PUBLIC HEALTH DEPARTMENT

A GUIDE TO INFANT FEEDING

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Infant Welfare Tables and Guide for use in Artificial Feeding of Infants

Compiled by

THE DIRECTOR OF INFANT WELFARE

in collaboration with

THE MEMBERS OF THE MELBOURNE PÆDIATRIC SOCIETY

Issued by

The Public Health Department—Maternal and Infant Welfare Division

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INTRODUCTION.

A SCHEME FOR ESTABLISHMENT OF UNIFORMITY IN TEACHING INFANT FEEDING METHODS.

The purpose of this lecture, which deals with the principles of balancing and grading cow's milk mixtures for use in infant feeding and the preparation of tables based on these principles, is to bring before the medical practitioners, and the children's specialists in particular, the importance of obtaining some scheme for uniformity in the teaching of medical students and nurses concerning methods of infant feeding, and to ask for co-operation of the members of the Pediatric Society in order that this end may be attained.

Perhaps it would be well for me to briefly relate a few outstanding facts in the history of the infant welfare movement in this State.

The movement started in Victoria in 1917 as a result of voluntary effort, but the financing of the scheme is undertaken by the Municipalities which own the centres, and maintenance is aided by Government subsidies.

It was early realized that this work needed nurses with special training concerning care of the well baby, and the need was further emphasized by the fact that for financial and ethical reasons, it was difficult to place medical practitioners in charge of each infant welfare centre to supervise the work of the nurses.

As the nurse's main duty is to co-operate with the medical practitioner in giving detailed instruction to mothers, it is absolutely necessary for co-operation and for the public good, that the medical practitioner should be *au fait* with the teaching given to the nurses.

This means that the problem of gaining uniform teaching of infant feeding methods must be presented from the following points of view :—

(1) That of the medical profession—including the specialist, the general practitioner, and the medical student.
(2) That of the nursing profession—including the specially trained infant welfare nurse, the midwifery trained nurse, and the general trained nurse.
(3) That of the parents.

With regard to the details of the training of the infant welfare nurses, the two voluntary infant welfare organizations which initiated the movement have not been in the past in complete accord concerning the details of such training, and there has been much public controversy and misunderstanding which has hindered the progress of the movement and therefore retarded help that might have been given to the mothers and babies.

It was on this account that the Victorian Government, in 1925, requested Dr. Henrietta Main and myself to investigate matters in relation to the welfare of women and children both in New Zealand and Victoria.

We presented a report on this subject in 1926 emphazing the advantages of uniformity in teaching methods in infant feeding. To obtain this result in Victoria we recommended the instruction of the medical student in these matters of infant welfare, and in order to obtain uniformity in the teaching of the nurses we recommended the establishment of a standard infant welfare examination.

In 1926, the Government appointed a Director of Infant Welfare, and a Division of Maternal and Infant Welfare has been created in the Public Health Department. Also in 1927, regulations were gazetted concerning the training of infant welfare nurses establishing a standard infant welfare examination. Examinees wishing to obtain a special certificate, and to be State registered as infant welfare nurses, must have completed a prescribed curriculum in an infant welfare training school registered by the Nurses Board.

There are now three such registered infant welfare training schools in Victoria, and there is a likelihood of many more being established. It has, therefore, become an urgent matter to have uniformity in details of teaching in these schools, and with this end in view I have been preparing tables and lectures since my appointment as Director in October, 1926.

Without the co-operation of the medical profession the success aimed for will not be attained, so I sought for such a conference as the present one, and I trust that by such conferences a scheme for uniformity in teaching of infant feeding methods to medical students, nurses, and finally to parents and prospective mothers, will be moulded to represent more or less the views of leading Victorian medical specialists in children's diseases as co-ordinated by the Maternal and Infant Welfare Division of the Public Health Department. Therefore, I have only attempted to place before the members of this conference a more or less flexible scheme presented from the point of view of the medical profession and the specially trained infant welfare nurse, further simplification with somewhat lessened flexibility to be made later for general nurses and parents, if members are in agreement with the basic principles of the scheme.

Tables for delicate and premature babies and normal babies under one month of age are not included, but will be dealt with separately at a later date.

VERA SCANTLEBURY.

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6th April, 1929.

