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GROWTH AND DEVELOPMENT OF THE YOUNG CHILD

FROM ONE TO SIX YEARS

prepared for submission to the UNICEF Executive Board

by

THE INTERNATIONAL CHILDREN'S CENTRE

Paris

(25 p.)

65-12616

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INTRODUCTION

1. In most of the countries of the world, no matter what their degree of economic development, their demographic situation, or their human and material resources, the educator, the sociologist, the physician, the nutritionist, and the planner are now, more than ever before, concerned by the relative neglect of children in that transition period between the dependence of the infant and the independence of the school-child, which is, for want of a more accurate term, known as the pre-school age, but should preferably be called early childhood.

2. A child's development from birth to puberty can, in effect, be schematically divided into three stages, which may conventionally be referred to as infancy, early childhood and school age.

3. The first stage corresponds approximately to the first twelve or eighteen months of life, during which the infant, unable to express himself and incapable of independent movement, lives in close contact with his mother. His vulnerability and the high mortality and morbidity rates occurring at this time of life have long made him a focus for charitable action and subsequently for organized medical-social welfare activities.

4. Special techniques are employed for these welfare activities. They are well-known, relatively simple and effective; the need for them is obvious, and their dissemination is limited only by the lack of resources and personnel, by the absence of administrative structures and by general socio-economic factors.

5. Much later, at an age varying between six and seven years, according to country, the child, having already acquired complete motory independence and mastered his means of communication, affirmed his personality in relation to his parents and other adults, and being capable of elementary

intellectual operations, enters a society organized for him, where he will be a child among other children, namely, the school. His physical growth, like his emotional, intellectual and social development, will be regular. He will be able to learn and to adapt himself efficiently to new situations. The concentration of the school environment facilitates the task of ensuring the social and health welfare of school children. If all children do not attend school, if school attendance is not always satisfactory, if child social and health welfare is inadequate, this is still essentially due to the lack of personnel and resources, the absence of administrative structures and to general socio-economic factors.

6. Between these two stages, between the end of the first year and the school entry age, i.e., six or seven years, there is a special period of rapid transition; early childhood or the pre-school age, which is distinguished by the following characteristics:

(a) The child is then still living with his family, which constitutes his first environment. The structure of this family varies according to civilization and environment, but it always consists of a limited group of individuals of different ages and sexes having close relations with each other, which are governed by the customs of each people and each social group.

(b) After the separation from his mother, the child progressively but rapidly acquires increasing motory, emotional and social independence.

(c) He is still very delicate and his increasingly close and frequent contacts with the external environment expose him to the risk of many serious illnesses. His diet, which is no longer that of an infant, exposes him to malnutrition. This explains the high mortality rate characteristic of this age-group in under-privileged areas.[1/]

1/ Mortality rates are calculated for the age group 1 to 4 years inclusive.

It is sufficient to recall that in 1959-1961 the mortality for boys of 1 to 4 years was 4,616.4 per 100,000 in Mexico and 4,385.6 per 100,000 in the United Arab Republic, whereas the figure for Sweden was 95.2 per 100,000. As can be seen, there is a variation of approximately 1 to 48. This high mortality rate is essentially linked to infectious and nutritional causes, which can be avoided if the means of prevention and treatment are known.

(d) Mortality rates show that favourable and above all unfavourable environmental factors exert an immediate and serious effect on life and health. It is probable, however, that some of these factors have long-term effects and repercussions which are difficult to correct or even definitive on the subsequent development of the older child and the adolescent and even on the physical and psychic condition of the adult.

(e) But unlike the infant and the school-age child, the young child is hard to reach, and it is therefore difficult to look after his health. Social and health welfare techniques and educational methods are aimed sometimes at the family, sometimes at existing groups of children.

(f) These efforts must be adapted tovariable and fluctuating conditions. They seem to be particularly urgently needed in the underprivileged regions, where this age-group represents between 15 and 20 per cent of the general population.

(g) Social, health and educational activities, however, have not yet been perfected even in the most highly-developed countries, and, what is even more serious, the need for them is not always recognized by the administration, the general population or the family, which are not sufficiently aware of the importance of the

events occurring at this time of life, and of their immediate, long-term or definitive consequences.

7. This report deals with the following subjects:

(a) A review of the growth and development of the normal child;

(b) Factors capable of modifying them;

(c) The long-term effects of events occurring in early childhood;

(d) General conclusions.

8. This report is conceived as an attempt to make a critical survey of the facts and hypotheses which might receive practical application, in the short, medium or long-term, especially in the developing countries.

REVIEW OF THE GROWTH AND DEVELOPMENT OF THE NORMAL CHILD

Discussion of the concept of normality

9. Despite very great variations in geographical environment, material living conditions, social structures and cultural values, most of the world's children share a certain number of common characteristics and pass through the same phases of development. This very general statement is probably more accurate in relation to physical development than in relation to psycho-social development, and we must first of all mention the difficulty of defining "normality" when speaking of human development.

10. A normal child may be defined as one whose characteristics fall within the limits encompassing the majority of children in the reference age group to which they are compared.[2/] This presupposes the availability of accurate measurement techniques and of a satisfactory set of references.

11. The first condition is on the whole fulfilled as far as physical development is concerned, but very great difficulties are encountered in connexion with psycho-motory, emotional and social development: most measurement techniques are based on observations made in occidental cultural environments, and their content is influenced by the vocabulary, material, and psycho-sociological attitudes characteristic of the industrial civilizations. Research is urgently needed for the development of techniques adapted to varying ethnic, geographical and social conditions, especially in relation to the age with which we are concerned.

12. In order to be satisfactory, references and norms should be established on the basis of a group which is as homogeneous as possible in relation to the child or children to be studied. In other words, this group must share a maximum of common characteristics with those children. There is a different

2/ Conventionally these limits are assumed to include 90 to 95 per cent of the reference group.

standard for each region, each population and each ethnic community; and also for each period, for, owing to the rapid changes of these times, it is at present considered advisable to calculate norms every five or ten years. References established some time ago or in another country should be verified and standardized before being employed. In the statistical sense, there is not one norm for all children of a given age, but numerous norms which are temporarily and geographically variable; the establishment of these norms and the study of their evolution is likewise a field in which research is urgently needed in all the countries of the world.

13. In addition to these statistical norms, it might be interesting to study the characteristics of certain groups of children, for example, those who are relatively privileged from the point of view of health, nutrition, education or social situation, the other ethnic, geographical or cultural characteristics being similar.

14. This is particularly important in the poorer regions, where health and economic conditions are generally unsatisfactory and it may be useful to have a basis for comparison which would make it possible to define the potentialities of the child population.

15. Normal development implies something more than conformity to a series of statistical standards: it implies that changes take place at a certain speed and also in a certain order, which should conform to certain laws. At the preschool age, these changes are numerous and involve all sectors of development; the speed of general growth, which is still very rapid, slows down and remains more or less constant after the age of six.

16. Finally, in order to be normal, development must be harmonious. Little information is available on the correlation between height increase, dentition, bone maturation, the age at which a child learns to walk, the acquisition of personal habits of cleanliness and the development of language. These problems are being studied in several research centres. 3/ It is known, however,

3/ FAIKNER, F., Croissance et développement de l'enfant normal, une méthode internationale d'étude, International Children's Centre, Masson, Paris, 1961.

that there are wide individual variations in the growth of organs and functions, giving rise to the possibility of evident imbalance, whose frequency and transitory nature make it possible to affirm that they form part of normal development. As examples we may cite in the physical field, the muscular hypotonia and genu valgum of the European child and the umbilical hernia of the African child, and in the emotional field, the aggressiveness and night terrors of the child of two to three years of age.

Physical growth and development

17. During the years under consideration, the child's body is still undergoing very important transformations.

18. Corporal mass, i.e. weight, increases rapidly, but at a regularly diminishing speed. On the average, weight doubles between one and six years, and it is essential that the nutritional intake should provide an adequate basis for this substantial production of living matter which concerns the bony, conjunctive, muscular and reticulo-endothelial connective tissue rather than the viscera, which develop less rapidly. The thickness of the subcutaneous fatty tissue, which increased suddenly at the end of the first year, diminishes relatively and then becomes stable.

19. The limbs lengthen more rapidly than the trunk and the child seems to become thinner and more long-limbed, owing to his changing proportions. The growth of the encephalon slows down; at the age of nine months the perimeter of the trunk is already larger than that of the head and will later greatly exceed it.

20. Height is still increasing rapidly, but the rate of growth diminishes progressively, decreasing by approximately one-half between the second and sixth years, and subsequently remaining more or less constant until the pre-puberty period. Height measurement is of fundamental importance in following a child's development (Falkner, 1961).[4/]

4/ FALKNER, F., Office measurements of physical growth, Pediatric Clinics of North America, 1961, 8: 13.

21. The rapid growth of the long bones of the limbs is accompanied by the appearance of ossification centres at the level of the epiphyses of the wrist and foot. The evolution of bone maturation is more or less identical in all children, and constitutes an excellent criterion of development since it depends on the intake of calcium salts, Vitamin D, possibly on the protein intake and above all on glandular activity (thyroid hormone).

22. Dental maturation also evolves rapidly. The primary dentition is complete at approximately three years, and the eruption of the permanent dentition is in preparation, beginning towards the age of six with the appearance of the first molar and the loss of the incisors, a highly visible phenomenon which for many persons symbolizes the end of early childhood.

23. The endocrine glands, with the exception of the sexual glands which are semi-dormant, are functioning normally. Among these glands, the thyroid gland is the principal growth regulator, which explains the probable, but as yet ill-defined, effect which lack of iodine exerts upon development. The hypothysis, stimulated by the action of the growth hormone, seems to become active towards one year, exerting an influence on protein anabolism and the mobilization of fatty acids.

24. The growth regulation mechanism is still far from being fully understood,[5/] but there is a tendency to acknowledge that heredity governs the potential that can be realized in optimum environmental conditions. Genetic factors do not become clearly operative until the age of three, and prior to that time, environmental influences are dominant; the statistical correlation between the child's present height and his adult height, and between his present height and that of his parents, which is very low during the first two years of life, suddenly increases towards the age of three and remains at more or less the same level until the pre-puberty period. Tanner has compared a child's growth

5/ TANNER, J. M., The regulation of human growth, Child Development, 1963 34: 817.

to a trajectory of the auto-directed device, whose internal control mechanism corresponds to the genetic heritage. The environment may cause the device to deviate temporarily from its course; if its influence is too intense or too prolonged, the deviation becomes definitive and can no longer be automatically compensated.

25. The composition of the corporal mass changes principally during the second and third years. The water content of the tissues is still very substantial; a large proportion of the corporal water is still free in the extra-cellular space, and thus in an unstable and rapidly exchangeable condition. This explains why water requirements are still considerable and why there is danger of acute dehydration during the attacks of diarrhoea which afflict the child of two to three years of age. The food conservation capacity is still limited, and the organism finds it difficult to tolerate irregularities or cessation of food intake.

26. The enzymic systems, however, are functioning quite normally; all the metabolic reactions, relating to both digestion and general metabolism, are already possible.

Diet and Nutrition

27. We have seen the importance of the tissue growth which is characteristic of this period: the doubling of the size of the body, the lengthening and development of the bone structure, the body's liquid requirements and the lack of bodily reserves. The diet should fulfil these growth needs and at the same time enable the basic metabolism fundamental to life to remain stable and replace the considerable amount of energy expended by a being who is discovering the world and who, while awake, is constantly engaged in bodily activity.

28. Average dietary requirements have been specified recently in a number of physiological research projects and studies by various committees of FAO and WHO 6/7/8/ and by the national commissions. They will probably be detailed

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6/ F.A.O. Besoins en calories, Etudes de nutrition de la F.A.O. No.15, Rome 1957.

7/ F.A.O. Besoins en protéines, Etudes de nutrition de la F.A.O., No.16, Rome 1958.

