

THE NORMAL CHILD

*Some Problems of the First Five
Years and Their Treatment*

By

RONALD S. ILLINGWORTH

M.D., F.R.C.P., D.P.H., D.C.H.


SECOND EDITION

All normal children present some problems in their upbringing. This book describes those common problems of infancy and childhood which consist of variations from the average not amounting to disease. It is designed for use by all doctors who are concerned with the care of children, especially family doctors and doctors in the Child Welfare Service. Students will find it a valuable introduction to the wider study of paediatrics.

The title of the book has been changed to embrace the first five years, and the contents have been modified accordingly. Many sections have been rewritten, and new ones inserted, so that the whole text has been brought thoroughly up to date. By rigid pruning it was found possible to avoid materially lengthening the book.

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THE NORMAL CHILD

PREFACE TO THE SECOND EDITION

WHEN I completed the first edition of this book I felt that from the nature of the subject many years would elapse before sufficient alterations would become necessary to justify a second edition. I soon discovered how wrong I was. There seems to be an increasing interest in the problems of the normal child—certainly an increased recognition of their importance—and a large number of relevant papers have been published in the last three years. These have been studied and digested, more than 200 new references being added, obsolete ones being removed.

The title of the book has been changed to include the first five years, and the contents have been modified accordingly. Many sections have been rewritten, and new ones inserted, so that the whole text has been brought thoroughly up to date. By rigid pruning it was found possible to avoid materially lengthening the book.

The index has been completely rewritten.

R. S. ILLINGWORTH.

Sheffield, 1957.

PREFACE TO THE FIRST EDITION

It has long been recognized that a knowledge of anatomy and physiology is a necessary basis for the study of medicine and every medical student accordingly has to learn about the structure of the human body and how it works. It is notable, however, as Ryle pointed out some years ago, ³⁶⁵ that while one would have thought that the study of health would seem to be the proper preliminary to the study of disease, health has no special place in the curriculum. Ryle said "It is surely an omission that so little attention has been paid by the students of disease and their teachers to that state from which deviation or departure must occur before the existence of disease is recognized." In the case of Pædiatrics, it certainly cannot be said that a knowledge of the normal child, of his growth, mind and development, is regarded, in England at least, as an essential basis for the study of the sick and diseased child. Yet it would seem obvious that a knowledge of the normal should precede the knowledge of the abnormal. Individual variations in the anatomical, physical, mental and biochemical make-up of the normal healthy child are so great, that a thorough grounding in the normal and in the normal variations which occur, is an essential preliminary to the fuller study of disease.

In some teaching schools, there is too much emphasis on the rare and the "interesting," and too little emphasis on the common conditions which form the large bulk of family practice. In the case of children, many of these common conditions consist of variations from the normal which hardly amount to disease, but which cause a great deal of anxiety and concern to the parents. The doctor may leave the medical school ill-equipped to deal with them. He learns a great deal from his own children, but lacking that knowledge of the normal and of normal variations which he should have learnt as a student, he is liable to read far too much into his experience with his own family and to make unwarranted generalizations which will prove harmful when applied to his patients.

It is the responsibility of the teacher to interest the student in the common rather than the unusual, the important rather than the rare, in persons and people rather than in cases, in health as well as in disease, in prevention as well as in cure. He must instil in him a thorough knowledge of the normal, as an essential basis for the study of the abnormal.

It is because I felt that this knowledge of the normal is not easy to acquire from the available textbooks that this one was planned.

This book is intended to describe the problems other than disease which arise in the normal child in his first three years. It is not intended to be a handbook of child management, to give a description of the normal child, or to discuss biochemical and other laboratory investigations. The variations in the normal biochemistry of childhood are so great and the interpretation of the findings so difficult that, if properly covered, such a discussion would fill a book in itself. Questions of physiology, embryology, nutrition and general medicine, are omitted except only in so far as they are strictly relevant to the subjects under discussion. A knowledge of those is assumed. The book does set out to describe the normal variations in the normal child, variations which cause a great deal of worry to the parents, and which, if improperly managed, may cause a great deal of suffering to children. It sets out to give the doctor as much help as possible in trying to decide whether an individual child is normal or abnormal: it sets out to give him as much guidance as possible in the management of simple behaviour problems, such as any doctor concerned with the care of children ought to be able to deal with himself. The range of topics discussed includes behaviour problems, feeding problems, problems of physical and mental development, and certain problems of preventive pædiatrics. It is intended for all doctors who are concerned with the care of children, especially family doctors and doctors in the Child Welfare Service. It is hoped too that it will help them with their own children.