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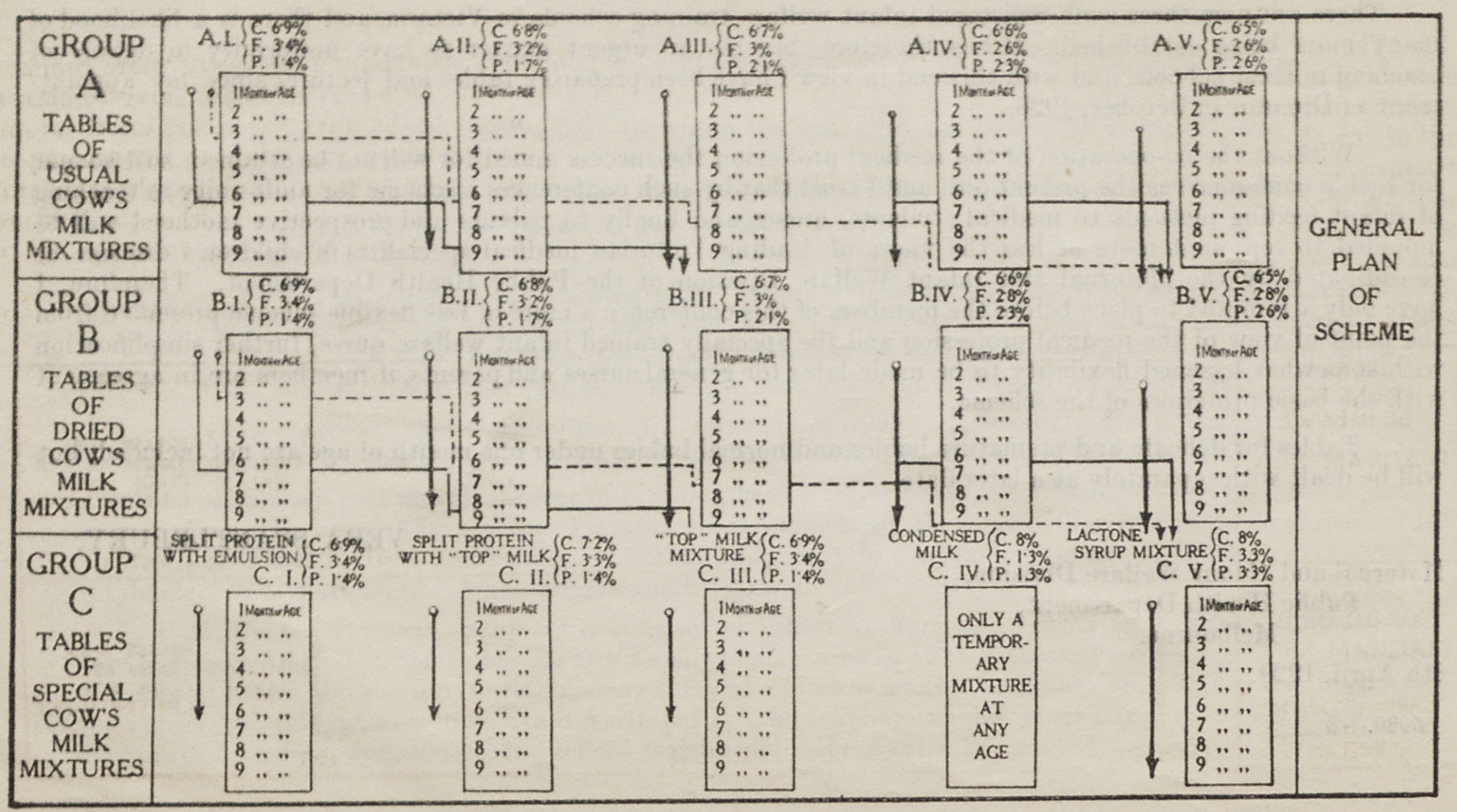
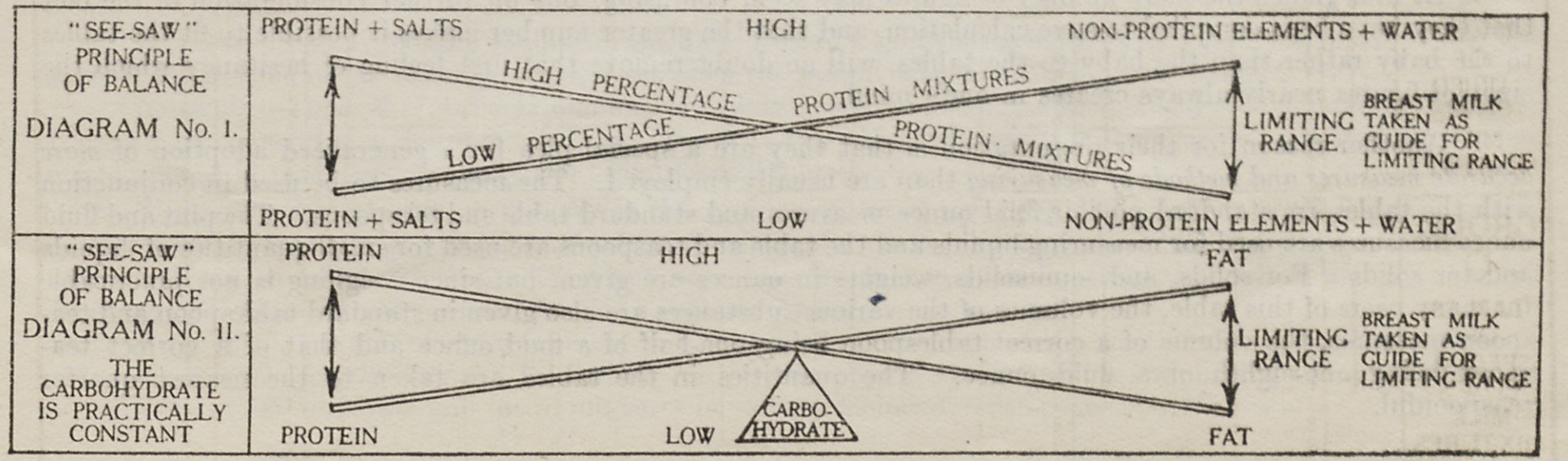

GROUP A
TABLES OF USUAL COW'S MILK MIXTURES
GROUP B
TABLES OF DRIED COW'S MILK MIXTURES
GROUP C
TABLES OF SPECIAL COW'S MILK MIXTURES
A.I. C. 6·9% F. 3·4% P. 1·4%
A.II. C. 6·8% F. 3·2% P. 1·7%
A.III. C. 6·7% F. 3% P. 2·1%
A.IV. C. 6·6% F. 2·6% P. 2·3%
A.V. C. 6·5% F. 2·6% P. 2·6%
B.I. C. 6·9% F. 3·4% P. 1·4%
B.II. C. 6·8% F. 3·2% P. 1·7%
B.III. C. 6·7% F. 3% P. 2·1%
B.IV. C. 6·6% F. 2·8% P. 2·3%
B.V. C. 6·5% F. 2·8% P. 2·6%
Month or Age
2 .. ..
3 .. ..
4 .. ..
5 .. ..
6 .. ..
7 .. ..
8 .. ..
9 .. ..
SPLIT PROTEIN WITH EMULSION C. 6·9% F. 3·4% P. 1·4% C. I.
SPLIT PROTEIN WITH "TOP" MILK C. 7·2% F. 3·3% P. 1·4% C. II.
"TOP" MILK MIXTURE C. 6·9% F. 3·4% P. 1·4% C. III.
CONDENSED MILK C. 8% F. 1·3% P. 1·3% C. IV.
LACTONE SYRUP MIXTURE C. 8% F. 3·3% P. 3·3% C. V.
ONLY A TEMPORARY MIXTURE AT ANY AGE
GENERAL PLAN OF SCHEME

Groups A, B, and C.

The various lines or " pathways " between and connecting the different columns represent the more common methods of *grading the feedings* according to *age of infant*, and *balance of mixture*. Other " pathways " may be chosen for individual infants as occasion demands. The mixtures are balanced according to the inter-action and interrelationship of the elements of the mixture, the medium, especially the protein, being modified according to the amount of carbohydrate and fat present in the mixture, and vice versa. Within a limited range (breast milk being the standard) the " *See-saw* " *principle of balancing mixtures* is as follows :—When the salts and protein components of the mixture are low, the non-protein components and water are high, and vice versa, as will be seen by looking from the left to right hand end of either groups A or B.

Diagrams I. and II. are diagrammatic representations of the " See-saw " principle of balancing mixtures within definite limiting range (breast milk being the standard).



BASIC PRINCIPLES OF THE SCHEME.

These tables have been compiled to save the busy practitioners and infant welfare nurses time and trouble of calculation in *balancing* and *grading* food mixtures for infants. They are meant to be used for reference as *guides* and *aids* in ordering cow's milk mixtures. Certain basic principles have been followed in their compilation, and these I shall briefly outline. The main fact to be remembered is that the *Individual Baby* is the deciding factor, but a certain amount of help may be gained by remembering the underlying principles of infant feeding which these tables should convey.

At first glance the mere number of figures may seem confusing, but on further consideration of the fact that they have been compiled to save calculation, and that the greater number makes it possible to fit the tables to the baby rather than the baby to the tables, will no doubt remove that first feeling of hesitancy which the sight of figures nearly always creates in one's mind.

