals between Free Construction periods were made longer. It also had to fit into the teacher's work with the rest of the class, so he or she could spare as much time as possible observing the children at work, and talk with them afterwards about what they had been doing.

All children should begin with the G blocks and the A blocks should not be used in Infants' classes, as there are too many pieces, some very small, for the young child to cope with, and it might confuse the childrens' grasp of the interrelationship of the blocks. In Junior schools, however, where the teacher would want to use the material for teaching purposes as soon as possible, we considered it sufficient for each child to make first three Free Constructions with the G blocks, followed by three with the A blocks, and then preferably each child working individually by himself.

The introduction of Poleidoblocs to the class is very important, and a standard formula was suggested and should always be applied.

The teacher should first show the box to the whole class, remove the lid and tilt the box so that the contents can be seen, pointing out the nice pattern the pieces make when put in their proper places in the box. Now is the time to tell the children a story about the contents, that calls their attention into focus. We have all met a child's love for a small stone or pebble. He may be attracted by its colour, its shape or the smooth feel when touching it, and many children guard their treasures fiercely.

It is this feeling of 'specialness' which should be created for the children in relation to Poleidoblocs. These are not just ordinary building bricks, they are special, they have been specially made to work with in schools.

Having introduced the blocks they should be taken out one by one in irregular order, only one of a kind at a time, while the teacher explains that they are rather like a family, as some have common qualities such as colour or shape and some not, and there are interesting things to be found out about them. This 'finding out' is what work with Poleidoblocs is going to do.

At some point here, the teacher removes all the blocks from the box to show the diagram on the base and points out that the presence of this diagram makes it sure that all the blocks return safely to the box again in their correct places.

The teacher then places them all back in the box, to show they go neatly home, and shows the full box so that the children see the arrangement again.

It is then up to the teacher to choose when the Free Construction periods could best be fitted in during the work and each child in turn given the opportunity to work with them.

We decided that a standard, not suggestive phrase should be made by the teacher when the children were ready to begin, such as – 'Make with the blocks whatever you like – and tell me when you have finished', leaving the child to get on by himself.

We found early on, that it was important that the teacher used the word 'work' not 'play' when calling the children to their Free Construction sessions. Again, it was the children who taught us, as once an Infant school teacher happened to say to a group of youngsters in her class 'Now it is your turn to play with the blocks' and immediately got the reply 'We don't want to play, we want to work!' The teacher was quick to take the hint and replied 'Let's sit down and see what we can find out about these blocks' and the children went to work and found how many small ones made up the big ones, etc. A child in his first years of school has, of course, in his own opinion of himself, left 'playthings' behind when at school. He wants to work and to find out and to learn.

In order that we could get an idea of the childrens' attitude to this material and the use they made of it, a Record Form was designed to be filled in by the teacher after or during each Free Construction period. This also made it possible for the teachers themselves to compare by the end of, say a term, what actually each child's responses had been. As we knew the teachers had very little time to spare, the Record Form was designed so that most questions could be answered by a tick in the relevant column, and only the name and explanation the child gave of his construction, spontaneous remarks and any special observations made by the teacher needed to be written in words.

As this first experiment was arranged so that a group of children worked at the same time (not necessarily working together, which did not actually happen very often) the Record Form had space for the names of up to six children. It made it easy for the teacher and us to see which child made something original on his own, had his own ideas, or who copied somebody else, if not actually the construction made, but by identical names they gave it. As for instance, when out of six children's responses three call their a 'Japanese fort' there can be no doubt of copying names. But in order to get an idea of a single child's consecutive constructions, it was necessary to separate them out from each Record Form.

During this period several visits were made to the four schools taking part in the investigation, giving the opportunity to see how it all worked, and to discuss matters with the headmasters and the teachers. There were matters to be clarified, instructions to be modified, and we shared the progress made with the schools who had undertaken considerable extra work on top of an already busy schoolday.

The time limit was to be around 20 minutes, but if a child had been some time getting started or was in the process of finishing, he should be allowed more time. Most children finished however, in less than the time given and those few who got nothing completed, would not have achieved anything by extending the time.