In planning the book I was constantly faced with the difficulty of deciding what is normal and what is abnormal, and what, therefore, should be included in the book and what excluded. It is almost impossible to define the normal. It is certainly not synonymous with the average. A child may differ very widely from the average child in physical and mental development and yet be perfectly normal. An attempt has been made to include the extreme range of normal variations which may occur. This was a matter of great difficulty, for so little has been written about the subject, and differences of opinion are wide. The preparation of the book has certainly taught me how much we do *not* know about the normal child, and how much awaits investigation.

Behaviour problems are included in the book because every normal child has them. I feel that a child with no behaviour problems would be highly abnormal. The book may well be criticized for including topics which are on the borderline between health and disease, such as cyclical vomiting and motion sickness. They are, however, extremely common, and are unrelated to any known organic disease, and accordingly it was felt that they should find a place in this book. Infections are not discussed, but a section is devoted to the prevention of infection and so to the preservation of health.

Another difficulty experienced was that of repetition. So many different subjects have been discussed in this book that any attempt to give a reasonably comprehensive account of each individual problem has inevitably led to minor repetitions. I felt that this was preferable to an excess of cross references, which are so often irksome to the reader. Many of the repetitions are simply due to the fact that numerous different problems arise from the same basic causes.

It is difficult in a book of this nature to give full credit to all papers which have been read in its preparation. It was felt undesirable to list all the hundreds of articles read. Instead an effort has been made to include at the end of the book only those references which the reader will find of value. Specially recommended reading is printed in heavy type. A few references to articles which are particularly worth reading, but which are not specifically referred to in the text, are given at the end of this list. References to articles which are not otherwise relevant to the subject under discussion are referred to by asterisk, and the reference is given at the foot of the page. Any references which I was unable to read personally are denoted by the words "quoted by," referring to the author who referred to that work in his paper or book. I have made every effort to include in the references those papers which do not accord with my opinion, so that both sides of the question can be read.

In conclusion, I wish to express my gratitude to Professor Wilfred Vining of Leeds, who taught me so much when I was a student, and to Dr. Arnold Gesell, of New Haven, who taught me so much about the normal child while I was in his Department. The section on Developmental Problems is inevitably based largely on Gesell's works—on knowledge which I acquired from him and his staff, and from his numerous books and papers. In the section on Behaviour Problems I have frequently referred to an excellent series of articles in the *Journal of Pediatrics* by Dr. Harry Bakwin, and I wish to thank the Editor for permission to do so.

Professor Vining (Leeds), Professor Capon (Liverpool), Dr. Donald Court (Newcastle-upon-Tyne) and Dr. Doxiadis (Sheffield) have read and criticized the entire script. Dr. Harold Waller (Tunbridge Wells), Dr. John Emery (Sheffield), Dr. John Lorber (Sheffield) and Mr. Robert Zachary, F.R.C.S. (Sheffield) have read parts of it. To all these friends I wish to express my thanks. The opinions expressed in the book, however, are my own, and they do not necessarily accord with those of my friends. This could not be, for many of the subjects are highly controversial, and in the present state of our knowledge, purely matters of opinion, so that on some of the topics there was no agreement between my critics. Readers of the book will probably

differ still more, and I should like it to be known that I should welcome their criticisms and suggestions.

I also wish to thank Mr. A. Foster, Medical Artist to the United Sheffield Hospitals for the sketches on pp. 177-191 ; Mr. Larway and A. K. Tunstill of the Photographic Department of the United Sheffield Hospitals, for the clinical photographs ; Messrs. J. & A. Churchill Ltd., for permission to reproduce the illustrations on pages 30 and 37 from the book by Evans and MacKeith on " Infant Feeding and Feeding Difficulties " ; Nea Service Inc., for the right to reproduce the Wetzel Grid ; the Editor of the *British Medical Journal*, for Table 5 ; Dr. H. Stuart of Boston for Table 7 ; Messrs. Allen and Hanburys for the photographs on page 33 ; and Messrs. Charles Dent and Little, Brown & Co., for permission to publish extracts from two poems by Ogden Nash.