8/ O.M.S./F.A.O. Besoins en calcium. Rapport d'un groupe d'experts - Série de rapports techniques No.230, Genève, 1962.

in the reports prepared by the specialized agencies of the United Nations. We shall simply recall here a few points which seems to us to be important:

a) The amount recommended at that age per kilogramme of weight is greater than for the school child or adult. The fundamental elements are:

- a sufficient and regular calorie intake of between 1,300 and 1,700 calories per kilogramme, varying with the climate and the child's activity;

- a daily intake of good quality protein, that is, of high value in biological terms, ideally either an animal protein, or a mixture, supplying the amino-acids which are said to be indispensable in correct proportions.9/The average requirements of that protein are between 1.5 and 2 grammes per kilogramme of weight;

- a calcium intake of between 400 and 500 milligrammes per day, ideally supplied by milk;

- an intake of water of between 50 and 100 grammes per kilogramme of weight per day, never to be discontinued even in case of illness or fever;

- an intake of sodium, fluorine and iodine, generally supplied through food but which may require special measures in certain environments (fluorine for the prevention of dental caries, iodine for the prevention of goitre);

- an intake of vitamins, of which we shall only mention Vitamins A and D, a deficiency of which is still too frequent (as a result of insufficient sun, which is a factor in rickets).

b) These nutrients are supplied in the form of foods. This period is is characterized by the transition from a homogeneous diet, consisting essentially of milk, liquids or mushy foods, to a varied diet with different tastes, smells and consistencies. The dietary education of the child, the transition from the breast, pap or bottle to the full family meal, is made in progressive stages, sometimes beset with difficulties, obstacles, setbacks and periods of refusal and sometimes, on the contrary, marked by joyful discoveries and veritable explorations of a new world of food. Patient kindly encouragement by the adult plays a very important role in this.

9/ TEPLY, L. J. Nutritional needs of the pre-school child, Nutrition Reviews 1964, 22, 3:65

> Children all differ in their attitude towards food, and although hunger, the urge to satisfy the body's needs, can easily be satisfied where food is available, the display of appetite, or the child's desire to eat what is placed before him, varies with the emotional conditions, the way in which the food is presented and the feeding habits.

29. In economically backward regions, feeding habits are dominated by late weaning, which occurs during the second or even third year.

30. Frequently occasioned by the next pregnancy, this weaning is sometimes very abrupt. We shall comment later on the consequences of this brutal change in feeding habits which may go hand in hand with a radical change in the child's way of life. We must stress at this point the fact that the mother's milk remains the child's basic food well beyond the six to nine months' recommended by paediatricians in the industrialized countries. After some hesitation, the authors are all agreed that it would be more prudent to continue this breast-feeding, on condition that from the age of six months a supplementary diet is provided, supplying the mineral salts, the calories and above all the proteins which are almost always lacking in the normal diet of the children of those regions. There will undoubtedly be a consideration of methods of supplementation in the other reports. We shall merely insist on the fact that the small child capable of eating, digesting and assimilating is incapable of choosing and providing his own food and that he is entirely dependent on what adults will do for him. At that age, the child is therefore still totally dependent with regard to food, whereas in other ways he is acquiring an increasing autonomy.

Acquisition of mechanisms of defence against the external environment

31. When he leaves the cradle, the play-pen or his mother's arms or back, the child who can walk and will soon be able to run explores the world. His first encounter is with the universe of the microscopically small beings of his environment: microbes, viruses and parasites. The extent of this encounter

and the stage at which it takes place vary according to the ecological conditions, home and family hygiene, local epidemiological conditions and the extent to which he comes into contact with earth, water, and above all with adults and other children.

32. During its first year, the child completely loses all the antibodies which its mother had transmitted to it passively during pregnancy through the placenta and which are connected with the various illnesses and latent infections suffered by the mother in the course of her life. The reticulo-endothelial system of the infant has become capable of preparing active antibodies.

33. We know that these antibodies are generated in the cells of the lymphatic tissues, which undergo hypertrophy at this age to an extent determined by the extent of their encounters with infecting agents, (such hypertrophy is not observed in the animals raised in sterile conditions which are known as "germ free" animals). Provided the infection is not too severe, the infant acquires, without suffering from the illness, prolonged or permanent immunity against certain illnesses, and the more widespread the infection is, the sooner the child acquires this immunity. The earliness of concealed poliomyelitis infection is shown, for example, by the fact that, whereas 50 per cent of the children less than one year old at Dakar (Senegal)[10/][11/] have a certain type of antibody in their systems, the same percentage is attained only at the age of six or even fifteen years in the case of certain groups of children in Sweden. Frequently, such immunity is only acquired by actually suffering the disease, with all the disastrous consequences which that may entail.

10/ WHO Expert Committee on Poliomyelitis, report No.2. Technical report series No.145, Geneva. 1958.

11/ SAID, G. and collaborators. Etude des anticorps neutralisant les virus de la poliomyélite chez trois groupes d'enfants Africains de la region de Dakar (A study of the antibodies which neutralize the poliomyelitis virus in three groups of African children from the Dakar area), Sem. Hôpitaux de Paris, 1959, 35, 18/4: 1362.

34. Infancy is the time when the child contracts common contagious illnesses from contact with others (older brothers and sisters, playmates, school-mates).

35. We have few precise data on chicken-pox, but we know that is is almost universally disseminated. As for measles, we know that according to Douglas[12/] it is contracted by 55 per cent of British children before the age of 6. In France, according to Celers[13/], 45 to 73 per cent of children contract it between the ages of 1 and 6, the percentage varying according to whether the children live in the country or in the towns, whether they live in crowded conditions or not, and many other factors. Measles generally has few or no ill-effects on a child which is otherwise healthy and properly fed, but it can be serious in less favourable conditions.

36. Many digestive and respiratory infections, due to bacteria or virus, complicate the life of infants, but it is difficult to evaluate their frequency; Valadian[14/], Miller and collaborators[15/] and Membre[16/] have shown that, while hardly any child escapes them, their frequency falls off considerably between the ages of two and five. They do not seem to have any adverse effect on the development of an otherwise healthy and well nourished child, but the same is not true in the case of under-fed populations.

12/ DOUGLAS, J. W. G. and BLOMFIELD, J. M., Children under five, Allen and Unwin, London, 1958.

13/ CELERS, J. Seminaire sur l'épidémiologie et la prévention de la rougeole et de la rubéole (Seminar on the Epidemiology and the Prevention of Measles and German measles). C.I.E., Paris, June, 1964 (in the press).

14/ VALADIAN, I., STUART, H.C., and REED, R. B. Studies of illness of children followed from birth to 18 years, Monogr. Soc. Res. Child Development, 1961, 81, 26, 3.

15/ MILLER, F. J. W. and coll. Growing up in Newcastle-upon-Tyne, Oxford Univ. Press, 1960.

16/ MEMBRÉ, M. J. Fréquence des maladies des voies respiratoires chez les enfants de 0 à 7 ans, (The frequency of illnesses of the respiratory passages in children from 0 to 7 years of age), Thesis, Paris, 1962.

37. It would be extremely dangerous, however, to rely exclusively on this mechanism of concealed or possibly benign illnesses in order to acquire permanent immunity. So many serious infections threaten the infant that attempts must be made to prevent them by means of vaccinations:

a) If vaccinations have been carried out during the first year, they can be consolidated by booster injections which will raise the level of antibodies to the effective level; this is so in the case of whooping-cough, diphtheria, tetanus, and poliomyelitis, where immunity lasts for a very long period; but other vaccinations, such as those for smallpox or even tuberculosis, must be repeated several times.

b) If vaccinations have not been carried out during the first year, they must be carried out and supplemented by booster injections during early infancy, when the risk of infection is very considerable and the congenital immunity has been exhausted.

38. The acquisition of satisfactory immunity through vaccinations is an integral part of the normal development of a modern child, and health services must make it their aim to establish such immunity in all the children for whom they are responsible.

39. At this age, the child's exploration of the world around him involves a major risk of accidents, and, while in countries where the risk of infection is very high and nutritional standards very low, the death rate due to accidents for children between the ages of one and four may average only 3 per cent of the total death rate (the 1959-1961 figures for boys were 3.6 per cent in Colombia and 2.8 per cent in Ceylon), the deaths due to accidents may (in countries where there is hardly any danger due to infection or malnutrition and the total number of deaths is smaller) represent from 30 to 40 per cent of the total (42 per cent in Switzerland and 31.4 per cent in the United States for boys in the years 1959-1961).[17/] As we know, such accidents often take place inside or around the home.

17/ WHO Epidemic and Demographic report, 1964, 17, 1-2.

40. This coming into contact with their surroundings also has positive aspects, however. It is the child's first introduction to danger and its first experience in prudence. According to L'Hirondel, falls, slight burns, stings, and cuts constitute a "vaccination against accidents". The experience in the control of movements and impulses in the home or in nursery school paves the way for the active education which is the child's true safeguard against accidents.[18/19/]

41. The development of such control is linked with the child's motor development (itself dependent upon the neurological maturation, which becomes complete at this age) and above all with its social and psycho-emotional development.

Neurological maturation; motor and sensorial development

42. The marvelous machine that is the human brain is almost completed at the age of one year, but its complex functioning has not yet been settled, and its possibilites depend to a great extent on the way in which they are utilized. At the age of 6 or 7, most of the fundamental mechanisms have become fixed, and the plasticity of the system is much reduced.

43. Between the ages of 1 and 5, the encephalon grows from 60 to 90 per cent of its final volume. No new nerve cell is developed after birth. Most of the processes of biochemical and enzyamtic maturation with which we are familiar (many aspects are still unknown in this field) take place during the first year; the most intensively studied of them is the construction of the sheath of myelin surrounding the centrifugal pyramidal fibres which govern voluntary movement. Myelization takes place primarily during the first year, but it continues subsequently at a slower rate. Only the supporting tissue, which has no real neurological function, continues to grow. The nerve cells, which are already present and formed, come into operation gradually in an order which is still not clear.

18/ L'HIRONDEL, Les accidents chez l'enfant (Accidents and Children), Journées médico-sociales des services de Protection Maternelle et Infantile, Evian, 1957; 33.

19/ WHO, European Regional Office, Conference on the prevention of accidents involving children, Spa.16-25 July 1959.

44. It would appear that such activation of the nerve cells cannot take place too soon, no matter what stimulation there may be from the outside world, but even when the brain has reached maturity, stimulation probably remains necessary in order to cause the appearance of nervous activity. We do not yet know whether the absence of stimulation at a given moment during a sensitive period causes a delay which is difficult or impossible to make good, or permanent loss of the function in question. During the first years of life, the connexions between the cells multiply and become more complex, new circuits come into action, and the complexity of the mechanism increases with the maturation of the structures and with the accumulation of experiences and sights and sounds.

45. We know that maturation generally takes place in cephalocaudal order, the functions of the head and the upper members being always more highly developed than those of the trunk and the lower members.

46. We also know[20/] that maturation of the motor areas is generally more advanced than that of the sensorial areas, which in their turn come before the visual and auditory areas and the areas of association of the cerebral cortex. From the age of one year onwards, it is the sensorial areas and, above all, the areas of association which undergo the most rapid development.

47. This development manifests itself in the increasing complexity of the responses to a given form of excitation, in the increase in the number of conditioned reflexes, and in the increasing possibilites of voluntary, cortical inhibition of such reflexes. According to Pavlov, a new system of conditioning begins to function, at the end of the first year of life, and it is this second signalling system which enables the child to begin to speak.

48. The electrical activity of the brain, as registered by an electroencephalograph, considerably resembles that of the adult, and from the age of three onwards the rapid waves of low amplitude characteristic of adult records are to be observed.

20/ CONEL, J. L. The post-natal development of the human cerebral cortex. Harvard Univ. Press, 1957, 1958, 1959.

49. The equilibrium between the state of permanent contraction of the various muscles, i.e. the tonicity of the trunk and the members, permits the execution of increasingly perfected movements, two of which, manual prehension and walking, are fundamental in man.