Another reason for their presentation is that they are a special plea for a generalized adoption of *more accurate measures and methods of measuring* than are usually employed. The measures to be used in conjunction with the tables are standard pint or fluid ounce measures and standard table and teaspoons. The pint and fluid ounce measures are used for measuring liquids and the table and teaspoons are used for small quantities of liquids and for solids. For solids, and semi-solids, weights in ounces are given, but since weighing is not practicable for many users of this table, the volumes of the various substances are also given in standard tablespoon and teaspoon measures, the volume of a correct tablespoon being one-half of a fluid ounce and that of a correct teaspoon being one-eighth of a fluid ounce. The quantities in the tables are taken to the nearest quarter teaspoonful.

Application has been made to the Minister of Health for provision of such measures to be stamped in the following manner :—

(1) Infant Welfare Food Measure—Standard Tablespoon.
(2) Infant Welfare Food Measure—Standard Teaspoon.

This is a very necessary precaution as the household table and teaspoons vary to a large extent.

These food measures may also be used for measuring liquids (except acids) but owing to their shape and small volume are not as practicable for measuring liquids as vessels correctly graded.

Since, in measuring solids by volume, great variation in amounts may be obtained by varying degrees of pressure applied in packing the substance in the measure, the *method* has been chosen of packing the substance as *tightly* as possible and levelling off with a knife. This has been found in practice to give the most consistent results.

It will be noted by looking at some of the measurements that the carbohydrates vary considerably from one another in the volumetric measurements, even when the weight measurements are the same.

Example.—Table A. I.—Total amount of solution = 40 ounces. Added sugar = 2 ounces by weight. If cane sugar be used this = approx.—4 tablespoons 1½ teaspoons, whereas if milk sugar be used, it = approx.—5 tablespoons 1½ teaspoons, actually one tablespoonful more.

The reason for advocating the use of the above-mentioned measures and methods is that unless care is taken inaccuracies result, producing food mixtures which often cause digestive disorders of a more or less serious nature. Many so called minor upsets, which are neglected as being unimportant, but which are nevertheless disadvantageous to the baby, are traceable to such inaccuracies.

To sum up, the aim of these tables is to facilitate the production of the *most "safe" as well as sufficiently nutritious mixture for the infant.* To further aid in this object, special tables simplifying exact variation of percentages of carbohydrate and fat in mixtures have been included. See pages 99–101).

GROUPS A and B.

Tables A and B represent the usual cow's milk mixtures of fresh and dried milk, diluted with water to varying degrees, this process of dilution being one of the methods of modifying the cow's milk protein for the use of the infant. In all cases, the carbohydrate is added to the diluted mixture to bring the carbohydrate in the final solution to between 6–7 per cent., the lower value being given in the cases where less diluent is used.

In cases where more diluent is given, added fat is used to bring the fat in the final solution to not more than 3·4 per cent., this percentage decreasing as the diluent decreases, the protein therefore being less modified and present in a higher percentage. When the percentage of the protein is high, no added fat is given, and often such mixtures must be skimmed. The carbohydrate and fat may be altered and the protein further modified by one of the methods mentioned later.

The principle followed in balancing these mixtures is based on the bio-chemical composition of the ingredients and the inter-relationship of one with the other.

All complete foods must contain carbohydrate, fat, protein, salts, and water as essential food factors, and vitamins or fresh food substances as accessory food factors must also be given. Take human milk and cow's milk as examples and compare percentage compositions—

	Human Milk.	*Cow's Milk.*
	%	%
Sugar	7·0	5·0
Fat	3·5–4·0	3·5
Protein	1·5	3·5
Salts	0·2	0·75
Water	87·3	87·25
	100·0	100·00

These percentages are of necessity only an average, the percentages varying in different cases in both human milk and cow's milk owing to various causes. Within a limited range, human milk is taken as a standard, but bio-chemical examination shows that a mere following of the chemical composition by percentage composition, does not make a cow's milk mixture thus composed identical with human milk, as the composition bio-chemically is not adequately the same. The sugar is similar, but the fats and proteins differ in actual composition, and the salts differ in amounts. As Brenneman most aptly remarks :—" Our further aim in adapting cow's milk to the baby is not to make it like mother's milk chemically, but to make it, by modification and supplementation, act as nearly as possible as adequately as an infant food as does its mother's milk. While our food mixtures, however, often bear little resemblance physically and chemically to human milk, we nevertheless always keep before us the composition and properties of human milk as our standard, and depart from these only so far as the already unnatural food with which we are dealing makes it incumbent to do so."

It is the inter-relationship of the different elements in the mixture which makes it important to balance them. If this principle is remembered much error will be avoided, and statements referring to one element only in the mixture as the cause of damage will not be made. For instance, it should not be stated that infants cannot take " high fat " or " high protein." These statements have been proved to be incorrect, for many infants can take mixtures with a high fat or a high protein percentage according to the amount of other elements in the mixtures and according to the modification of these elements.

Balancing of Mixtures.

The diagrams on page 7 illustrate what is meant by so called " Balance."

Within a definite range, with human milk as standard, the " see-saw principle " of balancing has been adopted. When the mixture contains milk in a low proportion with a high amount of water, i.e., when the protein ingredient and salts in the mixture are comparatively low, the protein nearing a human milk standard

from the percentage composition point of view, then the carbohydrate and fat added may be of a relatively high percentage, again nearing human milk standard as far as possible ; and vice versa, when the mixture contains more milk, the percentage of protein being thus increased, for various independent reasons, e.g., the reaction of the individual child, the inability to deal with high fat percentage (and therefore the caloric requirement not being suited), the failure to gain on the amount of protein per pound of body weight in the lower mixtures, medical preference for higher protein percentage mixtures as based on theoretical and clinical considerations, then the non-protein ingredients and water are lowered within a definite range (human milk still being kept as a standard to limit this range). (See Diagram I., page 7.)

The carbohydrate does not swing to quite such a large extent as the fat, though it is necessary to decrease it, but when the use of a diluent is chosen as the method of modifying the protein, the chief elements taking part in the "see-saw balancing" of the mixtures are the protein and fat. This is diagramatically represented in Diagram II. on page 7.)

Therefore if the Tables A and B are studied (see diagram of tables on pages 6, 29, 41) it will be seen that the tables run from left to right as from *low to high protein percentage mixtures* with correspondingly *high to low fat and carbohydrate percentages.*

Tables A and B.

A I. and B I.—C 6·9 per cent., F 3·4 per cent., P 1·4 per cent. ;
A II. and B II.—C 6·8 per cent., F 3·2 per cent., P 1·7 per cent. ;
A III. and B III.—C 6·7 per cent., F 3 per cent., P 2·1 per cent. ;
A IV.—C 6·6 per cent., F 2·6 per cent., P 2·3 per cent. ;
A V.—C 6·5 per cent., F 2·6 per cent., P 2·6 per cent. ;
B IV.—C 6·6 per cent., F 2·8 per cent., P 2·3 per cent. ;
B V.—C 6·5 per cent., F 2·8 per cent., P 2·6 per cent.