R. S. ILLINGWORTH.

CONTENTS

Section 1

FEEDING PROBLEMS

CHAPTER	PAGE
1. BREAST FEEDING OR ARTIFICIAL FEEDING ?	1
2. THE FEEDING SCHEDULE	8
3. SOME BREAST FEEDING PROBLEMS.	18
4. BREAST AND NIPPLE DIFFICULTIES	27
5. INSUFFICIENCY OF MILK	39
6. DIFFICULTIES IN THE BREAST-FED BABY	55
7. THE ARTIFICIALLY-FED BABY	73

Section 2

PHYSICAL PROBLEMS

8. THE ASSESSMENT OF PHYSICAL DEVELOPMENT	82
9. THE SKULL	93
10. THE TEETH	99
11. THE SKIN AND UMBILICUS	106
11. THE BREASTS AND GENITALS	112
12. SOME MISCELLANEOUS PROBLEMS	117
14. THE PREVENTION OF INFECTION	132

Section 3

DEVELOPMENTAL PROBLEMS

INTRODUCTION	153
15. IS PREDICTION POSSIBLE ?	154

CHAPTER	PAGE
16. THE NORMAL COURSE OF DEVELOPMENT	162
17. GENERAL FACTORS WHICH AFFECT THE COURSE OF DEVELOPMENT	198
18. RETARDATION IN SINGLE FIELDS OF DEVELOPMENT AND FACTORS RESPONSIBLE	204
19. DEVELOPMENTAL DIAGNOSIS	210

Section 4

BEHAVIOUR PROBLEMS

INTRODUCTION	220
20. RELEVANT FEATURES OF THE PSYCHOLOGICAL DEVELOPMENT OF THE CHILD	223
21. PARENTAL ATTITUDES AND MANAGEMENT	236
22. DISCIPLINE AND PUNISHMENT	242
23. ANOREXIA AND OTHER EATING PROBLEMS	249
24. SLEEP PROBLEMS	264
25. PROBLEMS OF SPHINCTER CONTROL	277
26. CRYING. TEMPER TANTRUMS. BREATH-HOLDING ATTACKS	289
27. BODY MANIPULATIONS	301
28. JEALOUSY. FEARS. SHYNESS AND OTHER PROBLEMS	309
29. THE PREVENTION OF ACCIDENTS	321
30. TOYS AND PLAY. NURSERY SCHOOL	326
31. THE SICK CHILD. THE CHILD IN HOSPITAL	333
REFERENCES	339
ADDITIONAL READING RECOMMENDED	349
INDEX	351

Section I

PROBLEMS OF INFANT FEEDING

CHAPTER 1

BREAST FEEDING OR ARTIFICIAL FEEDING?

Incidence of Breast Feeding

THERE are wide differences in the incidence of breast feeding in this country and abroad. Selber³⁷⁴ reported that 93·4 per cent. of 1,382 European babies were fully breast fed on discharge from two hospitals in Durban, South Africa. The corresponding figures for coloured and Bantu babies were 97·9 per cent. and 98·6 per cent. Jelliffe²¹⁸ wrote that 100 per cent. of 155 mothers from poor Bengali villages were fully breast feeding their babies 1 and 6 months after birth. Only 54 per cent. of 78 women from the upper socio-economic class in Calcutta were breast feeding their babies at 6 months. In 1951, 94·4 per cent. of mothers discharged from the Jessop Hospital for Women at Sheffield were fully breast feeding their infants. In contrast to the above figures, I am told that not more than 2 per cent. of mothers discharged from some maternity units in Canada and the United States are breast feeding their babies. Steps are even taken by some¹¹⁴ to prevent lactation by administering testosterone cyclopentyl-propionate in cotton seed oil to the mother before the baby is born.