50. We know, in particular, that the co-ordinating role of the cerebral cortex develops throughout the first years of life and effaces the blind subcortical circuits, substituting for them more elaborate, more flexible and better adapted circuits.21/

51. The various senses also, are progressively integrated into and linked with the sensory motor circuits. There is already quite satisfactory co-ordination of auditory, visual and kinesthetic perception at the age of five.22/

52. The cerebral cortex may pave the way for learning to read and write.

53. Sleep develops according to a special pattern. At the age of two to three years, the child passes through a period when it has difficulty in going to sleep, wakes up in the night and suffers from nightmares, which are largely related to the richness and intensity of its emotional life.23/

54. In summary, although the brain structures are present from birth, they mature rapidly during the first years of life. That maturation, coupled with stimuli from the external environment, enables the child to acquire many new functions and to perfect skills it already possesses.

55. Acquiring and perfecting the ability to walk transform the small child's vision of the world during its second year. MacGraw has clearly demonstrated

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21/ THOMAS, A. and SAINTE-ANNE DARGASSIES, Etudes neurologiques sur le nouveau-né et le jeune nourrisson (Neurological studies on newly-born babies and babes in arms), Paris, Masson, 1952.

22/ BIRCH, H. E. and LEFFORD, A. Intersensory development in children. Monograph of the Society for Research into Child Development, 1963, 89, 28, No.5

23/ DEBRE, R. and DOUMIC, A. Le sommeil de l'enfant (Sleep in children) Paideia - Presses Universitaires de France - Paris, 1959.

this progressive development linked with the physiological maturation of the central nervous system;[24] the age at which a child learns to walk varies according to the individual, but all children free of motor defects do learn. Very exceptional circumstances are required to modify or inhibit this development, which is independent of intellectual potential and emotional motivation. It has been clearly shown that no attempt at premature exercise can bring forward the age at which a child begins to walk. Once a child has acquired the mechanism, it uses it constantly, rapidly extends its knowledge of three-dimensional space and undergoes its first independent experiences.

56. At almost the same time, the child becomes capable of controlling its sphincters. Here again, abundant proof has been provided that attempts to train the sphincters at too early an age do not alter the age of conscious and voluntary control, which in most cases occurs between one and three years; but within these limits, the establishment of habits depends on their underlying emotional significance, customs, the rules prevailing in the society in which the child lives and the value attached by adults to cleanliness, values which vary greatly, from one culture to another but which seem to exist almost everywhere.[25] The experiences of gratification or frustration undergone by the child during this training are, according to some psychologists, of the first importance in the formation of the personality.

57. Delicate manual prehension, the use of the thumb-and-index finger grip which is possible by the beginning of the second year[26], enables the child to manipulate delicate objects and improve its play. The movements, which are at first clumsy, all-embracing, involving all kinds of superfluous movements, become in the course of the years which concern us here precise, limited, aimed directly at

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24/ MACGRAW, M.B., The neuro-muscular maturation of the human infant, New York, Columbia University Press, 1943.

25/ WHITING, B.B. Six cultures in child rearing. J. Wiley & Sons, New York, London, 1963.

26/ KOUPERNIK,C., Développement psycho-moteur du premier âge. (Psycho-motor development in the first years). Paideia-Presses Universitaires de France, 1964.

achieving its purpose, by dint of incessant repetition, exercises, spontaneous experiences or experiences guided or planned by adults. It is known from Mrs. Montessori's work that training in some kinds of gesture cannot be started too early; but once the potential has appeared, there seems to be an optimum period after which the training becomes difficult, slower and perhaps less complete.

58. These gestures, which are acquired almost spontaneously at the pre-school age include all those which will enable the child to become independent of the adult in its elementary daily life (cleanliness, feeding, dressing, etc.), and enable it to gain a precise awareness of itself.

59. Furthermore, the gesture is an instrument of social communication, one of the most important, according to WALLON 27/, who stresses its role as a means of social communication.

60. Being able to walk, co-ordinating its movements and perfecting its gestures will make the child aware of its own body as something separate from the physical and human world surrounding it. At the same time, as the child becomes aware of the ego on the emotional and social plane, its motivity and the integration of its lateral dominance, (usually the right) enable it to orientate itself in space. In that orientation, which probably has an important bearing on a whole series of intellectual mechanisms, a part is also played by auditory and visual perceptions, which begin by being disorderly and confused but are later organized and delicately analyzed.

61. Finally, and most important, comes the development of speech. The ability to utter and articulate sounds may depend on motorial maturation up to a certain level, which is reached spontaneously by deaf children. But the acquisition of speech, that is to say using symbolic sounds to communicate with other people, presupposes the interpretation of those sounds by adults, and an unbroken succession of auditory (and visual) perceptions and of reactions from the child and responses from the

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27/ WALLON, R. De l'action à la pensée. (From action to thought) Flammarion, Paris 1942.

environment, which cannot be envisaged in isolation from the child's psycho-emotional development and the environment in which it lives.

62. Between the ages of one and two the child's vocabulary expands considerably from a few words to several hundred; each word has the meaning of a complete sentence expressing an emotional state and a mental attitude. Between the ages of two and four, the word, according to Piaget, is a "pre-concept" halfway between the symbol which lies at its origin and the generic concept it will eventually become. At the same time the child masters grammatical sentence construction and verb forms with disconcerting speed. The linguistic essentials are already there at the end of the second year. Subsequently the vocabulary will improve and become more accurate; the use of the first person occurs quite late, when the child asserts its personality in relation to others. On the whole, this development varies greatly from one individual to another. Furthermore, speech is an essential tool of social communication. We shall see below how its richness and content may be altered by the environment.

63. Moreover, throughout the above, we have had to refer constantly to the physical and human environment surrounding the child, which governs the extent to which its motorial potential is expressed, at an age when rapid development allows it to adapt and compensate as it can never again do later.

Psycho-emotional and social development

64. The various theories on the forming of the personality, which we cannot give in detail here, are agreed in attaching considerable importance to this period of life and to the interactions between the child and the adults surrounding it.

65. Such interactions take place chiefly within the family. Family structure differs greatly between different societies and cultures, from the restricted family of the nuclear type in the new industrial cities to the large tribal family comprising several generations and several parallel branches. In any case, it is generally at the age of six to eighteen months, depending on weaning, the way women's lives are organized and their work outside the home or in the fields, that the child will experience its first real separation from an ever present and available being, i.e. its mother (or the person who takes her place, or the several persons sharing that responsibility). That inevitable separation, if managed progressively, in good conditions, is a positive element in the child's personality, enabling it to build up its own image and attain relative independence. The increasing part played by the father figure, the importance of which had long been neglected by psychologists, and the progressive awareness of other adults who simultaneously protect but also oppose the child, enable it to live through a difficult period in its life without too many shocks; ruled by impulses over which it has little control, it goes through a phase of aggressive ness and antagonism (around three to four years), asserting its personality and learning to accept refusals. It is also within the family that it becomes gradually aware of its sex through its relations with the women around it and the men representing power and authority. This oversimplified outline, differs greatly from place to place, but anthropologists are agreed in thinking that models of social structures are instilled into the child at this age, determining its underlying attitude towards passivity, violence, the acceptance or rejection of authority and its own sex. 28/

28/ MEAD, M. and WOLFENSTEIN, M. Childhood in contemporary cultures. University of Chicago Press, 1955.

66. The family group can be merely protective or it can be stimulating, warm or frustrating. As we have seen, it can be either very restricted or extensive; it is often almost totally feminine, with the man, a distant and mysterious person, making only rare appearances. Sometimes, on the other hand, it is ruled by the father of the family in a permanent and authoritarian way. The effects of these different structures on the development of the child are little known, but it is known that the child assimilates them, portrays them in its play and reproduces them when it grows up.

67. In its family the child finds the responses to its gestures, the interpretation of its clumsy words and the encouragement for its motorial experiences, which enable it to progress in a suitable emotional climate. Often it is already entrusted with minor domestic tasks which it has to carry out to help and to satisfy the adults or its larger (or smaller) brothers and sisters. It is already an active member of a society in miniature where each person has a definite part to play.

68. The child's experiences outside the family will be interpreted according to the relations it has established with the family. During the first years, despite its increasing independence, it always needs to be able to return to the familiar and permanent rites, rhythms of life, habits and people which reassure it and give it the necessary emotional and material security. Emotional security is based primarily on the child's deep-seated relationships with its family and on the love it receives and gives. It is also based on the existence around the child of firmly established personal relationships between the members of the family group. The emotional autonomy described by ERIKSON[29/] in the small child is a stage during which it learns to control itself in accordance with certain rules laid down by its culture; the way in which those rules are transmitted to it also condition its feeling of security. But the essential factor, according to

29/ ERIKSON, E. Discussion on child development, Vol. 3. Tavistock Publications, London, 1958.

psycho-analysts, is the proper integration, with its constructive fights and frustrations, of the child's knowledge of its own body and its own sex. Alongside this emotional security is the need for material security, the security of a relatively stable routine, a framework to its life, established habits, which the child will use as a starting point in embarking upon new activities.

69. Social relations as we have seen, first grow up within the family. With children of the same age, its peers, a child establishes relations gradually, while playing, or at the day-nursery or kindergarten. Up to the age of three, the child is not really able to co-operate in play. It takes an interest for a brief moment, exchanges a few things, and then returns quickly to its solitary activities, indifferent to its surroundings. From about three, it is better able to take part in activities calling for association and co-operation, but play is apt to remain competitive, short-lieved, much affected by the emotional relations linking the child to the adult directing the group.30/, 31/. The maturation of social behaviour, as in the case of motor behaviour, can probably be accelerated after certain stages have been reached.

70. Play is undoubtedly the most important activity for the psycho-motor development of the child. He devotes practically all his waking hours to it, immerses himself in it completely, forgetting everything around him. This play should be respected and stimulated. There is no need for complicated or costly material; the child must make use of water, earth, simple things to which he attaches a symbolic meaning, recreating people, situations and difficulties he meets, solving simple problems and improving his movements and his thoughts.

30/ Centre International de l'Enfance, Séminaire sur les crèches. Paris, 5, 6, 7 December 1960. Réunions et Conférences No. 10: 51-73.

31/ SWIFT, J.W.. "Effects of early group experiences: the nursery school and day nursery". In Review of Child Development Research", Vol. 1, Russell Sage Foundation, New York, 1964.

71. The development of the intelligence is difficult to describe apart from that of motor functions, language and emotion. Nearly all authors agree with Piaget [32] and Wallon that the wealth of the language and the structure of the mother tongue have an influence on the development of symbolic thought. Piaget holds that language begins as an accompaniment to action, then enables the child to narrate something and finally becomes the means of the representative function. The information provided by the physical and social enrironment (Inhelder), from emotional contagion to communication properly so called, is one of the basic factors of intellectual development.

72. Without going into a discussion of the existence of stages, we shall take up the ideas of Piaget and Inhelder, according to which the child gradually makes three fundamental discoveries:[33]

a) The discovery of the permanent object that he can deal with, a discovery made at about the age of two years.

b) The formation of symbolic thought, which develops between the ages of two and five years through more and more elaborate imaginary games, and is reflected in drawings.

c) The discovery of fundamental intellectual operations, classification, seriation, counting, measurement. "In dealing with things the child discovers that he can introduce a certain order into the universe" (Inhelder). These different activities develop concurrently; they result in ideas such as that of the preservation of matter (Piaget).

73. The understanding of the relation of cause to effect, too, probably develops in specific stages. Up to the age of five years this concept is animist and then

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32/ PIAGET, J. La naissance de l'intelligence chez l'enfant. Delachaux et Niestlé, Neuchâtel - Paris, 1937.

33/ International Children's Centre, Seminar on day nurseries. Paris, 5, 6 and 7 December 1960. Meetings and Conferences No. 10: 51-56.

artificialist; the child is self-centred and does not yet feel the need for logical explanation. 34/ But the age at which the stages of causal thought first appear may vary according to experience and knowledge.