As each child finished, the teacher's task was to find out what the child had intended to make, and to suggest the child should 'tell her about it', avoiding leading questions. Some children might not have thought of anything special but if they heard the others name their constructions they may think it necessary to say something, and then they plump for one or other name already given, as mentioned above. There the teacher can assist by saying first something praising about the response and then casually ask 'is it meant to be something special?' The more time the teacher can spare to discuss the construction with the child, the more she will get to know about this child's individual way of 'thinking with objects', his ideas, his imagination. It will also give the teacher the opportunity to point out special features in the construction that the child has not been aware of while making it, and in this way, lay the foundation for the child's perception of similarities, equality, balance, symmetry etc.

As my task was to introduce the first steps of the use of Poleidoblocs in schools, the question of how and when to use the material for actual teaching was left to the individual teacher. However, every child's first experience with Poleidoblocs should always be some Free Construction sessions, first with the G's and then with the A's, according to the child's age and ability.

It was also important that this should take place in the classroom and the child not separated from his classmates, for instance left in a room by himself, as this might give him a feeling of isolation which was not intended. A child has an enormous capacity for concentration when his attention is caught and held, and even if some other child passing his table, should pause and make a suggestion, it will not be taken if not in line with the worker's own thought. And as work with Poleidoblocs becomes 'something we all do at school' the children at work will not be interfered with by the rest of the class.

There were as well pros and cons for having the children working in groups during the first terms in the Leicestershire infant schools. As could be expected, when they were seated round the table with the blocks in a heap in the middle, and the teacher said they could begin, each child would plunge forward and grasp as many as he could, regardless of what he got. The strong child got most, the slow and shy child only a few, and it was difficult to insist on a rule that they only took one block at a time as they needed them. But it had the advantage that they had to make do with what each had been able to get hold of, and sometimes that led to swapping pieces – 'Can I have your yellow one for one of my green?'

It called for competition and comparison – who's tower is the highest, how can we measure it? For instance –

> Tony and Peter built towers. Tony said his was the highest; he measured his by standing up. Peter also stood up, he said he was as high as Tony and his tower was higher than Tony's. Tony then tried to build his higher. Or – Chris and Fay built towers and Chris said they were both the same; they discussed this and yellow slats were used to prove who was right. Chris' was slightly taller.

Also collective ‘finding out’ came naturally. One child started counting his blocks and the others started counting theirs. Once they found out that the highest tower did not have the most blocks. Sometimes two children would make a combined response –

> Andrew and William built their constructions and joined them together with ‘a magic path’.

Only once in the Record Forms examined did all six children make a group response – a yard containing sheds, a house, a well, flower beds and walled gardens. In this case there must have been a definite leader among them.

For the timid and insecure child and the one with little or no imagination there was security in the group, seeing that all the others ‘did’ something with their blocks, so if sometimes nothing was actually completed, the child had the opportunity of handling the blocks and perhaps next time he would actually be able to do something himself.

The group children also discussed with the others what they were doing and called attention to their work. Of the responses examined only four (3 boys and 1 girl) of a total of 490 responses were reported to be silent while working.

But even if a total of 108 blocks (the contents of two G boxes) were to be shared by six children, giving them a fair amount each, what each child made with them might not be what he could have made with the contents of one box to himself. Also the influence of what the rest of the group made could not be entirely eliminated. It showed his response to a restricted number of blocks, perhaps not the ones he would have chosen, but also how he reacted to suggestions, competition and sharing while working with the others.

It was therefore decided that during the last part of the investigation in Leicestershire, the children should work individually, each at a table by himself, two at a time, and each have the contents of one G box to work with. The same Record Forms were used, but the teacher indicated on the Form which two children were working at the same time.

When in 1966 a group of schools under the Harlow Mathematic Study Group ventured into making an investigation of the use of Poleidoblocs in their schools, the Record Form used in Leicestershire was revised and redesigned so that each child had his own Record Form with

room for six responses. The children were to work individually from the start and the six responses were to be spaced within one school year. The same procedure of introducing the material to the class as described on page 3 was maintained, also the administration of the material to the single child. This was made into a short introduction for the teachers use with comments on how to use the Records Forms.