Many years ago Sedgwick and Fleischner,^{371, 372, 373} being concerned about the falling incidence of breast feeding, conducted an intensive campaign in Minneapolis in order to prove that women could breast feed their babies if lactation were properly managed. Manual expression of the breast was carried out as a routine until lactation was established. The result was that 96 per cent. of 2,847 women were fully breast feeding their babies at the end of the second month, and 84 per cent. of 2,355 women at the end of the sixth month ; 1,000 consecutive babies were discharged from maternity units fully breast fed. Similar experiments were carried out elsewhere.^{348, 350}

There is little doubt that if women really want to breast-feed their babies, and if lactation is properly managed, the great majority of babies will be fully breast fed for the first 3 or 4 months until a weaning diet is introduced. In the sections to follow I shall discuss the most important problems of breast feeding.

Possible Advantages of Breast Feeding

The Incidence of Infection

By far the most important advantage of breast feeding is the very much lower incidence of infections in babies fed on the breast than in those who are bottle fed. There have been numerous papers on the subject. The most frequently quoted paper is that of Grulee,¹⁷¹ concerning the morbidity and mortality in 26,061 babies under the care of the Infant Welfare Society of Chicago between 1924 and 1929. The mortality in the breast-fed infants was 1.54 per 1,000 as compared with 84.36 per 1,000 artificially-fed babies. The incidence of infections in the breast-fed babies was 37.4 per cent. as compared with 63.6 per cent. in the artificially fed ; 5.2 per cent. of the breast-fed babies and 16 per cent. of the artificially-fed ones had gastro-intestinal disorders. Robinson³⁵⁵ studied the morbidity and mortality of 2,295 babies who were entirely or partly artificially fed, comparing it with that of 2,412 babies who were fully breast fed. The mortality from infections was 30 per 1,000 in the 2,295 infants who were being artificially fed at the time of the onset of the fatal illness, as compared with 3.3 per 1,000 in the 2,412 infants who were being breast fed ; 17.9 per cent. of the breast-fed babies had some illness in the first seven months, compared with 40.7 per cent. of the artificially-fed babies. There was a three times greater incidence of otitis media in the artificially-fed babies, and there was a higher incidence of measles and whooping cough. The overall mortality was two and a half times greater in those artificially fed. When breast-fed babies became ill, the duration and severity of the illness was less than that of those artificially fed. Robinson thus gave convincing proof that the morbidity and mortality of artificially-fed babies is much higher than that of breast-fed ones. Stevenson⁴⁰¹ drew attention to the fact that in babies artificially fed for the first 6 months there is a higher incidence of respiratory infections (colds, bronchitis, pneumonia) than in breast-fed babies, not only in the first 6 months but also in the second 6 months of life. It seemed as if the breast-fed baby obtained something in the first 6 months which provided him with a greater resistance to infection in the second 6 months, when he was on ordinary mixed feeds.

Joensen,²¹⁹ in his 445-page monograph on breast feeding, found that fully breast-fed babies had considerably fewer colds and attacks of bronchitis or pneumonia than artificially-fed babies, and, when they did get a cold, they were less likely to develop bronchitis after it ; 1.87 per cent. of those who were artificially fed from birth developed pneumonia, as compared with 0.15 per cent. of those fully breast fed for 6 months. In addition, those fully breast fed in the first 6 months were less liable to acquire measles, influenza, acute tonsillitis or

unexplained fever in either the first or second 6 months, and less rubella, chickenpox or otitis media in the first 6 months. Several others^{116, 383} found a similarly high incidence of respiratory infection in artificially-fed babies as compared with those breast fed. Stevenson thought that one factor might be the high vitamin A and C intake of the breast-fed child. The breast-fed baby at 6 months obtains about 3,250 International Units of vitamin A from the mother, as compared with the commonly recommended dose of 1,500 units for the bottle-fed baby, and 55 mg. of ascorbic acid as compared with the commonly recommended dose of 30 mg. There is, however, no evidence that this is the factor concerned.