74. Thus, the intelligence of the small child, practical and directed towards the solution of concrete problems, functions through a series of experiments and sensorimotor and symbolic activities that pave the way for the subsequent formation of logical thought.

75. Gradually, too, the deliberate nature of creative activity begins to appear. 35/ Towards the age of five to six years the child is able to set himself a task and carry it out. He is fit for work (and no longer merely for play); according to C. Buhler, he is ready to start school. This aptitude for work is apparently - and we shall revert to this point - a product of education and culture.

76. As for moral development, it is still too early to speak of that. At that age there are only patterns of behaviour, strongly tinged with emotion, which are either approved or disapproved of by society. These behaviour patterns will create habits, good or bad, which may later become moral rules if the adults adopt a coherent, reassuring and logical attitude towards the sometimes disorderly and impulsive activities of the small child.

77. To sum up, the age that we are considering is above all that of grasping, walking and talking, which corresponds to the development of man, who first stands upright, then uses his hands, and, finally, with the development of his brain, makes sounds to express his ideas. Later comes the improvement of psycho-motor activity through play, and later still this ordered activity which enables him to work.

34/ SIEFEL, I.E. The attainment of concepts in Child Development Research. Vol.1, Russell Sage Foundation, New York 1964: 209-248.

35/ HERZER, quoted by WALL, W.D., in Education et Santé Mentale, UNESCO 1955; 64-94.

78. Throughout this evolution, the essential needs of the small child are stimulation on the one hand, and affection and security on the other.

79. Thus we have presented an outline of the somatic, sensorimotor and psychological development of the child from the age of one to six years. We have tried to bring out the essential characteristics in the majority of favourable environments, where the genetic potential can find maximum expression. We shall now try to analyse the action of factors that are likely to influence it, for better or for worse, with special emphasis on the factors to be found in the economically less favoured countries.

FACTORS LIKELY TO INFLUENCE THE DEVELOPMENT OF THE SMALL CHILD

80. In this chapter we shall consider the immediate effects of the various factors, leaving until later the enumeration of the facts and hypotheses regarding the long-term effects at school age, in adolescence and in adulthood.

Nutrition

81. The life, the physical health and the behaviour of the small child depend upon the good or bad quality of the food he is given and upon its adequate or inadequate supply.

82. In the rich countries, improved nutrition is helping to accelerate growth and physical development from the earliest years. Children today are larger and heavier at the age of one than was the case ten, twenty or thirty years ago. This accelerated development is reflected in an average increase, at the age of five to seven years, of 1.5 centimetres and 1 kilogramme every ten years.[36/] This phenomenon is to be observed in most countries where the level of living is rising.

83. The same thing is happening in societies in rapid evolution and in groups of human beings whose living conditions are for various reasons undergoing a change.[37/] As we have seen, in order to reach a practical conclusion with regard to anthropometric changes, it is necessary to repeat the reference measurements at least every ten years. On the basis of these measurements we shall perhaps be able to use simple anthropometric data collected on children periodically as an indication of the state of health of the population.

84. We do not yet know whether this acceleration of growth and somatic development is accompanied by an advance in the motor, emotional or intellectual development.

36/ Tanner, J.M. Growth at Adolescence, Blackwell, Oxford, 1962

37/ Greulich, W.W. A comparison of the physical growth and development of American born and native Japanese children. Amer. J. Phys. Anthrop. 1957, 15; 489.

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85. A deficient or unbalanced diet has an indirect or direct effect on the life of the child. High mortality rates among children between the ages of one and four years are to be found in the very regions where there are nutritional deficiencies. 38/, 39/

86. In these regions there is only a very slight drop in mortality rates after the first year. The ratio of infant mortality to mortality between the age of one and four is generally less than 10 in countries where children have a deficient diet; it was 2 in Guatemala and 4 in Mexico in 1952 40/; as against that, it is higher than 10 and sometimes reaches 20 in countries where the nutritional situation is good (Sweden 1960). The work of the Instituto de Nutricion de America Central y Panama 40/ shows that in some villages in Guatemala where the infant mortality rate is 101.4 per thousand, the mortality rate between the ages of one to four years drops only to 42.1 per thousand.

87. The part played by dietary deficiencies at the time of weaning is evident from the very peculiar evolution of annual mortality rates in certain parts of West Africa, such as Guinea and the Senegal valley. Demographic samplings have shown that in those areas mortality between the ages of two and three years is higher than between one and two years; 41/ children there are usually weaned at the end of their second year.

88. It is very difficult to obtain any precise indication of the effect of nutrition on mortality from health statistics. Nutritional disorders are rarely mentioned as such, the causes of death being given as respiratory, digestive or undetermined. Specific enquiries on the spot, however, show that in such circumstances malnutrition

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38/ WHO. The ten main causes of death 1954-1956, 1957-59, 1960. Bull. Epid. Demog. 1963, 16: 30.

39/ WHO. Infant and juvenile mortality in certain countries, 1951-1962. Bull.Epid. Demog. 1964,17:536

40/ Behar, M., Ascoli, W. and Scrimshaw, N.S. An investigation into the causes of death in children in four rural communities in Guatemala. Bull; WHO, 1958, 19:1093.

41/ Cantrelle, P.A., Etiffier, J. and Masse, N. Mortalité et morbidité de l'enfance en Afrique. Journées Africaines de Pediatrie. C.I.E. 1960:62

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lies at the root of a large proportion of deaths of very young children. In the work of the Instituto de Nutricion de America Central y Panama, the figure given is 38 out of 109 deaths between the ages of 1 and 4 years.

89. It is even more difficult to gain an accurate idea of the morbidity attributable to nutritional disorders. Various health and nutrition surveys have, however, drawn attention to the very great prevalence, varying according to the region, of: simple calorie deficiency leading to marasmus; and pure protein deficiency leading to kwashiorkor.

90. The fact is, as has been amply demonstrated by Cecily Williams,[42/] Senecal,[43/] Dean,[44/] Gomez,[45/] and many other authors, that the two deficiencies are nearly always associated, to various degrees, which explains the very great variety of terms given to the nutritional disorders of small children (multi-deficiency syndrome, protein-caloric malnutrition, etc.).

91. In addition to these major nutritional disorders there are the following vitamin deficiencies:

- liposolubles, A (affecting the skin and eyes) and D (with its resultant calcium deficiency leading to rickets), and
- hydrosolubles, mainly complex B, responsible for beriberi and a number of skin lesions.

92. Unfortunately these difference deficiencies are often found together, but it seems, too, that protein malnutrition, with the enzymatic and metabolic disturbances

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42/ Williams, C. Kwashiorkor, nutritional disease of children associated with maize diets. Lancet, 1935, 2:1151

43/ Senecal, J. Le Kwashiorkor - étude clinique et biologique. L'enfant en milieu tropical. 1963, 12:9

44/ Dean, R.F.A. and Jelliffee, D.B. The diagnosis and treatment of protein-caloric malnutrition. Courrier, 1960, 10:429

45/ Gomez, F. Malnutrition in infancy and childhood with special reference to kwashiorkor. Adv. in Pediatrics 1955, 7:131

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that accompany it, causes the secondary appearance of signs of vitamin deficiency (especially Vitamin B) conditional upon it. If we add to that the possibility of mineral deficiencies (especially of calcium), we see what a complex problem it is.

93. The anaemias, which are also very prevalent, are due mainly to iron deficiency and to impoverishment of the blood caused by parasitoses, the most serious of which is infestation by ankylostoma.

94. Nutritional deficiencies lead to severe illnesses, entailing long and costly treatment, but they also influence physical development, psychic behaviour and susceptibility to infection.

95. Caloric deficiency stunts growth in weight, in height and in bone development. Protein deficiency has a similar effect, although the actual loss of weight is concealed, in serious cases, by water retention. Generally speaking, it can be said that protein malnutrition, and the caloric deficiency that usually accompanies it, affects weight first and foremost. By assessing the percentage of underweight in relation to the average, Gomez 46/ was able to draw up the following classification, which is in widespread use in Latin America and is employed in tracking down disease:

- First-degree malnutrition: weight between 85 and 75 per cent below the theoretical average for the age;
- Second-degree malnutrition: weight between 75 and 60 per cent of the theoretical average for the age;
- Third-degree malnutrition: weight below 60 per cent of the theoretical average for the age;
- Malnutritions with third-degree oedema rank with third-degree malnutrition.

96. Weight shows above all the present condition of the child and its immediately preceding nutrition.

46/ Gomez, F. Malnutrition in infancy and childhood with special reference to kwashiorkor. Adv. in Pediatrics 1955, 7:131.

97. Height, on the other hand, is not stunted unless the nutritional deficiency (in calories, in protein or in calcium) is lasting. The proportions do not develop normally and bone formation is retarded in relation to height (and consequently to the height-age). The hormone balance is upset and the enzymatic functions disturbed.

98. The effect of compensatory nutrition on physical development has been the subject of a number of works (Barrera-Moncada[47] among others). All agree in stressing the striking recovery in weight and the clear, but slower recovery in height and in bone development. The great rapidity of growth restores the child to normal but the retardation is not always completely overcome. The quality of the recovery apparently depends upon a number of factors:-

a) The age of the child at the start of the deficiency: the younger the child, the more difficult will be his recovery. Malnutrition that starts after the age of one year apparently has a far better chance of being cured than malnutrition of the same degree which sets in earlier, during the first year of life;

b) the duration and extent of the malnutrition;

c) lastly, and above all, the quality of the compensatory nutrition, which must be continued for a long time in order to build up the child's capital of protein. If the child, living in unfavourable economic and social conditions, is again given an unbalanced and inadequate diet, his growth will again be stunted before he has been able to recover and he will continue to be thinner and smaller than his friends who are being properly fed.

99. There is a pattern of mental and emotional behaviour characteristic of the small child suffering from malnutrition. Although mere calorie deficiency only causes apathy, a severe protein deficiency becomes manifest through particular disorders which have been very well described by all those who have had occasion

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47/ Barrera-Moncada, G. Estudios sobre alteraciones del crecimiento y del desorrollo psicológico del sindrome pluricarencial (kwashiorkor) Ed. Grafos Caracas 1963.

to observe kwashiorkor (Brock and Autret [48], Geber, M. and Dean,[49] Barrera-Moncada[47]) or its Latin American synonym, the multi-deficiency syndrome. The child shows no interest in his surroundings, he is sad, motionless, irritable, crying or whimpering all the time and withdrawn within himself, and he loses his curiosity and his desire to explore the world. The appraisal of tests shows some retardation, more marked in language than in motor control.

100. Anorexia is an added complication to this severe syndrome and aggravates still further the insufficiency of the food intake.

101. In the less serious cases, i.e. in children who have minor indications of malnutrition or who are suffering from retardation in height weight growth, which is nutritional in origin, there is in general a lowering of development and intellectual quotients. It is very difficult to dissociate the effect of the social environment as a whole, the effect of genetic factors and the effect of nutrition proper, but a whole series of studies, recently summarised by Cravioto,[50] indicates that there is a correlation between the results of the tests and nutrition. Let us add to this the observations of Geber and Dean[51] on the progression of the performance

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47/ Barrera-Moncada, G. Estudios sobre alteraciones del crecimiento y del desarrollo psicologico del sindrome pluricarencial (kwashiorkor). Ed. Grafos Caracas 1963.

48/ Brock. J.F. and Autret, M. Le kwashiorkor en Afrique. WHO Geneva, 1952

49/ Geber, M. and Dean, R.F.A. The psychological changes accompanying kwashiorkor. Courrier 1956, 6:3.

50/ Cravioto, J. Malnutrition and behavioural development in the pre-school child. Paper presented to the International Conference on the prevention of malnutrition in the pre-school child, 7-11 December 1964, Washington D.C.

