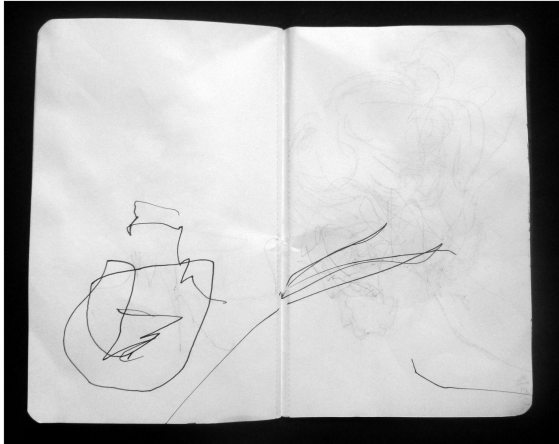
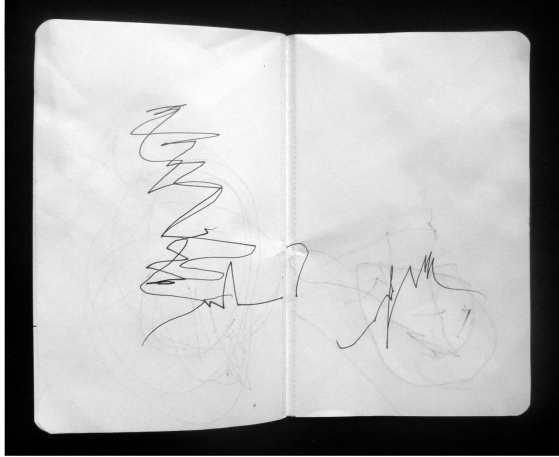
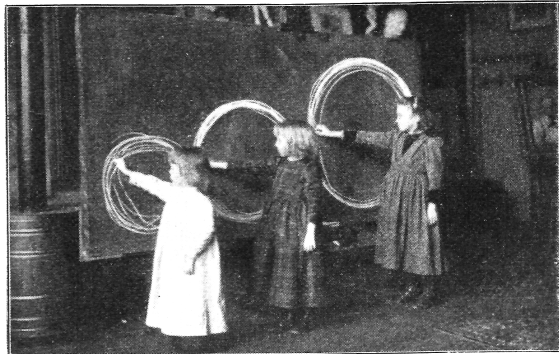


475.* Now the problem of what the "meaning" of an intellectual concept is can only be solved by the study of the interpretants, or proper significate effects, of signs. These we find to be of three general classes with some important subdivisions. The first proper significate effect of a sign is a feeling produced by it. There is almost always a feeling which we come to interpret as evidence that we comprehend the proper effect of the sign, although the foundation of truth in this is frequently very slight. This "emotional interpretant," as I call it, may amount to much more than that feeling of recognition; and in some cases, it is the only proper significate effect that the sign produces. Thus, the performance of a piece of concerted music is a sign. It conveys, and is intended to convey, the composer's musical ideas; but these usually consist merely in a series of feelings. If a sign produces any further proper significate effect, it will do so through the mediation of the emotional interpretant, and such further effect will always involve an effort. I call it the energetic interpretant. The effort may be a muscular one, as it is in the case of the command to ground arms; but it is much more usually an exertion upon the Inner World, a mental effort. It never can be the meaning of an intellectual concept, since it is a single act, [while] such a concept is of a general nature. But what further kind of effect can there be?

476. In advance of ascertaining the nature of this effect, it will be convenient to adopt a designation for it, and I will call it the *logical interpretant*, without as yet determining whether this term shall extend to anything beside the meaning of a general concept, though certainly closely related to that, or not. Shall we say that this effect may be a thought, that is to say, a mental sign? No doubt, it may be so; only, if this sign be of an intellectual kind — as it would have to be — it must itself have a logical interpretant; so that it cannot be the *ultimate* logical interpretant of the concept. It can be proved that the only mental effect that can be so produced and that is not a sign but is of a general application is a *habit-change*; meaning by a habit-change a modification of a person's tendencies toward action, resulting from previous experiences or from previous exertions of his will or acts, or from a complexus of both kinds of cause.



- 1 Initially, methods should involve as much of the cortex as possible to assist the firing of cell assemblies over a wide area.
- 2 From 1 it follows that early training should be based on objects rather than symbols and that a multi-sensory approach should be used.
- 3 Attention should be given to the type, form and intensity of stimuli used. With young children large, well-designed, distinct, visual stimuli and clear, well-articulated sounds are necessary. Much experiment and research are still needed in this connection.
- 4 In order to establish interfacilitation between cell assemblies, systematic practice and drill are essential.
- 5 Developmental readiness is vital. Thus simpler cell structures must be built before more complex ones can arise.
- 6 Language will be important in exciting and inhibiting cell activity in the absence of direct receptor stimulation.
- 7 Programming of learning situations will be essential. Learning must be guided, controlled and made explicit in the early stages. This implies that training may be needed to clarify sensory experiences.
- 8 Neural pathways which are more easily established should be used to develop those which are difficult. Thus, remedial methods should make use of strong neural links to improve weak ones, and eventually result in compensation through new linkages in intact cells.
- 9 Movement, which involves the motor areas of the cortex, plays an important part in cell-assembly connections. Thus, in some instances, children may learn quicker by using stimuli which move, or appear to move, rather than static ones.



On one occasion in a school just opened in Milan, 1908, the children re-acted to the piano by jumping about in confusion, waving their arms, moving their shoulders and legs. This was really an attempt to represent by a sort of chaos the complexity of the rhythmic movements they were hearing. They were actually making, without any assistance from others, a spontaneous attempt at musical interpretation. They soon grew tired of this, saying that "the thing was ugly." They had, however, divined the possibilities of an orderly motory action; and when they had become quiet again, they began to listen to the music with great interest waiting for the revelation of its deep secret. Then suddenly they began to walk again, this time regularly and according to the real measure.

One of the children, whose graph was somewhat as follows:



(pauses, that is, on the line of quiescence, with frequent excursions into the negative field), took no part in these rhythmic exercises. On the contrary, he was always breaking them up by pushing the other children out of line or making a noise. Finally, however, he did learn not to disturb others; in other words, to stay *quiet*, something which he had never known how to do before. It is a great conquest for a disorderly child to gain the ability to become quite motionless, in a gently placid state of mind. From this point on Riziero (that was the child's name) entered on a higher plane of existence — one of order, labor and politeness.

Excursions into the Negative Field

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3. A.E. Tansley, 1967, *Reading and Remedial Reading*, London: Routledge and Kegan Paul, pp. 132-133
4. Walter Crane, 1898, photograph: "Natural Variation in Repetition of Ornamental Forms. Primary school children drawing on a blackboard, Philadelphia" in *The Bases of Design*, London: George Bell and Sons, p. 341
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