In these tables A.V. and B.V. there is no "added" fat, the fat percentage depending on the fat present in the cow's milk in the mixture. In these mixtures it is often necessary to actually remove the fat before use, as the modification of protein is lessened, there being less diluent added. It may even be necessary in the case of the A mixtures to further modify the protein, especially as the amount of milk increases, by using other protein modification methods as well as dilution, e.g., boiling, citrating, bengerizing, &c. (see Methods of Modification of Protein, pages 80, 81, 82).

The lactic acid preparations which are shown in Tables C are specially dealt with in the preface to those tables (pages 16 and 17), wherein it is shown that they come in line with the "balancing" scheme, the protein being modified, but otherwise than with a diluent.

Grading of Mixtures.

If the diagram on page 6 is consulted, it will be seen that between the columns representing tables of mixtures in the A and B groups, are perpendicular lines following the columns to varying levels which are represented in the columns as the different months of age of the child. These perpendicular lines branch off at different levels to the next columns.

They represent "Pathways" indicating the various ages of grading from one mixture to the next as chosen by different observers. As the mixtures are balanced and as the ingredients can be further modified if need be, the pathway chosen is not of such importance, for babies adapt themselves to well balanced mixtures.

Different clinicians, still adhering to the general scheme of balancing and modifying the mixture, may place their "pathways" where they think most suitable. Indeed, they may draw their own "pathways," both for babies in general and for any baby in particular, but *certain guiding rules* should be followed:—

(1) In young babies it is wise to begin with well diluted mixtures, the rapidity with which the baby is graded into less diluted mixtures depending on the individual baby's progress.

(2) If the baby is taking his full caloric need, is digesting his food, putting on weight in the normal manner, is firm, good colour, happy, and having normal excretions, rather than to change the mixture it is better to increase the amount of the mixture within normal limits (i.e., the total amount of each feed not exceeding more than 8–9 ounces).

(3) But, if the caloric value per ounce of the mixture being taken is low, this may not be possible' then the strength of the mixture, i.e., the proportion of milk in the mixture, must be increased and the child graded to the next table and so on. This is well illustrated in mixtures with high fat percentages, when difficulty is shown in digesting such mixtures. The fat is lowered and more mixture is given. If the fat is lowered considerably, the caloric value per ounce of mixture is too small and it is necessary to give more protein, so more milk is added.

In cases where a high percentage of protein is given, it is necessary to give larger amounts of the mixture as the caloric value per ounce of these mixtures is usually lower than in the mixtures with a low percentage of protein, but a high percentage of fat (except in the case of lactic acid preparations which will be specially mentioned in preface to Tables C). In order to give sufficient calories to the child it may be necessary to commence at an earlier age with cereal jelly and other foods than when the lower protein and higher fat percentage mixtures are being given.

(4) It is most important to remember that all changes of increase, or of grading from one mixture up to another must be made gradually.

Rapid changes of decrease of the total mixture or of any special ingredients in the mixture must be made when signs of intolerance are shown by the baby (see pages 85 and 86).

(5) When commencing to feed with an artificial mixture it is most important, for the sake of safety, to start with a lower percentage of the ingredients than those mentioned in the tables as the final solutions. This may be done as mentioned above by further temporarily diluting the mixture with more water or whatever diluent is being used (this does not apply to lactic acid preparations) or it may be necessary to keep the percentage of one or more of the elements lower than in the final solution. For instance, it may be necessary to keep the carbohydrate slightly lower even when the full protein is reached (as shown by examination of stools, see page 86). If this is the case a less number of teaspoons of the carbohydrate may be added, the percentage being lowered 1 per cent. or more as required (see table for varying percentages, page 99).

However, this is not usually necessary unless the fat is also too high and if the approach is made by dilution such a course is seldom required.

With the case of fat, very special precaution must be taken especially in the summer time and in hot climates.

It is necessary to approach to the final solution as regards fat percentage, with caution. In the case of the low percentage protein mixtures, when added fat is used, only small amounts of the fat should be added to begin with, and with top milk mixtures, only a short time allowed for setting at first.

In the case of high percentage protein mixtures (and in some cases even in those with a low percentage of protein), it is necessary to remove fat by skimming the milk as much as possible, or even by using machine skimmed milk. This also applies to lactic acid preparations, especially if rich cow's milk, such as that from a Jersey herd, is being used.

GROUP C.

This is a somewhat miscellaneous collection of tables in more or less common use.

The "Split Protein" mixtures Table C. I. and Table C. II. are useful for feeding very young and delicate or premature babies. They are somewhat troublesome to prepare so are usually ordered on special occasions. They are digestible because there are more soluble proteins present. These have been adopted from Sir Truby King's teachings.

Table C.III. has also been adopted from his teachings. These "top milk" mixtures contain a low protein percentage and are given when no emulsions are available. As it is very difficult to ascertain the fat percentage without special examination of the made up mixture, the hours of setting should only be very gradually increased to the full 7 hours. It is most inadvisable to attempt these long hours in the summer time.

Table C.IV.—A *condensed milk mixture* is included as it is useful in feeding very young babies, and for temporary use in emergencies, or in grading babies from breast milk to artificial mixtures.

Tables C.V., and VI.—Lactone Syrup with maltose, and Lactone Syrup Mixtures.

These mixtures, on first appearance, with all the elements high, seem to contradict the above mentioned theories of balance, but on closer study perhaps this is not the case. The balance of mixtures depends on the *medium* in which the carbohydrate and fat are given, i.e., the condition of the protein and the salts in solution, but chiefly on the modification of the protein. Again, in these mixtures the composition and properties of human milk are taken as the standard. It is a modification of the *quality only*, and *not the quantity* of the protein. In

the A. and B. mixtures, some of the milk is removed, and in the remainder the curd is modified by one or two methods. In these lactic acid milk mixtures *no* milk is removed, and the curd is modified with the addition of the acid and with the boiling of the milk.

There are several effects of adding acid to the milk.

Brenneman states that " the acid has a decided germicidal effect, and it has a very favorable effect on metabolism, especially of the minerals " (another modification of the medium in which the carbohydrate and fats are given).

As Brenneman suggests " the acid may have some, as yet, unsuspected action on the *fats*, and *carbohydrates*. Its outstanding effects are two radical changes :—

(1) An attenuation of the curd.

(2) The greater buffer value of cow's milk as compared with human milk, resulting from the larger amount of casein and phosphate, is reduced so that the hydrogen ion concentration becomes practically identical with that in breast milk digestion."

Approximately the amount of the buffer salts in cow's milk is three times that in breast milk, neutralizing a large proportion of normal gastric acid secretion, thus making protein precipitation and digestion difficult.

What is done in adding lactic acid, is to saturate two-thirds of the buffer salts with lactic acid, prior to feeding, thus leaving one-third to combine with the gastric secretion. This leaves the same quantity of buffer salts as is present in breast milk, to be acted on by the gastric juice.