51/ Geber M. and Dean, R.F.A. Gesell tests in African children. Pediatrics, 1957, 20: 1055

ratings in the Gesell test for the African child brought up in rural surroundings, which are much higher than those for the European child during the first half year, but which then fall behind when, among other things, the mother's milk becomes inadequate in quantity, and there is no supplementary diet.

102. Compensatory nutrition has as marked an effect on mental and emotional behaviour as on growth. Children suffering from severe protein malnutrition quickly recover their appetite and their spirits and once again show an interest in people and things; if the development tests are repeated, a tendency towards normal development is apparent, language remaining somewhat behind motor development. According to Geber and Dean, the more attention the mother gives to her child, the more complete his recuperation.

103. In cases of concealed malnutrition, it is much more difficult to know whether the supplementary dietary intake in itself might improve the functioning of the mental and emotional processes. It might certainly prevent them from deteriorating as a result of prolonged and severe malnutrition.

104. It should also be pointed out that test methods are not always standardized for the populations under study and they remain difficult to apply in different cultural conditions.

105. The mechanism of the effect of malnutrition on the mental and emotional processes is still largely unknown and experimental histochemical and enzymological studies are necessary in order to define it.

106. The effect of nutrition on the development of the child being indisputable three factors must be mentioned at this point:

a) First of all, the lack of protective foods, supplying the child and the rest of the population with the indispensable nutriments referred to earlier: that lack is an economic problem, a problem of production and distribution.

b) The lack of education on the part of the parents and of the adults as a whole, who very often have several high quality foods available to them which they do not give to the small child. 52/

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52/ BURGESS, A. et DEAN, R.F.A. Malnutrition and food habits. Tavistock Publ. London, 1962.

c) The part played by weaning customs and habits.[53/, 54/] Fortunately, the practice of prolonging breast-feeding by the mother is, as we have seen, still very widespread in the backward regions. But breast milk is never a sufficient food beyond the age of 6 months and even less so beyond the age of one year. Supplementation techniques may make up for that deficiency, but all too often the supplementation consists of farinaceous elements. Moreoever, in many regions weaning is brutal and rapid. A new pregnancy may be the cause of it, but often custom demands that the child should be taken off the breast all at once and even separated for several days from his mother and from the family group in which he lives. To the deprivation of the mother's milk is added an emotional shock to which several authors attach importance. Even where the separation is less abrupt, weaning is often accompanied by a change in the child's life, who must now learn to cope for himself among the others.[55/] The serious forms of kwashiorkor generally appear in the following weeks.

Infections and Parasitoses

107. The small child's encounter with viruses, microbes and parasites is not always a simple matter, merely resulting in a slight illness and having no influence on his health or development.

108. The virulence of germs, the important factor of contagion and the lack of resistance due to the state of malnutrition are responsible for a particularly high death rate through infectious diseases at that age. We have already pointed out several times the high death rates linked with common infections. Respiratory and digestive illnesses are the primary causes of death between the ages of 1 and 4 in the majority of tropical and sub-tropical countries. The actual incidence is very

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53/ Senecal, J. Alimentation de l'enfant dans les pays tropicaux et subtropicaux. Courrier 1959, 9:1

54/ Education of the mother with regard to the feeding of the child of 0 to 6 years of age. Breast-feeding by the mother, preparation for weaning, the practice of weaning, feeding after weaning. Reports and communications and discussions. Seminar on education with regard to health and nutrition in Africa, South of the Sahara. I.C.C., Meetings and Conferences, 1962, 13:21.

55/ Whiting, B.B. Six Cultures, Studies in child rearing. J. Wiley & Sons, New York - London, 1962

high and very difficult to evaluate. But it is known, as a result of certain studies, that each child is affected several times in one year. The frequency and gravity of the infections, and of diarrhoea in particular, diminish rapidly with age; they increase with the aggravation of a state of malnutrition.[56/] Improvement in the state of nutrition has in several cases caused a decrease in the mortality rate and in the prevalence of diarrhoea.[57/]

109. Among the contagious diseases, measles remains a formidable and deadly disease in certain regions. We shall single out two facts from recently published data:

a) The death rate is ten to twenty times higher in Latin America than in North America, with very great variations according to regions. According to a study made in Senegal, measles caused 52.5 per cent of the deaths occurring between the ages of 1 and 4.[58/]

b) The aggravation of the existing nutritional state is such that Morley[59/] noted that the seasonal peak of kwashiorkor occurred a few weeks after the seasonal peak of measles. He noted that 15 per cent of children take more than three months to recover their initial weight.

110. Skin infections such as framboesia, and above all eye diseases such as trachoma, begin at this age and then continue their chronic development. The detection and simple treatment of trachoma where the conjunctiva is still only slightly affected permit a cure without any after-effects.

56/ Gordon, J.E. et col. La enfermedad diarreica aguda en los paises en via de desarrollo. Bol. de la Oficina San. Panam. 1964, 56, 5:424.

57/ Scrimshaw, N.S. The effect of the interaction of nutrition and infection on the pre-school child. Paper presented to the International Conference on the prevention of malnutrition in the pre-school child. 7-11 December 1964, Washington, D.C.

58/ Cantrelle et col. Mortalité et morbidité de l'enfant en Afrique. Journées africaines de Pédiatre. I.C.C., 1960:62

59/ Morley, D. The public health problems created by measles in the developing countries. Report presented to the seminar on the epidemiology and the prevention of measles and rubella. I.C.C. June 1964, in the course of publication.

111. Tuberculosis in the small child is an illness which can spread and, in the course of the first year of development, give rise to meningitis or miliary fever.

112. Malaria which persists in certain regions, affects the child from his earliest years.

113. All these infections are more serious and more severe in the less developed regions and have a greater effect on the life and development of the small child:-

a) Because the infection, by increasing the consumption of calories and proteins, reducing the appetite and sometimes causing too long a halt in feeding, aggravates malnutrition;

b) Because malnutrition in its turn encourages the inception of the infection and diminishes the possibilities of defence; 60/,61/

c) Because living conditions, over-crowding and the lack of clean water multiply the chances of contamination;

d) Because the too frequent recurrence of infections does not allow the body to make up the height weight retardation which, at first temporary and easily made up, eventually becomes permanent.

114. The incidence of parasitic diseases and their effect on the life, health and development of the small child is probably linked to the same factors, to which must be added the lack of sanitation.

115. The very great prevalence of intestinal parasitoses of all types is well known and ankylostomiasis and bilharziasis are known to be causes of anaemia. It is known that intestinal parasites consume considerable quantities of proteins (but it is probable that a great part of those proteins are then reabsorbed by the child). Little is known about the effect of parasitism on metabolism and development, a subject still requiring research.

60/ Dubos R.J. and Schaedler, R.W. The effect of diet on the fecal bacterial of mice and their resistance to infection. Journ. Exp. Med. 1962, 115, 6:1161.

61/ Scrimshaw, N.S. The effect of the interaction of nutrition and infection on the pre-school child. Paper presented to the International Conference on the prevention of malnutrition in the pre-school child, 7-11 December 1964, Washington D.C.

Motor, sensory and psychical disabilities

116. For the small child to learn how to control his movements and how to speak, for him to be able to pass through the stages of psycho-social development, his motor and sensory mechanism must be intact. There is a danger that any break in the communications which link him with the outside world will interfere with the acquisition of skills. However the body still preserves its plasticity and the child remains capable of compensating for certain deficiencies and of adapting himself to abnormal situations.

117. On the motor level, neurologists, orthopaedists and psychologists have agreed that the detection, treatment and re-education of the handicapped child should be undertaken at the earliest possible moment. The early acquisition of the function and the correction of deformities favour the normal development at a later stage of the bone structure, muscles and nervous system, and the creation of compensatory functions in those parts of the body and muscles that are sound. Moreover, it is most advisable to allow the child to handle objects, move about and become aware of his body and his personality at as near normal an age as possible. These facts were very clearly stressed during a recent seminar organized by the International Children's Centre, particularly by Masse [62a] and Gibbs [62b]. They have a bearing on all types of infirmities, both congenital (phocomelia, cerebral motor defects, spina bifida, dislocation of the hip etc.), and acquired (poliomyelitis, trauma, tuberculosis etc.).

62/ Problems raised by motor disabilities in children under 3 years of age:

(a) physical growth, Masse, P.

(b) psychological development, Gibbs, N.

Seminar on the future of children suffering from motor disabilities. ICC., 7-8-9 December 1964; unpublished papers.

118. On the sensory plane: The need to compensate for disability is at least as urgent. Deafness, even partial deafness, breaks the link between the child's vocal sounds and the adult's reply, prevents the development of speech and makes the deaf person a deaf-mute. Re-education, generally begun at school age, is a painful experience and will never be entirely successful. It is still difficult to overcome almost complete deafness in a small child, even at an early stage and even with the most complicated apparatus. But there are a great many children who are hard of hearing but who still have more or less useful remnants of hearing and whose deafness shows retardation or difficulty in speaking. In their case, early diagnosis and re-education may make an almost normal resumption of development possible.

119. Sight disorders, whatever their origin, raise similar problems. Improvement of tactile and auditory perception can have remarkable results if undertaken early.

120. Motor and sensory disabilities as a whole raise a series of common problems:

(a) Early diagnosis is not always easy; it calls for consultations for children of pre-school age.

(b) In some respects, treatment and re-education are easier and more rewarding than later. But they should not lead to long hospitalization or to permanent immobilization in impersonal and unstimulating surroundings.

121. The small child's emotional needs must be taken into account in any solution. Hence, generally speaking, there should be homes for few children, where they stay a short time, with consultations on re-education, special kindergarten classes, and, above all, with definite instructions given to the parents, who can often take an active part in the treatment.

122. The same is true of the diagnosis and treatment of personality disorders in children, which are often comparatively easy to correct at that age. In spite of the serious problems which mental retardation of organic origin

raises, we shall not consider it in this report. We shall merely say that techniques of motor and intellectual stimulus at pre-school age may make it possible to increase the independence and practical effectiveness of backward children.

123. Such solutions, however, are difficult and costly and call for specialized personnel. In many countries, the number of children suffering from disabilities is still much lower than the number of those suffering from nutritional deficiencies or infectious diseases or living in conditions unfavourable to their emotional and intellectual development.

Psycho-social factors

124. We now come to the effect of social and psycho-emotional factors. Empirically, their effects are well known, but it is difficult to interpret them because of the many complexities and interferences which it is impossible to dissociate. In this chapter we shall therefore confine ourselves to emphasizing the immediate effect of the most important of the psycho-emotional factors on the small child. Their long-term consequences are discussed in the last chapter of this report.

General socio-economic level

125. The socio-economic environment of the population reacts on the child through the family group. In every region of the world, it may be noted that the physical and intellectual development of children varies with the family level. In a given ethnic population children of the underprivileged groups of the same age are smaller, lighter, and less advanced in psycho-motor and intellectual performance.

126. A detailed analysis of socio-economic factors shows the part played by the parents' education, their profession and income, their housing, the stature of the family, their rank at birth, the urban, rural, industrialized or non-industrialized nature of the population. All these factors provide a basis for the establishment of sociological classifications.[63/]

63/ GRAFFAR, M. Etude sociale des échantillons. In Falkner F. Croissance et développement de l'enfant normal, C.I.E., Masson, Paris 1961.

127. We would emphasize:

a) Overcrowded housing, which causes the spread of infectious diseases and affects the quality of the care given to the small child, especially among country people who have migrated to the big cities.

b) Education of the parents. This seems to be at least as important as the economic level, as has been proved by infantile mortality. It is probably just as important in infancy.64/

c) The family's intrinsic qualities, that is, its ability to meet difficulties, is also closely related to the child's development.65/

128. Differences between the extreme social groups in the same population are exaggerated, with a kind of cumulative effect, when the socio-economic level is lowered. On the other hand, the differences are reduced when the general level is raised. Variations in weight and height of children from 3 to 5 years of age observed by the research teams of the International Children's Centre were less notable in Stockholm than in Paris (unpublished document).