Numerous other papers have shown that there is a very much higher incidence of gastro-enteritis in artificially-fed babies than in those breast fed, and that the mortality of those who acquire the infection is much higher if they are artificially fed. Much of this difference can be ascribed to errors in the feeding technique. Unless the food, bottles, teat and everything else necessary for the preparation of feeds are handled with full aseptic precautions, infection of the baby may occur. It is, in fact, impossible to ensure in most homes that feeds are handled with proper care. It is certainly true that, if the feeds were prepared in the way recommended by the American Academy of Pediatrics,¹⁴ the incidence of gastro-enteritis in artificially-fed babies would be greatly reduced. Such surgical asepsis can and should be achieved in every hospital handling babies, but it is common knowledge that in many hospitals the standard falls a great deal short of this. Gordon and Levine¹⁶¹ advocated modified cow's milk for premature babies, largely on the grounds that they gain weight faster than on human milk. In a very well equipped hospital with an adequate and properly trained staff that may be true, but it would not be true for many other hospitals. The results of the application of such a recommendation might well be disastrous. In Egypt during the War⁴⁰² severe malaria spread northwards from the Sudan and affected large numbers of the natives. The babies mostly escaped the malaria, perhaps because of the prevalent practice of wrapping them up entirely from head to foot at night. So many mothers became seriously ill that, with American help, suitable artificial feeds were given from water-buffalo milk, every effort being made to teach the people clean methods of handling food. The babies were given proper supplies of vitamins. Almost every one of the babies died. The deaths were not due to unrecognized malaria, for the same thing happened in non-malarious districts.

The explanation for the lower incidence of gastro-enteritis in breast-fed babies may lie in two observations. The intestinal flora of a fully breast-fed infant is characterized by the prevalence of *Lacto-*

bacillus bifidus, in contrast to the mixed flora of infants fed on cow's milk. György¹⁷⁷ found that a mutant of *Lactobacillus bifidus* required for its propagation a specific growth factor, containing glucosamine, fructose and galactose, present in large quantities in human milk, and in still larger quantities in colostrum. Cow's milk has only a thirtieth to a hundredth of the activity of human milk. He suggested that the increased resistance to gastro-enteritis may be related to this factor in its effect on the bacterial flora of the bowel.

The stools of the fully breast-fed infant are more acid than those of the baby fed on cow's milk, partly as a result of the intestinal flora described above, and Ross and Dawes³⁶⁰ showed that the specific types of *Esch. coli* which are related to infantile gastro-enteritis will not multiply at the pH of the breast-fed infants' stools. Even a single complementary feed of cow's milk caused an immediate rise of the pH of the stool, with the result that the specific types of *Esch. coli* would be enabled to multiply.

By far the safest way of feeding a baby, particularly if the social circumstances, hospital arrangements or sanitary conditions are poor, is direct from the mother's breast.

Convenience

There can be little doubt that in most ways breast feeding is far easier for the mother. There is no equipment to sterilize and there are no feeds to mix and measure. It is an advantage to mother and child that the quantity of milk taken by the breast-fed baby cannot be determined except by test feeds. This relieves the mother of much anxiety caused by the day-to-day variations in the child's appetite. When the mother visits friends or travels, it is much easier for her to feed the baby on the breast than to take all the necessary equipment for artificial feeds. When the baby demands feeds at night, as he usually does in the first 10 weeks, it is a great deal easier for her to feed the baby on the breast than to prepare an artificial feed. Few mothers have a refrigerator in which to keep the day's feeds ready made up. In my opinion too many mothers with organic diseases, such as rheumatic carditis, are advised to bottle feed their babies on the grounds that it will be easier for them. In fact artificial feeding causes much more work than breast feeding.