When the Harlow experiment was over, it was again time to revise the Record Form and simplify the Instructions for future use. They will be produced here as App X and Y. The aim had been to avoid ambiguous items (such as whether a construction was asymmetrical or amorphous) and to list only what would apply to any child's response and easy for the teacher to assess and fill in. Following are examples and commentaries on the various points.

Attitude

At the beginning of the session they may be eager, indifferent, bored or just refuse. Their remarks may vary from 'this is just smashing' or 'I can't do anything, they are just blocks'. Most children however, do get going, sometimes when hesitating, encouraged by others in the class. If there is a flat, persistent refusal from any child, this should be accepted by the teacher and recorded on the Form. He may do something next time – it depends on the reason for refusal – if timid or insecure, give him time – if lack of interest, don't press him.

At the end of the session they may be indifferent whether to stop or not. Most children finish a construction started, and the child who makes a complicated structure should have the time needed to finish it. On the other hand, if some child makes constructions one after another, not because he is endeavouring to find something he is satisfied with, but only building up, taking to pieces and repeating this, then he should be stopped. The teacher might in this case, ask him if he is trying to find out something, perhaps he would like to discuss it.

Compare shape and size

Many children comment on the nice colours, how smooth the blocks are to touch. It was a surprise to find from the Record Forms examined that the majority of children took notice

from the beginning of the different sizes and shapes, and arranged them in some order before they began working.

Type of construction

Here the overall shape is decisive. All constructions will naturally have to be of some height when made on a table, even a well which is thought to go 'down'. A castle can be built in height, but it can also be a castle with smaller buildings and towers connected by walls; then it would be 'in width'. Bridges, tunnels and trains will naturally be classed as 'in width' while several smaller constructions dispersed on the table, or moving traffic, will belong under the heading 'spread out' whether they are part of a whole town, village, playground etc. or considered by the child as single objects.

Most children build in height, even girls; in width or spread out it is almost equal. We were at first not aware of the variant 'enclosures', but a teacher commented that many girls called their response 'a house' while actually it was an enclosure with objects inside it. It is therefore included in the revised Record Form. Some, but not many children move their cars or trains about, so this was not included in the final Form but can be noted on the back of it if the teacher finds it important.

The final point under this heading is 'experimenting' and only the teacher can judge whether the child is really experimenting or making several attempts to achieve something. It may be that the measure of concentration can give the clue.

Final results

Most children complete their constructions whether working individually or in groups; nearly all group children did (98%) leaving only a small percentage with 'nothing completed'. It is seeing what the others can do that encourages the hesitant and uncertain child to make something also. Even when a child working by himself cannot get started, it is encouraging to note how concerned his classmates may be about it. One teacher reports how one or other of them stopped at a girl's table, told her how nice the blocks were and tried to show what could be done. If such a child, does not get started, it is better that the teacher postpones the session until another time; otherwise the child may get deeper and deeper in his misery over not being able to make something. Poleidoblocs must never be

felt by the children as something beyond their power to cope with. Some tell stories in relation to their constructions, the individuals more than the group children, but that may be because the individual child has more time to tell the teacher about it, and the teacher more time to listen. Such stories could be recorded on the back of the Form.

Nearly all children give their construction a name. It might be something the child set out to make from the beginning or something that takes shape while fitting the blocks together, or rearranging them; or he may name it after what it looks like to him when finished. The completed but not named constructions are few among the individuals (hardly existing among group children). On one occasion a small boy boldly stated 'I don't know what it is but I like it'. This must be a very independent and self-possessed secure child because most of them have a feeling that it has to be something. The teacher should be careful not to convey any such idea when asking the child about it, and it is really not important whether a child can give his construction a name or not; it is the way in which he has used the blocks, how much he has been aware of the interrelation of them, in which way he has been able to substitute or reconstruct a bigger piece with smaller ones if a particular shape was not available and he wanted to achieve balance or symmetry. This is his 'thinking with objects'; the name he eventually gives it will be the idea he has in his mind, reflecting his sphere of interest and his imagination, and that will be dealt with in the following paragraph.