Therefore, it is feasible to believe, the medium being so digestible, i.e., the protein modified and also the salts affected, that a high percentage of carbohydrate and fat can be used. Again, the carbohydrate used is a dextrin-dextrose and it is therefore less easily fermentable than sugar only, and absorbs more slowly (see modification of milk mixtures, pages 80–82.)

Heating of Milk for use in the Cow's Milk Mixtures.

Boiling of the cow's milk is advised, especially in the summer time.

Simmering of the milk is the usual method employed.

As seen in studying the effect on the curd of boiling the milk (see page 81), there is no doubt that digestion is aided and danger from the presence of pathological germs is lessened by these methods. Heating to 155° F. is a method sometimes used in the winter time, especially in the more diluted mixtures.

Addition to Diet of Food Accessory Factors.

To supply *Vitamine C*	Orange juice Lemon juice Grape juice Carrot juice Swede juice Cabbage juice Tomato juice.
To supply *Vitamine A*	Cod liver oil and its preparations. Milk Butter Cream
To supply *Vitamine D*	Cod liver oil.

In all cases is *Vitamine C* added to the diet in some form of fruit juice, preferably orange juice.

Except in hot weather, cod liver oil is added in very small quantities to increase the Vitamines A and D, and in some cases it may be used in larger quantities to supply caloric needs as added fat.

Tables D.

First and foremost it must be remembered that these tables are only to be used as *guides*, so that some idea of the *amount of mixture* to be offered to the infant may be obtained and the chances of under or over feeding be lessened.

As before noted, it is necessary to calculate the *caloric needs* of the child in order to have some idea of the amount of mixture of a certain caloric value per ounce which should be prepared. There are many influences varying the caloric needs, so that only approximate factors can be taken.

Different investigators in different parts of the world have arrived by calorimetric experiments and by clinical observations of normal babies being fed on human milk at more or less similar conclusions concerning the caloric needs of normal infants. Normal babies under one year of age have been found to need approximately 50 calories per lb. body weight, and when growth is less rapid in the later months of the first year of age the caloric requirement is slightly less than this amount.

The determination of the caloric requirements from measurements of the surface area of the child is probably more accurate than from the body weight, but it is more complicated and in the case of infants differing slightly in weight, the difference between the two methods is so slight that the body weight has been chosen as the basis of calculation, being much more convenient for use in practice.

The following factors used by Sir Truby King have been selected for use in the tables :—

"*Caloric requirements of Normal Babies, according to weight factor only.*"

Weight	× by	50	during first month of age
,,		50	,, second month of age
,,		50	,, third month of age
,,		47	,, fourth month of age
,,		45	,, fifth month of age
,,		44	,, sixth month of age
,,		43	,, seventh month of age
,,		42	,, eighth month of age
,,		42	,, ninth month of age.

These factors obviously as used in the tables must only be regarded as approximate, and infants with smaller body weight within a given group might conceivably have a higher, and those with a higher body weight have a lower factor. The variation, however, is not sufficient to negative the use of Sir Truby King's figures within a given group. Underweight babies need more calories per pound body weight, and over weight babies need less than normal weight babies.

Therefore, in cases *above* or *below* the usual range of *expected weights for age*, the number of calories required per pound body weight may be estimated according to the nearest expected weight in the tables rather than to the actual weight.

In the same way, when the weight is within the usual range of expected weights for age, but the infant appears under-nourished (as confirmed by birth weight and height weight age tables), the number of calories required per pound body weight may be estimated according to the average weight for the age, rather than to the actual weight.

To obtain this usual range of expected weights, the average weight for age lines used in New Zealand and New South Wales and that compiled from weights of Victorian children were taken, and a range of weights 14 per cent. above, and 14 per cent. below these average lines was calculated as including expected weights of normal babies for the different months of age. The average weight given is the mean of the weights taken from the above-mentioned weight for age lines.

When deciding the *amounts* of mixture needed, the *caloric value per ounce* of the mixture must be known also. The total caloric needs are estimated, and the amounts of mixture needed will equal the total caloric needs divided by the caloric value per ounce of the mixture. To save calculation this has been worked out in the tables.

As shown before, the caloric needs of the child are variable according to many conditions, e.g., in summer time less calories are required than in winter, and the amount of the infant's clothing makes a considerable difference; the more clothes, the less the caloric requirements. A very active baby requires more than a quiet one. Finally, bottle fed infants need more than breast fed ones, because of the greater amount of energy used in the process of digestion, as well as the greater loss through the excreta. Therefore, the amounts taken by different children will vary accordingly. There are temporary conditions under which full theoretical requirements should not be fulfilled, e.g.—

(1) For the first few weeks of life of the new born.
(2) With normal infants abruptly weaned, until their tolerance for a foreign food can be gradually increased.
(3) With babies who have been overfed, until their digestive apparatus has had a chance to recuperate.
(4) With infants who have been underfed, until their tolerance for food has been gradually increased.
(5) With those who are having a complete change to a modified milk mixture, until the final solution is reached (i.e., until the bulk sugar can be gradually increased).

(6) With those who have diarrhoea or have recently recovered (until the stools approach normal).
(7) With those who have excessive vomiting, until it ceases.
(8) With infants who have loss of appetite, until food is readily taken (care concerning mothercraft details is necessary in these cases.)

As important as the *caloric requirement* is the *water requirement* of the baby. W. M. Feldman says :— " Owing to the greater proportion of water in the infants' body tissue (70 per cent. as against 60 per cent. in an adult), as well as to its more rapid metabolism, the infant requires a greater amount of water per unit of body weight than an adult." He calculates that thriving breast fed infants are found on an average to take about 160 grams of milk per kilogramme body weight in a day, containing about 150 grams of water. Hence we infer that the *normal water requirements per day of a baby are about* $2\frac{1}{2}$ *ounces per pound body weight.*

Therefore, the minimum amount of fluid requirement, as well as the caloric requirement, must be satisfied. *Two or three ounces of water per pound body weight* is the average quantity required by normal babies per day. When there is excessive loss of water by perspiration (e.g., in summer), or by other excretory organs or by vomiting correspondingly more is needed. If the caloric requirements, but not the fluid requirements, are satified, the latter will have to be made up either with water given with the meals or between the meals. This is a danger in the summer, for the thirsty child, seeking its full fluid requirement, may over eat if not given sufficient water, and dietetic upset is a consequence.

It will be noticed with the lower percentage protein mixtures containing high percentages of carbohydrates and fats, that the caloric value per ounce of the mixture is high (19–20 per ounce), resembling human milk. Also there is more water in these milk mixtures so that it is easy to satify both the caloric and water requirements. Sir Truby King has given the following working approximation for mixtures containing about twenty calories per ounce (human milk standard).

