CONCLUSIONS

49. That perceptual habits are largely determined by cultural and environmental factors seems to be firmly established throughout these varied and widely scattered researches. One further piece of experimental evidence, though assembled with other questions in mind, reinforces this conclusion. Dr. R. MacArthur, studying the correlation between 'field dependence' (as defined by Witkin et al, the field dependent person is one who orientates himself by reference to the environment, and whose perception tends to be global), and sex among the Eskimos, used the Embedded Figures Test which shows the ability to perceive a shape or figure that is embedded in a complex picture. It was a replication of an earlier investigation by J.W. Berry, and MacArthur concludes "this replication of Berry's findings for the Eskimo adds evidence suggesting that this ability to perceive embedded figures may be shaped largely by social or environmental influences. (Reported in Sex Differences in Field Dependence for the Eskimo: Replication of Berry's findings in International Journal of Psychology 1967, Vol.2, pp. 139-140).

50. W. Hudson summarises the position thus: "In a cultural group that has a normal range of intelligence, that in addition possesses high educational qualifications but is isolated from the dominant cultural norm, pictorial depth perception is not closely related to intellectual endowment or educational achievement. The critical threshold is cultural and not educational." (Hudson, W. Pictorial Depth Perception in Sub-cultural Groups in Africa reported in Journal of Social Psychology 1960, Vol.52, pp. 183 - 208).

51. Hawkridge and Duminy have both pointed out that the kind of education itself has an effect of reinforcing certain culturally established habits but that the influence of the social environment can be reduced by taking compensatory educational measures. Mundy-Castle in his paper on pictorial depth perception among Ghanaian children suggests that primary schooling in developing nations would be enhanced by the incorporation of specific training and informal experience in the perceiving, organising and handling of visual and spatial materials. Edgar Bowden points out in Perceptual Abilities of African and European Children Educated Together, that "The effect of making the environmental experience of Africans more like that of Europeans is always to reduce any observed differences in perceptual abilities."

52. Yet even when the environment of the school is the same, the pupils' experiences are not alike. For example, African pupils have fewer experiences with the conventional units of spatio-temporal measurement than have European children. Cole, working in Liberia, found that illiterate African adults and children who had not been to school were slow to learn to recognize such geometric figures as the circle and the triangle, suggesting that the African words available to describe them were inadequate because they failed to discriminate between, say, a circle and an ellipse.

53. Further, Dr. S. Biesheuvel, in an essay on psychological tests and their application to non-European peoples in The Year Book of Education published by Evans Bros. in 1949, drew attention to the fact that all the pictorial tests that had been used up to that time overlooked the fact that a picture printed on paper is a highly conventional symbol, which a child growing up in Western culture has already learned to interpret by the time he goes to school because he sees pictures from his earliest days and is encouraged to draw pictures himself. He also argues that "To make the object pictured culturally meaningful is of little avail, if pictorial

representation itself is unfamiliar and if it does not evoke the attitude of interpretation which a European group automatically assumes."

54. Dr. Biesheuvel's erstwhile colleague, Dr. W. Hudson, writing in the International Journal of Psychology in 1969, claims that "It is clear from the evidence obtained from systematic studies of pictorial depth perception and from observation of the drawings of black illiterates that the perceptual cues and representational conventions common in Western pictorial art provide problems of interpretation to the black man. Differences in objective and lack of meaningful exposure to the Western forms of art are largely responsible for these difficulties."

55. Hawkridge points out in Programmed Learning and Problems of Acculturation in Africa published in Aspects of Educational Technology, Vo.2, Methuen 1969, pp. 317 - 325. "The European pupils had apparently picked up enough in their previous formal and informal education to enable many of them quickly to learn to translate lines used two-dimensionally to represent masses in three dimensions; the Africans had not. The evidence generally shows that while literacy and numeracy may have been actually overlearned by the end of the primary school, other skills such as visual perception and some higher mental processes such as scientific thinking have been neglected in the African primary schools."

56. In his concluding remarks, to the Scientific Council for Africa South of the Sahara meeting of specialists on educational adaptation to African conditions held in Lagos in May 1960, Dr. Hudson examined the educational implications of his experimental work on perception from the point of view of the teacher. He asks for a critical approach when training methods which have worked satisfactorily in one cultural context are applied to another and different cultural group. Those that demand "parity of esteem", equality and uniformity of educational practice ignore the fact that culturally at the present time the Western world and Africa are not alike. Most of the existing educational systems and methods are rooted in European culture which is likely to need modification and adaptation for African peoples. He does finally concede that pictorial material is worth the time, money and effort needed provided it is appropriately designed for the particular group and conceived as a visual aid, not as an independent entity.

57. E.T. Abiola studied the pictorial representation made by Nigerian children of objects in their environment. He found, as many other observers have done, that pupils not exposed to Western art, drew what they knew, not what they saw. They used the 'Lascaux' perspective. He suggests that, given a developmental trend in the form of perceptual concepts and given that an analytical approach to objects becomes necessary in a community, then adequate exposure to representational materials and representational training should ensure the disappearance of the flat non-visual and didactic representations which are supposedly basic to the African. We find the same contention that schooling is a major factor influencing the ability to interpret visual presentation in the work of Fonseca and Kearl* "Formal education sharply increases the ability to interpret pictorial symbols which: (a) have an extended or figurative meaning; (b) demand more capacity of abstraction; (c) are to be interpreted as a series telling a story; (d) are not necessarily related to the daily life experiences of the viewer".

* Comprehension of pictorial symbols: An Experiment in Rural Brazil by Luiz Fonseca and Bryant Kearl published by College of Agriculture, University of Wisconsin, 1960.

58. However, Schwitzgebel sounds a less optimistic note about the effectiveness of compensatory educational measures. In 1962 he carried out comparative studies of white and Zulu students completing certain visual tasks. He concluded that specific perceptual organizations are culturally characteristic and environmentally dependent. But he also noted that some of the perceptual skills might not be attainable even after extensive education.

59. McFie suggests that in the general education of children in similar cultures to the one he studied in Uganda a particular stress should be placed on representational and constructional tasks - on the kind of subjects taught in technical schools. As long as constructional toys and other 'geometrical' tasks do not occur in their environment, their abilities in these respects will remain undeveloped and they will be handicapped in their attempts to deal with the representational and mechanical features of European culture.

60. The question now is one of feasibility. Can such training be provided in order to universalize learning materials?

61. Though working in the United States, the findings of Brinkman are relevant here. He tested the feasibility of programmed learning techniques to teach the visualization of space relations and concluded that the skill of individuals in spatial visualization can be improved when appropriate training is provided and by implication indicates that programmed learning techniques should be applied.

62. If such specific training is underpinned with enriched early experiences of manipulating shapes and carrying out constructional tasks, it is likely that many of the findings reported in this paper will not again be replicated, and that the perceptual deficiencies noted by Howard Poole will have disappeared from those societies that have adapted to modern technological organisation.

63. In the meantime designers of visual material from which children and adults can learn now, must take note of cultural, environmental, social and linguistic differences. Simplicity is the keynote, with illustrations based on those concrete and intellectual experiences of the learners which circumscribe their perceptual capacity.