Sometimes the unexpected happens. A boy of 6½, well adjusted, said to be keen on maths and with a keen sense of humour, when confronted with Poleidoblocs in his first Free Construction period, made many small structures and discarded them; on his second session he 'just sat and stared at the blocks jumbled in front of him' according to his teacher.

This boy may have developed ahead of his chronological age or be somewhat inhibited with the experimentation of objects; he has little imagination; he may come from a background with strong emphasis on the necessity and importance of learning. At a later date the need for what he missed earlier may appear, and it may be wise for the teacher to watch for it. Such cases are quite common in psychotherapy.

When a structure is named by the child, it falls into the category Representational with five sub-groups.

Only a relatively small proportion come under the heading Objects, which means single objects not included in any other group and not related to each other as for instance, a car and a garage would be. Yet there were some unusual items among them, such as: a dustbin, a crab, a mousetrap, daddy's tool box, a candle, toadstools, besides the more usual such as record players, slides, roundabouts, toys, machines etc. Some girls made 'patterns' of the shapes or the colours, and it is regrettable that there were not means available for photo recording.

External scenes is far the largest sub-group, with 94% of the group children (1961) and 62% of the individual responses (1967). If this sub-group is further analysed into categories of Environment, Places visited or heard of, Traffic, Outer Space, we find some interesting difference in boys' and girls' responses in the 1967 Record Forms. If under the heading Environment we count all the items which at the present day will be part of a child's everyday surroundings, we find that they represent 60% of the girls' responses, but only 26% of the boys' responses. It looks therefore as if the 5-6 year old girl is much more aware of her daily surroundings than the same age group boy. Of these, 'houses' is the most frequent item on the girls' responses; often she builds only the actual rooms with furniture, people etc. and calls this 'a house', while the boys build very few houses, and then it is the actual building. But not only houses are important for the girls, also the town itself or the village with church, shops, school, people, gardens and parks. Also entertainment is included with cinemas, shows and fairs. Boys think more in terms of factories, parking, power and radio stations. On the other hand, it was a girl who built a football stadium and a boy who made a wedding reception.

One favourite feature for building for boys as well as girls are churches; perhaps because the old churches in Britain are impressive buildings, even in small villages, and here church and school are often situated side by side, so a church becomes a natural part of the environment. A girl makes a 'burnt down church', a boy adds to his church 'a place where they go for tea; but most remarkable is the small boy who makes 'a church on wheels so it can go to the rescue'. It is a reminder to us of how children think in facts: 'churches' come to

the rescue of people in need all over the world, and how should they be able to go there if not on wheels?

If 'Places visited or heard of' are considered, castles and palaces are favourites, but also the sights of London (from school excursions, perhaps) appear in the responses, even museums. The boys make forts, the girls make mazes, one of which is 'secret'.

In terms of Traffic the boys' responses outnumber those of the girls, especially as far as air traffic is concerned. This is also the case, even more marked, when the responses relate to Outer Space. The girls here show very little interest or imagination and build only rocket stations, while the boys' responses are varied and real. They will of course, have had opportunity to watch much of it on T.V. but three small boys have really thought ahead, and their imagined future development deserves to be recorded: -

> One makes a 'Space bulldozer with Instruction Tower'. A bulldozer is a machine which removes obstacles, and the maker imagines there will be obstacles in Outer Space that have to be removed, therefore a bulldozer may be needed with its instruction tower.
>
> Another boy makes 'Two planets with a roadway between'. What he means is a communication line between two planets, but not knowing the abstract word 'communication' he calls it a roadway.
>
> A third boy makes a 'Space Control Engine' which needs no interpretation.

They were after all only six years old, the first said to be very intelligent with a remarkable fund of information, but the second boy a foster child, very difficult and disturbed, who cries easily.

It is also a boy who adds the new feature: oil, by making an 'Oil station with Oil tower.'

The examples given above have been recorded from the 1967 'individual' responses, but when we look back on the 'group' responses from 1961 we also find objects concerning Space, but at that time only in terms of rockets, mostly unrealistic such as farms with

rockets, garages with rockets, rockets with bricks; some girls even make 'rockets with toilets'.