These figures are easily remembered, as there is an increase of a half-ounce to each feeding each month. It is only an approximation, and with mixtures of lower caloric value per ounce more must be offered according to Table " D " as otherwise the child will be given insufficient, and the caloric needs will not be satisfied. Likewise, with mixtures of a higher caloric value per ounce (over twenty calories per ounce), there is a danger of overfeeding and digestive troubles if babies are forced to take these amounts.

At end of	first	month	of	age	..	..	25	ozs.	per 24 hours
,,	second	,,	,,		..	..	27½	,,	,,
,,	third	,,	,,		..	..	30	,,	,,
,,	fourth	,,	,,		..	..	32½	,,	,,
,,	fifth	,,	,,		..	..	35	,,	,,
,,	sixth	,,	,,		..	..	37½	,,	,,
,,	seventh	,,	,,		..	..	40	,,	,,
,,	eighth	,,	,,		..	..	40	,,	,,
,,	ninth	,,	,,		..	..	40	,,	,,

With higher protein percentage mixtures which have to be balanced with a lower carbohydrate and fat percentage in the mixture (except with Lactic Acid preparations—see special mixtures), the amount of mixture given to satisfy the caloric need has to be greater than in the above mentioned low protein mixtures. It is *important* when using mixtures witha higher caloric value than twenty calories per ounce (e.g., Lactic Acid preparations), especially in the summer time, to remember the *water requirement*, as less of these mixtures is required to satisfy the caloric requirement, and the water requirement may not be satisfied if insufficient water is given between meals.

GENERAL INSTRUCTIONS.

For Preparation of Mixtures.

Scrupulous cleanliness should be observed, all utensils being boiled and kept in boiled water covered from flies and dust until used. Also personal cleanliness must be observed.

The cow's milk to be used must be obtained from as reliable a source and as soon after milking as possible ; also twice daily if possible. If the baby is in city or suburbs, bottled milk from a reliable dairy is advised. Milk should be obtained from a herd rather than from one cow. The cows should have been tuberculin tested and the milk rapidly cooled after milking (preferably brine cooled) and it should be kept cool until used, below 40 degrees F. if possible and not above 60 degrees F.

As the milk has to be heated for baby's use either by boiling or home pasteurization, it is preferable to use fresh unpasteurized milk from a reliable source so as to prevent double heating. In any case, fresh fruit juice must be used, and in winter time extra cod liver oil emulsion or ostelin may be given to provide an extra supply of the fat soluble A vitamin, and in the latter case, of the anti-rachitic or vitimin D.

The milk should be boiled in the summer time, and if there is need to increase the digestibility of the casein curd, or if the cow's have not been tuberculin tested, in the winter time also.

DETAILED INSTRUCTIONS.

One of the following Methods of Heating Mixtures may be employed.

(*a*) The jug containing the milk is stood in a saucepan of cold water which reaches the level of the milk in the jug. The water in saucepan is brought to the boil and allowed to boil for 10 minutes. The milk is added to other ingredients of the mixture, the whole is then cooled rapidly by standing the jug in running water and when cool enough, placing it in a shallow pan of water, and covering it with muslin or gauze, the ends of which dip into the water. The water should be changed frequently. It should then be placed in cooler or in ice chest.

(*b*) The milk is placed direct into saucepan and brought to boil and allowed to boil for 3–5 minutes. It is then added to other ingredients of mixture which is cooled rapidly as in (*a*).

(*c*) The milk may be placed in a double boiler and allowed to *simmer* for 5–10 minutes. It is then added to other ingredients of the mixture, which is rapidly cooled as in (*a*).

(*d*) On some occasions the whole mixture is made up before heating (the added fat being excluded) and only a temperature 155 degrees F. is reached.

The mixture is placed in jug tightly covered with gauze, and the jug is placed in a saucepan of boiling water which is kept heated until a dairy thermometer placed in the jug containing the mixture registers 155 degrees F.

The mixture should be kept at this temperature for 10 minutes, then should be rapidly cooled as in (*a*).

To Make up Mixtures in Tables A.

The milk may be—

(1) Heated separately.

(2) Or with other ingredients.

When boiling or simmering is the method used, it is better to heat the milk separately, taking above the average amount required and measuring it exactly after boiling.

Requisites.—One jug ; half-pint measure, marked in ounces ; milk, standard tablespoon, standard teaspoon and knife on a clean plate ; lime water (in A. I.) and selected carbohydrate ; boiled water ; saucepan of boiling water for scalding utensils ; feeding bottles ; butter muslin.

The sugar or dextri-maltose should be measured carefully, being tightly packed and levelled off, with a knife in a standard tablespoon or teaspoon. It should be dissolved in boiling water and then placed in measuring vessel for liquids and boiled water (preferably cold) added up to the desired amount. The boiled milk may be used to dissolve the sugar and cool boiled water added.

When a lower temperature is required all the ingredients are mixed and the total mixture heated (as in method (*d*)) and then rapidly cooled.

The mixture may be made up for 24 hours or 12 hours and bottled, or it may be prepared for one feeding, the amounts being chosen accordingly.

To Make up Mixtures in Tables B.

Use standard tablespoon and teaspoon tightly packed with dried milk and levelled off with a knife. Do the same with any added carbohydrate. Place dried milk and carbohydrate together and pour boiling water on them.

To Add Fat in Mixtures A, B, or C1.

1. *Method of Giving Emulsions.*

(1) It may be given separately by spoon immediately before feeding ; or

(2) It may be given mixed into each bottle separately, and well shaken up.

In both cases the total amount of emulsion ordered for the day must be measured with a standard table or teaspoon and put into a small cup or basin, and this quantity must be divided into equal amounts for each feeding during the day.

Teaspoons and tablespoons used for measuring must be of standard size, and always scraped off level.

2. *Method of Giving Butter.*

If this is added it must be boiled, skimmed and then accurately measured in the standard spoon.

Tables C.—To make C. II.—Requisites—Top Milk Recipe.—Two jugs ; half-pint meaures marked in ounces ; one conical dipper ; one standard tablespoon and one standard teaspoon and knife on clean plate ; lime water ; sugar of milk ; one bottle of Danish rennet ; boiled water ; saucepan of boiling water and dairy thermometer.

Directions.

Dip off number of ounces of top milk required and put in jug. Measure out number of ounces required for making whey, from the remainder of the milk (to make 15 oz. measures off 20 oz.). Measure out lime water and add to top milk. Measure sugar of milk. Dissolve sugar in number of ounces of boiled water required. Add to top milk and lime water. Cover tightly with butter muslin and stand on one side.

To Make Whey.

Take the measured out quantity of milk and stand jug containing same in saucepan of boiling water. Heat milk to 100 degrees F. Remove jug from saucepan, add rennet (dissolved in a little cold boiled water) to milk; stir well; cover and stand until set. Then break up curd with fork, place jug in saucepan again and bring to temperature of 155 degrees F. Strain through butter muslin, return jug to saucepan and bring to 155 degrees F. again. Measure off number of ounces of whey required. Add to other ingredients. Bring whole mixture to 155 degrees F. and stand for 10 minutes.