129. It is in fact difficult to determine what part heredity really plays in these variations. The parents of children in the low-level groups are also smaller and they have less psycho-social effectiveness. Leaving aside, for statistical purposes, the effect of the parents' stature, it has been shown in Great Britain that variations in the stature of children as a result of the profession of the father were still significant.66/

130. The way social factors react cannot be simply defined. They affect nutrition and exposure to the risks of infection and accident. They also promote or inhibit spontaneous genetic possibilities of sensory, motor, emotional, intellectual and social development.

64/ GIRARD, A., HENRY, L. et NISTRI, R. La surmortalité infantile dans le Nord et le Pas-de-Calais. Population, 1959, 14, 2: 221.

65/ DRILLIEN, C. M. A longitudinal study of the growth and development of prematurely and maturely born children. Patterns of maternal care. Arch. Dis. Childhood, 1959, 34, 178: 487.

66/ TANNER, J. M. Growth at Adolescence, Blackwell, Oxford, 1962.

Social structure

131. The work of ethnologists and sociologists 67/ shows how quickly the child's behaviour conforms to the models adult society offers him:

a) In industrialized and technically developed surroundings the relationship of the father-mother-child triad is based on an intense emotional exchange. The child's awareness of his parents, his alternating dependence and autonomy in regard to well-defined persons is accompanied by a constant emotional stimulus driving him to outstrip himself, to progress, to do better than his parents. When, for various reasons, the triad is broken, society tries to compensate for this failure. But if conditions are to be favourable for the child's development, he must be assured 68/ emotional and moral stability, that is, a home where he will find bonds of affection, regular discipline, room for his impulses to spread, and parents who accept him and provide him with models of balanced conduct.

Many children will not find themselves in these ideal conditions. They will consequently have troubles with behaviour, speech, sleep and appetite and these troubles will have to be anticipated, diagnosed and treated.

b) Elsewhere, the child finds around him a numerous family group which assures him of warm and constant affection. At the same time the only model it offers him is a rigid social structure, ruled for generations by a series of ancestral customs, to which he must learn to conform as soon as possible. 69/ He quickly learns to be polite, to respect adults, and to make himself useful and to conform to various rites and ceremonies. His personality develops with ease and without shocks, but also perhaps without constructive frustrations.

c) In another place, the period of complete physical and emotional dependence stops abruptly with weaning. 70/ The child goes on living in the house, or with another family, but he is now on his own. As we have seen, these traumatic experiences precipitate kwashiorkor, the weaning disease. Dean and Geber, among others, have emphasized the repercussion of these practices on the child's personality.

67/ MEAD, M. Childhood in contemporary cultures. Univ. of Chicago Press, 1955.

68/ THOMSON, G. G. Child psychology, Houghton. Mifflin Co. Boston 1952.

69/ MEAD, M. Childhood in contemporary cultures. Univ. of Chicago Press, 1955.

70/ WHITING, B. Six cultures. Studies in child rearing. J. Wiley, ed. New York 1963

d) Finally, the child may find himself in a moving, unstable and continually changing situation in one of those border quarters of big cities to which people of rural origin flock without professional training, work or housing. 71/ 72/ Sometimes he is lucky enough to remain surrounded by a large, protective and effective family, composed mainly of women who stay at home while the father seeks work or works outside. But very often the mother also leaves him during the day to perform her thousand family and material tasks. Then the child lives practically abandoned, as in the ranchos of Latin America and the medinas and shanty towns of Africa. He is exposed to accident and infection, forages for his food and is not quite sure to whom he belongs. The effect of such living conditions on the child is not well known; it is known that in such conditions there is considerable risk of disease and death.

132. It would be impossible to describe here all the intermediate situations that exist between these extremes.

133. The impact of social structure on the child's development is shown in the difference in behaviour between boys and girls. Psycho-motor development, and even the death rate, will change with sex according to whether society attaches more importance to the boy or the girl. This is probably why the general superiority of the girl in psycho-motor performance, the greater physiological weakness of the boy in the face of disease, and some unfavourable factors, are not observed in certain human groups.

134. On the whole, the effect of social structure is linked with the quality of the care the child is given and with the degree of stimulus he receives from his parents or from the persons who share the parental functions.

71/ LEWIS, O. Five families, Mexican case studies in the culture of poverty. Science Ed. J. Wiley. New York 1962.

72/ Instituto Interamericano del Nino, El nino abandonado. Col. del I.I.N., 1959, 33, 3: 325.

Quality of care given to children

135. Since the works of Spitz, Bowlby and Rondinesco-Aubry, attention has been largely directed to the effects of lack or poor quality of maternal care. These publications have had a remarkable influence on understanding of the child's development and on the organization of social protection. They have been revised, criticized and re-examined.73/ 74/

136. The idea of maternal care has been broadened to include the love and physical care the child receives from one or several persons (generally his mother, but sometimes other members of the family or a valid maternal substitute). All psychologists are agreed that for the child's development this (these) person(s) must be as permanent as possible. Abrupt change in fact causes reactions of distress and confusion which manifest themselves either by violent protest or, on the contrary, by apathy, lack of interest and psychic regression. The same effects result from repeated changes of living surroundings.

137. The child's age has a great bearing on the effects of separation from the family surroundings or of deficient care. It seems that after eighteen months or two years these effects, although still serious, are less so and are more easily overcome.

138. The specific quality of the emotional relationship is perhaps more important than the mother's physical presence. Typical syndromes of institutionalism have been found in complete family surroundings when relations between the child and the adults were disturbed.

73/ La carence de soins maternels. Réévaluation de ses effets. Cahiers de la Santé Publique No. 14. O.M.S., Genève 1962.

74/ YARROW, L.J. Separation from parents during early childhood, in Child Development Research. Russell Sage Foundation, New York, 1964.

139. Likewise, total absence of a masculine image from the family group is unfavourable to the individual's harmonious development and hampers the child's self-identification.

140. All these effects vary considerably with the nature of the child, the strength of the bonds he has established and the stimulus he receives in his surroundings.

141. The effects of a break-up of the family structure therefore vary greatly with the antecedents and the replacement remedies

142. In many cases, the rest of the family take charge of a child who was already living in a broad group where the maternal image was shared by several persons. The transition is then progressive and without traumatic or other unfortunate consequences.

143. Generally, however, some temporary or permanent replacement solution must be found for orphans, abandoned children and children deprived of normal family surroundings for social reasons.

144. It is now well established that the child's development is adversely affected by staying in big impersonal institutions. Homes for small numbers are much preferred and, when possible, placement with stable families.

145. Children living in the peripheral quarters of rapidly urbanized areas probably suffer to some extent from the same emotional and material deficiencies. All descriptions of their living conditions [75/] show how neglected they are because of housing conditions, poverty, family instability and the adults' lack of elementary education. The risk of disease and accident is here added to repeated psychic trauma and lack of motor and intellectual stimulus.

Effects of stimulation on development

146. We have seen that various psycho-motor actions appear only when neurological maturity has reached a certain level. No exercises, no previous apprenticeship can advance the age of walking, gripping or muscle control.

75/ PAUL-PONT, I., SATGÉ, P. et THIAM, P. Enquête sur les conditions de vie des enfants dans un quartier de Dakar, Enfant en Milieu Tropical, 1965, 22: 6.

147. There are, however, a certain number of functions whose appearance and improvement are linked in part to the stimulus the child receives from his environment and to the depth of his emotional response.

148. Speech development depends largely on surroundings. Children brought up in mediocre nurseries are more noticeably retarded in speech than in other respects. Soviet authors make a great point of preventing this retardation in children's collectives. 76/, 77/, 78/

149. It has often been noted that children brought up in comfortable surroundings are more advanced in speech than poorer children. Descoeudres brought this out clearly in 1946.79/ The same author noted that the differences are more marked in vocabulary and general knowledge tests than in intelligence tests. She also points out that there is a difference between the speech content of Swiss village children and that of Parisian children.

150. These differences are perhaps even more marked in poorer regions where the family group, rural or recently urbanized, uses a rather poor vocabulary. The adults around the child are often illiterate and the houses have neither books nor pictures which could encourage symbolic speech.

151. On the other hand, the proliferation of means of mass communication, the increasing use of radio, transistor stations, television, or illustrated magazines could change the child's speech content and thought, even in relatively poor neighbourhoods.

76/ LEZINE, I. et SPIONEK, G. Quelques problèmes du développement psycho-moteur et d'éducation des enfants dans les crèches, Enfance, 1958, 3: 245.

77/ LEZINE, I. Psycho-pédagogie du premier âge. Presses Univ. de France, Paris 1964.

78/ AKSARINA, I. et col. Guide pour l'éducation dans les crèches et les maisons d'enfants. Medquiz, U.R.S.S. 1954.

79/ DESCOEUDRES, A. Le développement de l'enfant de 2 à 7 ans, Delachaux et Niestlé, Neuchâtel-Paris, 1946

152. Among causes of acquisition of a rich and complex speech, bilingualism has a special place. Bilingualism has been the subject of many studies, but their results are contradictory: the young child can learn a language with astonishing speed, but it appears that this supplementary knowledge does not interfere with solid progress in his mother tongue.

153. Finally, among all the environmental factors which may promote speech development, the most important is the parents' desire to see it happen and succeed on the intellectual and social planes.

154. Stimulation of motivity. Froebel and Montessori were the first to show how play could stimulate motor activity in the young child. This stimulation consists in providing him with material appropriate to his stage of maturity and letting him handle it, build, create and overcome growing difficulties.

155. The reports we have on the play of children living in poor neighbourhoods show how well they succeed in using the simplest and least attractive materials.[80] However, research on children at the age of entry into primary school seems to show a variation in adaptation to the use of pencil and paper among children who have not had the opportunity to use them before. We do not know whether the relatively lower I. Q. of pre-school children from poor neighbourhoods is due to the lack of facilities for play or to a complex of other unfavourable circumstances.[81]

156. Nevertheless, very simple methods would probably make it possible to improve the situation by educating mothers and medico-social personnel in the better use of existing materials in order to provide the child with more suitable elementary toys.

80/ CENTNER, Th. L'enfant africain et ses jeux. CEPSI No. 17, Elisabethville 1963.

81/ ORTIGUES, M.C. et COLOT, A. La classe d'initiation dans l'agglomeration dakaroise. L'enfant en milieu tropical, 1965, 22: 26.

157. Stimulation of social development. Several experiments have shown that group life, when well organized and directed by an educator with technical knowledge, may accelerate the stages of the young child's adaptation to society. This fact is illustrated by the results of education in the kibbutzes. Children raised in small groups, who see their parents only a few hours a day, tend to identify themselves with the group more quickly. 82/

158. Several pre-school educators maintain that, given a certain degree of maturity, collective education can make co-operation between children 83/ easier and better prepare them for integration into the social environment of the school.

82/ RABIN, A.I. Behaviour research in collective settlements in Israel, Am. J. of Orthopsych. 1958, 28: 572

83/ FROYLAND-NIELSEN, R. Le développement de la sociabilité chez l'enfant, Delachaux et Niestlé, Neuchâtel-Paris 1951.

159. The stimulation of intellectual activity. On the other hand, the experience of kindergartens and nursery schools seems to demonstrate that well prepared play activities enable the child progressively to solve simple problems of increasing difficulty, thus preparing him for the process of logical thought. In many cases where the community's attitude towards the child is affectionate, passive or overly protective, he is given no concrete problems to solve and this development may be delayed.

160. Furthermore, it has been noted that the lower class child of Dakar experiences great difficulty in recognizing drawings of every-day objects with which he is familiar. The tests carried out during the longitudinal study undertaken under the auspices of the International Children's Centre show that at the age of six years half of the population have a mental age corresponding to five years; from three to six years, the same difficulties persist from year to year; they relate particularly to the symbolic function and the acquisition of logical thought (generalization, analysis, synthesis).