Children's imagination and actual knowledge about new inventions and new adventures will naturally be accelerated in relation to the development of communication, such as T.V. and space satellites and what may come in the future.

Interior scenes, some with people and animals, are also more frequent in girls' than in boys' responses. There are people in houses, castles, towns, walking across a bridge, school with teacher and children. There are animals in Zoos and horses in stables. One girl makes what she calls 'Mummy writing' – unfortunately we have no photo of it, because it is difficult for us grown-ups to imagine how a child sees this represented with the blocks. The sub-group Phantasy is poorly represented. Everyday life offers so much that is real to feed children's imagination that the old fairy tales disappear; only the witch seems to have survived, some features from modern fiction are also represented. But as modern fiction is mostly visually represented in comic strips in magazines or audio/visually on T.V. they do not challenge the child's own inner imaginative 'picture-making' as did the old fairy tales. In my opinion this is to be deplored.

If we summarise the responses to the group Representational made by the 5-6 year old children from the Harlow experiment and compare boys' and girls' responses we find the following: -

Categories	**Boys**	**Girls**
Environment	26%	60%
Places visited or heard of	38%	29%
Traffic	13%	4%
Space, present day & future	16%	1%
Fiction, Fairy tale	3%	2%

Miscellaneous	3%	5%

The question of Symmetry is interesting, but as the Harlow Record Form was not clearly enough formulated, and the item was not included in the Leicestershire Record Form, the revised Record Form (see App X) contains only one item to be ticked if applied to the construction in question, otherwise not. The most interesting occasion in relation to symmetry was once when I attended a session in a Leicestershire Infant school: a small boy selected identical blocks with both hands and placed them simultaneously on a symmetrical construction. It may be of general interest if teachers made special notes of similar behaviour. Another question in relation to symmetry is that of balance, as we have seen in responses to the Lowenfeld Mosaic Test. A feeling for balance is related to a feeling for symmetry, but less rigid in many ways. Such cases can be recorded on the back of the Form.

Teacher's Estimate of the child's response as applied to the actual construction can be classified in one of four categories: brilliant, good, average or poor execution. This can of course mostly be of use for the teacher who wants to follow the single child's responses through a series of Free Construction sessions as no rule can be given as to what can be classified in these categories. The judgement must in every case be a subjective valuation by the individual teacher.

Finally, the children were asked their own opinion of what they had made in terms of "satisfied" or "not satisfied". In the 'individual' responses (Harlow 1967) far the greatest part was satisfied with what they had achieved. The girls were generally more satisfied (in terms of percentage) than the boys. Comparing this with the 'group' responses (Leicestershire 1961) we find that only half of the children said they were satisfied with their achievement, boys and girls nearly the same. In this case one cannot rule out the question of copying answers. If the first child asked says No, and no comment to this given by the teacher (which is correct) some insecure children may well think this is what is right to say, so they will also say No. In the 'individual' cases the child has only his own opinion to give, and in most cases they like what they have done.

We would like to stress that the experiments in Leicestershire and in Harlow have been investigations and not research in the scientific meaning of this word. Our main aim was to gain experience of what was possible and what responses could be got under the circumstances available. It was not the main purpose to find out, for instance, how many children built in height, in width etc., or what kind of construction was made in each category. The main purpose was first to find how children reacted to Free Construction periods in a school setting, and if it was possible to fit it into an ordinary school schedule. Secondly, by recording not only the childrens' general attitude and response to Poleidoblocs, but also what they made and what they said their constructions were meant to be, it has also been possible to classify these responses into general and specific categories for later comparison. The comments and the results dealt with in this chapter are based on an analysis of the Record Forms, filled in by the teachers. The answers to our queries have been that the children's attitude on the whole has been positive, their responses interesting and the interested teachers have found ways and means of fitting Free Construction periods into the time schedule of their classes.

What has been achieved by these Free Construction periods for the single child and for the class as a whole can best be judged by the teacher, so – over to the teachers in the following chapter.