Remove and cool rapidly. To make 15 oz. whey, take skim milk 20 oz. and rennet ½ tab.

Table C. III.—Requisites, Top Milk Recipe.—One jug; half-pint measure marked in ounces; one conical dipper; one sugar measure; one standard tablespoon and knife on a clean plate; lime water; sugar of milk; boiled water; saucepan of boiling water and dairy thermometer.

Directions.

Dip off number of ounces of top milk required and put in jug. Measure out lime water. Add to top milk. Measure sugar of milk. Dissolve sugar in number of ounces of boiled water required. Add to top milk and lime water. Stand jug containing mixture in saucepan of boiling water and bring to 155 degrees F. Stand at this temperature for 10 minutes. Cool rapidly.

Condensed Milk Mixture.

C. IV.—Measure condensed milk by pouring the milk into a standard measure either glass ounce measure, or into a standard tablespoon or teaspoon and level off with a knife and put in measuring vessel and pour on boiling water to the required amount.

Lactone Syrup Mixtures.

C. V. and VI.—Measure lactone syrup* in glass measuring vessel with great care. Boil the cow's milk for 3 minutes in a clean saucepan. Pour milk into clean jug and cool rapidly. When milk *quite cold*, measure the required amount and then mix the measured lactone syrup with the cold milk stirring all the time.

To Give Fruit Juices.

With all utensils scalded, squeeze juice into standard measuring vessel, strain and dilute with warm boiled water. Orange juice and tomato juice are the most frequent chosen juices.

Begin with half teaspoon diluted with 1 oz. of warm water. Increase the juice gradually according to reaction of baby until the strained and diluted juice of one orange or one large ripe tomato is given daily.

A good time for giving this solution is at 4 p.m. It is also a useful method of persuading the baby to take extra amount of fluid (especially of the diluent water) between meals.

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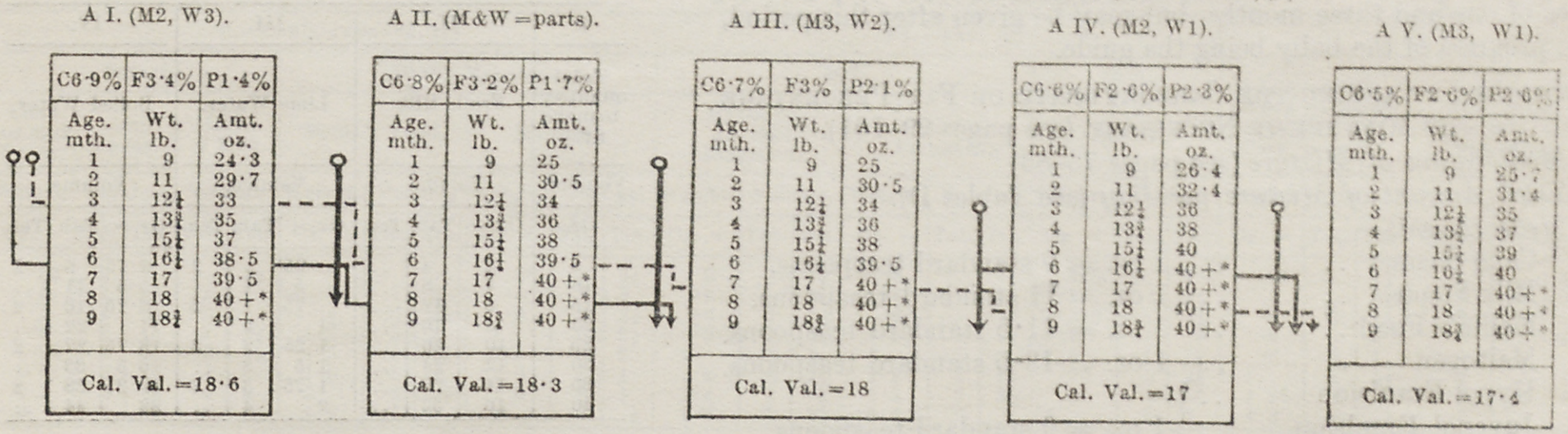
* Either the Lactone Syrup with Maltose, or the Lactone Syrup may be used.

Group A.

Tables A.—Usual Cow's Milk Mixtures.

(Cow's Milk being taken as containing C. 5%, F. 3·5%, P. 3·5%.)



A I. (M2, W3).

C6·9%	F3·4%	P1·4%
Age. mth.	Wt. lb.	Amt. oz.
1	9	24·3
2	11	29·7
3	12¼	33
4	13¾	35
5	15¼	37
6	16¼	38·5
7	17	39·5
8	18	40+*
9	18¾	40+*
Cal. Val.=18·6		

A II. (M&W=parts).

C6·8%	F3·2%	P1·7%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25
2	11	30·5
3	12¼	34
4	13¾	36
5	15¼	38
6	16¼	39·5
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=18·3		

A III. (M3, W2).

C6·7%	F3%	P2·1%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25
2	11	30·5
3	12¼	34
4	13¾	36
5	15¼	38
6	16¼	39·5
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=18		

A IV. (M2, W1).

C6·6%	F2·6%	P2·3%
Age. mth.	Wt. lb.	Amt. oz.
1	9	26·4
2	11	32·4
3	12¼	36
4	13¾	38
5	15¼	40
6	16¼	40+*
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=17		

A V. (M3, W1).

C6·5%	F2·6%	P2·6%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25·7
2	11	31·4
3	12¼	35
4	13¾	37
5	15¼	39
6	16¼	40
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=17·4		

* More than 8 oz. feedings—May need educational diet and extra food, especially in winter months

"Age" = Age at end of x months after birth.
"Weight" = Average weight for normal baby.
"Amount" = Amount in ounces of mixture which should be offered to obtain full caloric needs.
"Cal. Val." = Caloric value per ounce of mixture when final solution is given.

The various lines or "pathways" between and connecting the different columns represent the more common courses followed in grading the feedings from one mixture to the next according to age of infant and digestibility and balance of the mixture. Other "pathways" may be chosen as the general routine or as routine for individual infants as occasion demands.

Usual Ingredients Chosen for Mixtures.

The *usual* ingredients chosen from Table A. I. for use are either in Columns II., III., IV., V. (one of the sugars), VI. (one of the 50 per cent. cod liver oil emulsions), or Columns II., III., IV., VII.

This mixture is usually ordered for normal baby between the ages of one and three months, but may be given after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83)

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar .. .. 1 oz. = 9 standard teaspoons.
Milk Sugar .. .. 1 oz. = 11 standard teaspoons.
Mellin's Food .. .. 1 oz. = 11·5 standard teaspoons.
Maltogen .. .. 1 oz. = 13·5 standard teaspoons.
Hypol Emulsion ..
Juvenol Emulsion .. } 1 oz. = 9 standard teaspoons.
Butter .. ..
Elliot's Emulsion ..
New Zealand Emulsion .. } 1 oz. = 8 standard teaspoons.