161. On the other hand, particular aptitude for the comprehension and motor execution of simple orders was noted.[84/]

162. Other studies have shown that children brought up in an under-privileged family environment do not make the experiments necessary for the acquisition of the basic mechanisms of logical reasoning, such as classifications, seriations and numerations.[85/]

163. In this connexion, we must draw attention to various studies now being carried out which seem to prove that the basic logical concepts and mathematical reasoning can be acquired very early in life, even before the appearance of the number concept.

84/ Moreigne, F. and Senecal, J. Résultats d'un groupe d'enfants africains au Terman-Merrill. Revue de Psychologie Appl. 1962, 12, 1: 15.

85/ Bardet-Giraudon, C. in Colloque sur les conditions de vie de l'enfant africain en milieu urbain. C.I.E., Dakar, 15-22 December 1964.

164. All these facts emphasise the fundamental importance of a satisfactory pre-school education, provided by the family and, if necessary, by the community.

LONG-TERM EFFECTS OF EVENTS OCCURRING IN EARLY CHILDHOOD

165. The experience of various specialists, based essentially on empirical data, indicates that events occurring in early childhood influence the health, the mental and emotional condition and the behaviour of the school child, the adolescent and the adult.

166. In the biological field, experiments with young animals show that metabolical changes, and even small deficiencies occurring early in life, cause definitive and irreversible perturbations. Similar effects have been observed in human beings during the first months of life. We shall see that certain biological events occurring in early childhood very probably have durable and irreversible effects of which we are only now becoming aware.

167. In the psychological and social field, we know that, as Freud has shown, nothing is forgotten. We have also seen that there are periods favourable to certain acquisitions.

168. Much of the data described below need to be confirmed by prospective observations or by controlled studies with properly selected control groups. It is difficult to differentiate clearly between the effects of the early years and those of the following years, during which an unfavourable situation may persist or a radical alteration occur, particularly in rapidly changing societies. Finally, it still remains to be proved that the connexion between early childhood and subsequent development is really based on a causal relationship (which can be modified) and not on a statistical association related to the existence of other common factors, hereditary or acquired, permanent or irreversible.

Nutrition

169. Growth is permanently inhibited by nutritional inadequacies and imbalances.[86] We have seen that there is a greater possibility of immediate recuperation during the pre-school age than during the first year. However, children contracting kwashiorkor after the age of one will probably, at the school-entry age, remain smaller and thinner than their classmates.[87]

170. In all countries where serious dietary deficiencies are prevalent, the height, weight and many other anthropometric characteristics of under-nourished school-children and adolescents are inferior to those of children of the wealthy classes.[88]

171. The visceral, ocular and bone lesions caused by certain deficiencies have indelible and definitive after-effects.

172. Finally, it has been clearly demonstrated that bone maturation and pubertal maturation are retarded by nutritional deficiencies. Girls from under-privileged and under-nourished social groups have their first period later than girls from more privileged and better nourished groups of the same ethnic origin.[88] [89] Growth may continue a little longer, which in adults compensates somewhat for the differences in height found among children.

86/ Acheson, R.M. Effects of nutrition and disease on human growth. Human Growth. Pergamon Press, Oxford, 1960; 73.

87/ Barrera-Moncada. Estudios sobre alteraciones del crecimiento y del desarrollo psicológico del sindrome pluricarencial. Ed. Grafos-Ceraces, 1963

88/ Ramos Galvan, R. et coll. Somato-metria y nutrición. Bol. Hosp. Inf. Mexico, No. Special 1964.

89/ Tanner, J.M. Growth at adolescence. Blackwell Oxford 1962.

173. Physiologists and obstetricians believe that the quality of a woman's reproductive function (assessed in particular by the prematurity rate of her children) depends only partially on her growth during childhood and thus on her nutrition or living conditions.90/ 91/

174. However, it cannot yet be affirmed that malnutrition in early childhood has definitive and irreversible results. We do not know whether in ideal or experimental conditions a correct diet administered at the school-age can compensate for pre-existing deficiencies. In any case, it is certain that retardation of growth and maturation in early childhood creates a serious handicap for the school child and the adolescent, which may be aggravated by the unsatisfactory social and nutritional conditions in which most older children live in tropical countries.

175. On the other hand, it is possible that over-feeding (in calories, proteins, calcium, vitamin D or fats) may permanently alter the child's metabolism, accelerate the maturation and even the aging of the tissues, and encourage the appearance of certain chronic diseases in the adult. The experiments with very young animals carried out by McCance92/ and his collaborators have clearly shown that temporary over-feeding at a very early age has irreversible effects and definitively accelerates growth and bone maturation. It is not known whether these experiments are applicable to human beings, or at what age this effect is likely to occur and to cease. The study of the connexion between the child's diet and the occurrence of certain diseases in the adult, such as obesity and atheroma, remains one of the most difficult medical research fields.

90/ Baird, D. Environments and obstetrical factors in prematurity with special references to experiences in Aberdeen. Bull. WHO, Geneva 1962, 26, 2:29

91/ Montagu, A. Prenatal influences, Ch. Thomas, Springfield, 1962.

92/ McCance, R. Food, growth and time. Lancet 1962, 7257:621.

176. Little information is available as yet about the long-term effect on psycho-motor and mental development of malnutrition during early childhood. Experiments with animals have on several occasions demonstrated that, inter alia, well-nourished animals show a greater tendency to explore the world[93/] and that a protein deficiency early in life causes changes in the grey matter of the brain[94/]. The results cannot yet be applied to human beings. Psychical and mental development, like physical growth, are undoubtedly more seriously affected when malnutrition occurs early in life, before the age of one. At a later stage, there is a greater possibility of recuperation. Dean, Barrera-Moncada, etc., have demonstrated that children suffering from kwashiorkor who were placed on a satisfactory remedial diet and examined several years later had recuperated from their psycho-motor retardation. But in reality, as we have seen, the undernourished child who has been treated and cured by the physician usually returns to a family of limited means, whose education and dietary habits are unsatisfactory. Mental and physical recuperation are difficult, and the school-child continues to suffer from the same chronic malnutrition as the young child. Mexican authors working in rural and urban environments have noted differences in I.Q. in schoolchildren which are partly linked to nutritional status.[95/ 96/] They are, however, very cautious in interpreting these results, which in addition to being influenced by nutrition may be influenced by a number of social and genetic factors and by the psychical investigation techniques employed.

93/ McCance, R. Food, growth and time. Lancet 1962, 7257:621.

94/ Lowry, R.S. et coll. J. Nutrition, 1962, 78:245.

95/ Ramos-Galvan, R. et col. Bd. Med. Hosp. Inf. Mexico 1964, 21 21:2.

96/ Cravioto, J. Malnutrition and behavioral development in the pre-school child. Document presented to the Conference on the Prevention of Malnutrition in the pre-school age child. Washington, 7-11 December 1964.

177. In any case, the eating habits established in infancy may presist. They may be either favourable or unfavourable to the diversification of the diet and the rational use of good quality foods. Thus, a child who has acquired good habits at nursery school influences his parents and the human group to which he belongs, thus contributing to a gradual modification of the general attitude of the population. Later, he may pass on this favourable attitude to his own children. In order to achieve that, however, education regarding nutrition, like education regarding health matters in general, must be continued at school and in the various community groups of which the child may become a member.

178. Two facts seem to us to emerge from this discussion on the delayed action of the nutritional faults and disturbances of infancy:

a) The need to continue experimental and epidemiological research in this field, including research on adults, and at the same time perfecting methods of observation and measurement.

b) The unfailing effectiveness of programmes concerned with the improvement of infant feeding at an age when the prevention and cure of faults are economically reasonable and relatively simple.

Infections and parasitoses

179. The effect of infectious and parasitic diseases on the later development of the infant is superimposed on that of nutrition. Depending on their gravity, duration and repetition, they affect growth adversely and affect physical maturation either temporarily or permanently; they prevent recovery before school age; and they contribute to the above-mentioned differences between school children and adolescents from different social and economic groups.

180. Moreover, a number of infections contracted almost imperceptibly during the first years of life may develop unfavourably over a long period and culminate in permanent harm, thus:

a) The first infection of leprosy often takes place very early in life and culminates many years later in lesions that could easily have been prevented (e.g., by isolation, by BCG or by prophylactic measures using suitable drugs).

b) Trachoma, also, can be contracted during early infancy. The experience gained from anti-trachoma campaigns, particularly those carried out in North Africa, applies mainly to school children. The incontestable success of such campaigns is limited by the presence of pre-existing lesions, and efforts are now being concentrated on examination and treatment in the pre-school age groups.

c) Streptococcal infections of infants may, if not treated with penicillin, lead to acute articular rheumatism with its subsequent cardiac complications.

181. Some infections, such as tuberculosis, may be awakened after a long period of dormancy. Puberty is a particularly dangerous time as, particularly in the case of girls, the reawakening and development of an old tubercular infection which goes back to early infancy but has since remained latent may then take place. BCG vaccination carried out early in life and if necessary repeated avoids such phthisogenic tuberculosis of adolescence. It is probable that the chemical prophylaxis of the initial tuberculosis would have the same effect, but the experience gained from research in progress is not yet sufficient to confirm that affirmation.97/,98/

182. Finally, malaria contracted in infancy continues to develop year by year, thus reducing the child's chance of going to school, preparing for work and becoming a useful worker.

183. The infant, who, as we have seen, easily contracts apparent or latent illnesses caused by viruses, bacteria and parasites, plays the role of a sort of virus reservoir with respect to the population. This is so, for example, in the case of measles, poliomyelitis, various forms of diarrhoea and intestinal parasitoses. The prevention and treatment of children's illnesses may have a good effect on the general transmission of infection.

97/ Lotte, A. and collaborators. Chimioprophylaxie des tuberculosis primaires de l'enfant et de l'adolescent en France (The chemical prophylaxis of primary tuberculosis in children and adolescents in France) WHO Bulletin, 1964, 31: 223.

98/ Mande, R. Parts respectives de la chimioprophylaxie et de la vaccination B.C.G. dans les pays où la morbidité tuberculeuse est encore élevée. (The relative importance of chemical prophylaxis and BCG vaccination in countries which still have a high incidence of tuberculosis). 13e Congrès National de la Tuberculose. Algiers, 1961. Masson, Paris, 1961.

184. These few facts, which are merely examples which could be multiplied many times, show that the prevention and treatment of infections and parasitoses of infants are bound to have important long-term consequences.

Motor and sensorial ailments

185. If these ailments are not discovered and corrected at an early date they cause, as we have seen, considerable hindrance development and the acquisition of capabilities in the psycho-motor. These consequences become still further aggravated during later growth.

186. A whole series of chronic orthopaedic ailments of the adult are probably connected with anomalies in the development or minor uncorrected infirmities of the infant: thus, coxarthrocace, which is a degenerative ailment of the hip, occurs particularly at a dysplastic joint, i.e., where there is an uncorrected sprain of the hip.

187. The schooling, professional training and social integration of handicapped persons (whatever the nature of their infirmity) will be easier to organize if the children have already been treated and re-educated before they are old enough to go to school and if they have learned to move about, to make the various movements required in everyday life, to use the motor and sensorial resources at their disposal and to use tools and equipment. This is particularly important in the case of children suffering from several associated ailments.

188. In brief, the organization of the life of children suffering from a chronic ailment requires the early establishment of a polyvalent action programme begun as early as possible and providing, from the very beginning, not only for medical care, but also for the subsequent comprehensive social a d professional adaptation of the patients.

189. Such a programme is long and costly, and can only be carried out if the country has sufficient specialized personnel and if its resources are not already being used for some other purpose.

Psycho-social factors

190. Unresolved emotional conflicts dating back to early infancy reappear in the adolescent. This fact, which has been thoroughly established by the psycho-analytic school of thought, requires little emphasis. The relationships between frustrations, incomplete identification, emotional insecurity and the later development of the personality are at the basis of the psychotherapy of adolescents and adults. Fortunately, some of these unresolved conflicts and problems, when experienced anew during adolescence, contribute to the formation of the character of the man or woman and incite them to make greater efforts and to play an active role as a father, a mother or a member of a social group. These facts have become widely known in medical and social circles, thus permitting the application of mental hygiene measures from early infancy. Making parents aware of the elementary emotional needs of their children is an effective preventive measure in this field.