Psychological Factors

Quite a number of papers^{89, 107, 191, 300, 313, 330, 333, 375} have set out to determine whether there is any relationship between the duration of breast feeding and later behaviour. Some of these papers work back from psychiatric disorders in later childhood to the mother's version of the duration of breast feeding. In general these papers suggest that

the breast-fed baby fares better in later childhood than the bottle-fed baby, but the fallacies in all of the papers are numerous. One such fallacy is the fact that the mother who breast feeds her baby may be a different kind of mother, with different attitudes to life, from the mother who prefers to feed her baby on the bottle. In that case the child would be influenced not only by the duration of breast feeding but by the attitude of the mother. Newton,³¹³ setting out to determine whether there was a relationship between infant-feeding experience and later behaviour, found that 67 per cent. of the fully breast fed group were "especially sought after as playmates," "accept adult suggestions," "take responsibility well," "never like to show off or act silly." On studying the table in the paper it was found that there were only 3 children in the group. Two out of three was evidently thought to be synonymous with 67 per cent. Rasmussen³⁴⁴ went further and claimed that fitness for military service in 6,744 men at the age of twenty in Thuringia and Saxony was directly related to the duration of breast feeding!

Hoefler and Hardy¹⁹⁵ examined 383 children aged 7-13 years and investigated the duration of breast feeding. They found that those who had been artificially fed were inferior physically and mentally to the breast-fed ones. They had proved more susceptible to childhood diseases and had been later in walking and talking. (Those breast fed for an excessive length of time—over 10 months—had not fared so well.) It is unfortunate that the study was a retrospective one. Rogerson and Rogerson³⁵⁸ in a careful paper attempted to relate feeding difficulties and other experiences in infancy to the psychological status at school age. The study was a follow-up one, not a retrospective one like most of the other papers mentioned above. They found that a higher proportion of the breast-fed babies had good physical and mental health in later childhood. They thought that there was a significant difference in the school achievement of the breast-fed babies compared with that of the artificially-fed babies who had experienced various feeding difficulties. The breast-fed babies were almost consistently superior. Psycho-analysts see a deep sexual significance in breast feeding. Readers who are interested should read the papers by Turner⁴¹⁷ and Markey.²⁶⁹

Orlansky³²² rightly shows that there is in fact very little evidence for the statements that breast feeding is of psychological value to the baby. The fact that evidence so far adduced is largely fallacious, however, does not preclude the possibility that breast feeding is of value to the child from the psychological standpoint. It may well be that the baby gains something from the closeness to his mother. He may certainly gain from the psychological effect which breast feeding has on the mother. When one watches a proud mother feeding

her baby, one can hardly fail to notice the evident satisfaction which both are obtaining from the act. One does not obtain the same impression when watching a mother feeding her baby on the bottle. The mother has a sense of achievement when fully feeding her baby. She knows that he is utterly dependent on her and that no one else can replace her. This can hardly fail to strengthen the bond between mother and child and increase the mother's affection for him. If it does, the baby will certainly benefit. Her success, furthermore, gives her confidence which stands her in good stead when other problems arise.

Economic Factors

There can be no doubt that breast feeding is cheaper for the mother. She has no equipment to buy. The milk costs her nothing.

Chemical Differences and Digestibility

There are many chemical differences between human and cow's milk, but this is not the place to discuss them in detail. They have been well reviewed by Jeans.²¹⁷ There are differences in the protein and amino acid content, in the composition of milk fat, in nitrogen retention, in the calcium and phosphorus content, in the nature and degree of absorption of the carbohydrates, and in the vitamin content. There is little evidence, however, that the differences are in any way such that on these grounds alone human milk must be recommended in place of cow's milk. The increased calcium and phosphorus content of cow's milk does not seem to benefit the child in any way, though it is true that the artificially-fed baby stores more calcium and nitrogen than the breast-fed baby.

It is not easy to adduce evidence that breast milk is more easily digested than a properly constituted artificial feed. The digestibility depends to a large extent on the size of the curd. Breast milk produces a very fine curd in the stomach, whereas undiluted cow's milk produces a large tough one. But cow's milk is modified by boiling, drying or adding such substances as lactic acid, and the curd so produced is much smaller than that of untreated cow's milk and so is easily digested. Many pædiatricians, nevertheless, feel that an ill baby thrives better on breast milk than on cow's milk. An ill child who has been almost completely weaned may refuse anything else but breast milk, reverting to the ordinary mixed feeds when better.

Perianal Dermatitis

In fully breast-fed babies perianal dermatitis is less frequently seen than in babies fed on cow's milk. Pratt and Read³³⁸ found that the lower the pH of the stool and the perianal skin, the lower was the