191. The effects of the family and social structures on the development of the child are very varied and are difficult to evaluate precisely. The observations of ethnologists and anthropologists tell us that in stable primitive societies these structures are perpetuated and attitudes are maintained, but prolonged longitudinal observations would be needed to find out whether these attitudes are already established from the earliest years. It is very likely that education is capable of modifying them considerably, as the example of children adopted and transferred to completely different environments seems to show.

192. Nor are we very clear as to how the rapid social changes which take place in rapidly evolving areas affect the attitudes acquired during the first years of life.

193. Much work has been done on the long-term effects of deprivation of affection.[99] Among the most marked effects are emotional indifference and inability to establish solid links with others - characteristics which are very frequently found in adolescents whose infancy was spent in impersonal institutions or with a series of foster-parents of dubious quality.

194. These characteristics are found among some young delinquents; in fact they inhibit their future social life as adults, since they affect their ability to identify themselves with their work and to form their own homes, as well as affecting their scholastic success and their adjustment to school.

195. As has been seen, a lack of affection may be present in circumstances other than in day nurseries, children's homes or foster homes. The same evolution can be noted with some children who are perhaps more delicate, in united homes in which the parents do not fulfil their role, or in broken homes; it is particularly evident in the very underprivileged social environments of cities, where the child is left alone for many hours during the day, with his elder brothers and sisters or by himself. One cannot help thinking that such a situation has an effect on the formation of a stable personality; all social matters that unite the family, stabilizing the father's employment or protecting the child for a few hours daily in a kindergarten, can have but slight beneficial effects.

196. Much importance is attached to the basic motivation of parents as a factor affecting the progress and the success of their children. Studies done in Sweden[100] and in the United Kingdom[101] have shown that success or failure at school was linked statistically to that motivation and to the encouragement which the child receives from his parents. This was also noted in an analysis of school guidance in France.[102] It is quite probable that the motivation of parents and

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99/ Deprivation of mother-love. A re-evaluation of its effects. Cahiers de Santé Publique No. 14, WHO, Geneva, 1962.

100/ HUSEN quoted in WALL and coll. Failure in School. UNESCO institute for Education. Hamburg, 1962

101/ MILLER, D.K.M., quoted in Wall and coll. id.

102/ GIRARD, A., Orientation scolaire et milieu social. Education Nationale 1963, 35:5.

their encouragement of the child become evident long before school age, with the child's first experiments with words and with movement. Perhaps they play a role in the formation of a desire to work, and an interest in solving difficult tasks, which might be stimulated from infancy since they are dependent on the type of activity which the child has been offered.[103]

197. This motivation lessens in stable primitive societies and in environments where the birth rate and child mortality are high, creating a kind of fatalism. However, in this field as well, that assertion has to be confirmed by systematic studies.

198. If parents and particularly mothers are educated, they may, on the other hand, develop an active interest in child activities. An experiment to that effect was carried out at Dakar (Senegal) where it appeared positive but as yet it is not known whether the effects will be permanent.[104]

199. On several occasions we have mentioned the role of stimulation both emotional, verbal and motory in the formation of language and in the evolution of abstract thought. It might be supposed that the paucity and down-to-earth nature of home vocabulary and the absence of toys, drawings and pictures, have a permanent influence on the formation of intelligence. It is not known whether appropriate scholastic education can compensate for that deficit. Partial experiments have shown that when the African child began school, without any preliminary training apart from family life, he had great difficulty at the first grade level.[105] School is often a break with the home environment, and involves the use of new words and particularly new materials. Later,[106] difficulties have been noted in the acquisition of mathematical and geometrical concepts which were ascribed partially to the fact that an uneducated family environment does not familiarize the child

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103/ WALL, W.D., Education and mental health, UNESCO, 1955.

104/ PEILLON, D. and ISAAC, S., Le jardin d'enfants dans le quartier de la Sicap - Baobab à Dakar, C.I.E. Colloque sur les conditions de vie de l'enfant africain en milieu urbain, Dakar, December 1964.

105/ ORTIGUES, M.C. and COLOT, A., La classe d'initiation dans l'agglomération dakaroise. Enfant en milieu tropical 1965, 22:26.

106/ BARDET-GIRAUDON, C., Le test de Goodenough comme moyen d'appréciation sociale de l'enfant aux structures de Dakar, C.I.E. Colloque sur les conditions de vie en milieu urbain en Afrique, Dakar, 18-22 May 1964.

with the concepts of numbers, time, numeration, or seriation. It is possible that the acquisition of the mechanics of logical thought may be obstructed, hindered or permanently disturbed by a lack of preparation during infancy.

200. In these circumstances, it is appropriate to ask what effect collective pre-school education in kindergartens, infants' schools, nursery schools and the various day-care centres will have on the subsequent evolution of the child's personality, his intelligence and his ability to integrate into society. In this connexion, work is contradictory because of variations between social and family situations and because of differences in organization and methods between educational centres.

201. Lasting results are dependent, for example, on the type of activity or the ability of the teacher. GARDNER[107], when examining children who had attended two different types of kindergarten, found that active methods promoted initiative, creativity, inspiration, concentration and the ability to co-operate and to face familiar tasks during later school life.

202. The effect of group education on the establishment of social relations with the older child has been established, for example, with boys from Israeli kibbutzim in Israel.[108] Children brought up in this way seem quite able to control their emotions and group identification seems more important to them than family identification. It is difficult to know whether ordinary pre-school education has such a lasting effect on the social adjustment of the child.

203. Several authors since MONTESSORI, FROEBEL and DECROLY have noted that pre-school education promotes adaptability, intellectual curiosity and powers of observation later, and that play using well- designed equipment helps in acquiring intellectual techniques.[109], [110]

107/ GARDNER, D.E.M., Testing results of infant school. Methuen, London, 1953

108/ RABIN, A.J., Some Psycho-sexual differences between Kibbutz and non-Kibbutz Israeli boys. Journ., Proj. Techn. 1958, 22:328

109/ HERBINIERE-LEBERT. "Le rôle de l'école maternelle dans la première éducation" ("The role of the infant school in primary education"). Enfance, 1954, 1:1.

110/ MIALARET, G., Introduction à la pédagogie (Introduction to pedagogy). Presses Universitaires de France, 1964.

204. The age at which this favourable effect appears has still to be determined. According to ZAZZO (private communication), only children who start infant school after the age of four show a significant improvement in their school careers.

205. It also remains to be verified whether development of the numerical faculties, the early mastery of mathematical reasoning or rapid learning of languages by the small child give it permanent superiority over its comrades who learn these things later.

206. We will therefore note that in family circumstances consistent with a high social and economic level, pre-school education is a useful but not an essential complement to the motor, social and intellectual training of the child.

207. On the other hand, when the family environment, for social or cultural reasons, affords the child neither security nor stimulation, group, pre-school education is useful if it can be arranged. Its role in such a case is to make good those shortcomings, to provide the child with background, equipment and opportunities for play and expression, using simple means adapted to its environment.

208. Several authors have noted the favourable effect of pre-school education techniques on the future development of children from under-privileged social groups.[111/] Others believe that the great difficulty children experience in adapting to school in the developing countries might be avoided if they could receive an early sensorial and motor education. They also think that this might prevent some of the difficulties noticed in learning mathematics.[112/]

209. We do not know if these effects are permanent, and what part they may play in the formation of the personality and in the future social activity of children. But in the developing countries the part that pre-school education can play is much more far-reaching.[113/] Grouping children together in centres, even though

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111/ SWIFT, J.W., "Effects of early group experience." In Child development research. Russell Sage Foundation, New York, 1964.

112/ BARDET-GIRAUDON, C., Le test de Goodenough, comme moyen de mesure de l'inadaptation sociale de l'écolier aux structures de Dakar (The Goodenough test as a means of measuring the lack of social adaptation in schoolchildren in the structures of Dakar). C.I.E. Collogue sur les conditions de vie de l'enfant africain en milieu urbain. Dakar, 15-22 December 1964.

113/ PAUL-PONT, I., L'avenir de l'enfant d'âge préscolaire dans les pays à faible niveau de vie. (The future of the child of pre-school age in countries with a low level of living). Report submitted to the Twentieth World Conference of the World Organization for Early Childhood Education, Stockholm, 12-18 August 1964.

elementary and very simply equipped, makes it possible to give them, at one and the same time educational training, the correct food, the health protection and the material security that are essential for their subsequent harmonious development.

SUMMARY AND CONCLUSIONS

210. Early childhood is a period of rapid growth and numerous psycho-motor advances. It is a period when the child, although still very vulnerable, is already capable of adapting itself to certain trying circumstances and of responding very satisfactorily to the conditions of life and education.

211. The development of the child is dependent on the interaction of hereditary factors and environmental factors.

212. The former condition the optimum potential for development; their effect can be clearly seen in children living in privileged areas or in socio-economic conditions which allow the child to flourish.

213. The latter, if they are unfavourable, can slow down and change development either temporarily or permanently; their effect is most marked on children living in underprivileged regions or in poor socio-economic conditions. They then hinder the expression of the genetic factors.

Physical growth

214. Attacks of infectious diseases, and particularly inadequacies in the food supply, can slow down development. Their effect is reversible, if it is not too severe or is temporary. It may be lasting and probably permanent if the disease or deficiency is severe, prolonged or repeated.

215. The diseases and nutritional troubles of early childhood can have long-term effects which are relatively easy to prevent with a correct and balanced diet coupled with prophylaxis or the early treatment of infections.

Psychological development and social adaptation

216. Nutritional deficiencies have a very definite influence on the behaviour of the small child, the long-term effects of which are little known.

217. The family and social environment has a considerable influence on the development of the speech, the personality and the intellectual potential of the small child; some effects are lasting, and perhaps permanent.

218. There are still many questions to be solved in this sphere, in which scientific research is essential.

At the practical level

219. Programmes for children from one to six years of age are effective both immediately and in the long term.

220. They should aim at providing the child with its fundamental needs in nutrition, health protection, security, and emotional, motor and intellectual stimulation.

221. This effect is difficult to achieve. It varies according to the region; according to the mode of life of the people, - whether scattered or group living; the resources of staff and equipment; and socio-economic and cultural level of the families. It draws on techniques of which the following may be noted here:

a) Instructing the people, particularly parents, on the needs of small children and simple and effective ways of meeting them.

b) Organizing, when possible and necessary, group centres (kindergartens etc.), combining education with social, health and nutritional protection.

c) Aiming the activities of health, nutrition, and education and social protection services at the small child in a more systematic way, the first priorities being improvements in nutrition, the preventive treatment of infections, the strengthening of family structures, and education.

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4 June 1965
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UNITED NATIONS CHILDREN'S FUND

Executive Board

GROWTH AND DEVELOPMENT OF THE YOUNG CHILD FROM ONE TO SIX YEARS

Corrigendum

Paragraph 28 a) first sub-item

Change to read as follows:

- a sufficient and regular calorie intake of between 130 and 170 calories per kilogramme, varying with the climate and the child's activity;

Paragraph 95 first sub-item

Change to read as follows:

- First-degree malnutrition: weight between 85 and 75 per cent of the theoretical average for the age;

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8 July 1965
ENGLISH
ORIGINAL: FRENCH

UNITED NATIONS CHILDREN'S FUND

Executive Board

GROWTH AND DEVELOPMENT OF THE YOUNG CHILD FROM ONE TO SIX YEARS

Corrigendum

Paragraph 28 a) first sub-item

Change to read as follows:

- a sufficient and regular calorie intake of between 1,300 to 1,700 calories per day, varying with the climate and the child's activity;

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GROWTH AND DEVELOPMENT OF THE YOUNG CHILD FROM ONE TO SIX YEARS

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