A standard tablespoon = ½ one fluid ounce.
A standard teaspoon = ⅛ one fluid ounce.

Table A I.—continued on next page.

I.	II.			III.			IV.		
Total quantity to make up—	Fresh Mlik.			Lime Water.			Boiled Water.		
Volume.	Volume.			Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	2	4	..	·25	..	2	2·75	5	2
10	4	8	..	·5	1	..	5·5	11	..
15	6	12	..	·75	1	2	8·25	16	2
20	8	16	..	1	2	..	11	22	..
25	10	20	..	1·25	2	2	13·75	27	2
30	12	24	..	1·5	3	..	16·5	33	..
35	14	28	..	1·75	3	2	19·25	38	2
40	16	32	..	2	4	..	22	44	..

Table A I.

Milk Proportion.	Percentage Composition.				Caloric Value (per ounce o. mixture).
		C.	F.	P.	
Milk—two-fifths of Total Solution.	Final Solution =	6·9 ..	3·4 ..	1·4 (with carb. and fat added)	18·6
		6·9 ..	1·4 ..	1·4 (with carb. but no fat added)	13·3
		2·0 ..	1·4 ..	1·4 (with no carb. or fat added)	7·6

V.—Carbohydrate. (1)										VI.—Fat. (2)								VII.					
Sugars.					Dextri-Maltoses.					50%.					80%.			Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. (Containing Carb. 40% and Fat 50%.)		
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.							
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·25	..	2	..	2½	·3	..	3½	·26	..	3½	·2	..	1¾	·2	..	1½	·125	..	1	·16	..	1½	·2	..	1½
·5	1	½	1	1	·5	1	3	·5	1	3	·4	..	3½	·4	..	3¼	·25	..	2¼	·3	..	3½	·4	..	3¼
·7	1	2½	2	..	·9	2	2½	·8	2	2½	·6	1	1¼	·6	1	¾	·375	..	3¼	·5	1	1½	·6	1	¾
·9	2	1	2	2½	1·2	3	2	1	3	2½	·8	1	3¼	·8	1	2¼	·5	1	¼	·6	1	3	·8	1	2¼
1·25	2	3	3	1½	1·5	4	1½	1·3	4	2	1	2	1	1	2	..	·6	1	1½	·8	2	1	1	2	..
1·5	3	1	4	..	1·8	5	1	1·6	5	1	1·2	2	2¾	1·2	2	1½	·75	1	2¾	1	2	5½	1·2	2	1½
1·7	3	3½	4	3	2	6	½	1·8	6	1	1·4	3	¼	1·4	2	3¼	·8	1	¾	1·15	3	¼	1·4	2	3¼
2	4	1½	5	1½	2·5	7	..	2	7	½	1·6	3	2¼	1·6	3	¾	1	2	1	1·3	3	2½	1·6	3	¾

(1) *Carbohydrates.*—The quantities for use when no added fat, or Emulsion containing no sugar is also being given. The quantities of each carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lower proportionately.

(2) *Fat.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoons = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table A II. for use are either in Columns II., III., IV. (one of the sugars or dextri-maltoses), V. (one of the 50 per cent. cod liver oil emulsions), or Columns II., III., VI.

This mixture is usually ordered for normal baby between the ages of three and six months, but may be given before or after this period, the progress of the baby being the guide.

Methods of Varying the Carbohydrate or Fat Percentage of Mixture if necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion ..	1 oz. = 9 standard teaspoons.
Juvenol Emulsion ..	
Butter	
Elliot's Emulsion ..	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard tablespoon = ½ one fluid ounce.
A standard teaspoon = ⅛ one fluid ounce.

Table A II.—continued on next page.

I.	II.			III.		
Total quantity to make up—	Fresh Milk.			Boiled Water.		
Volume.	Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	2½	5	..	2½	5	..
10	5	10	..	5	10	..
15	7½	15	..	7½	15	..
20	10	20	..	10	20	..
25	12½	25	..	12½	25	..
30	15	30	..	15	30	..
35	17½	35	..	17½	35	..
40	20	40	..	20	40	..

Table A II.

Milk Proportion.		Percentage Composition. C. F. P.	Caloric Value (per ounce).
Milk and water—equal parts.	Final Solution =	6·8 .. 3·2 .. 1·7 (with carb. and fat added.)	18·3
Milk—one-half of Total Solution.		6·8 .. 1·7 .. 1·7 (with carb. but no fat added.)	14·3
		2·5 .. 1·7 .. 1·7 (with no carb. or fat added.)	9·3

IV.—Carbohydrate. (1)										V.—Fat. (2)									VI.					
Sugars.					Dextri-Maltoses.					50%.						80%.			Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. Containing Carb. 40% and Fat 50%.		
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.								
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·215	..	2	..	2¼	·27	..	3	·23	..	3	·14	..	1¼	·14	..	1	·09	..	¾	·15	..	1¼	·14	..	1
·43	..	3¾	..	4¾	·53	1	2	·46	1	2¼	·29	..	2½	·29	..	2¼	·18	..	1½	·31	..	2½	·29	..	2¼
·64	1	1¾	1	3	·80	2	1¼	·70	2	1½	·43	1	..	·43	..	3½	·27	..	2¼	·47	..	3¾	·43	..	3½
·86	1	3¾	2	1½	1·0	3	¼	·93	3	½	·58	1	1¼	·58	1	¼	·36	..	3¼	·62	1	1	·58	1	¼
1·0	2	1½	2	3½	1·3	3	3½	1·0	3	3½	·72	1	2½	·72	1	1½	·45	1	..	·78	1	2¼	·72	1	1¼
1·3	2	3½	3	2	1·6	4	2½	1·4	4	3	·87	1	3	·87	1	2½	·54	1	¾	·94	1	3¼	·87	1	2¼
1·5	3	1½	4	¼	1·8	5	1½	1·6	5	2	1·0	2	1¼	1·0	2	..	·63	1	1½	1·10	2	¼	1·0	2	..
1·7	3	3½	4	2½	2·0	6	½	1·8	6	1¼	1·16	2	2¼	1·16	2	1	·72	1	2½	1·25	2	2	1·16	2	1

(1) *Carbohydrates.*—The quantities for use when no added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is given. If a mixture of more than one kind is given, the quantities of each must be lowered proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, = 40 ,, ,, = 1 pint.
40 ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table A III. for use are either in Columns II., III., IV. (one of the sugars or dextri-maltoses), V. (one of the 50 per cent. cod liver oil emulsions), or Columns II., III., VI.

This mixture is usually ordered for normal baby between the ages of five and seven months but may be given before or after this period, the progress of the baby being the guide.

Methods of Varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Table D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion	1 oz. = 9 standard teaspoons.
Juvenol Emulsion	
Butter	
Elliot's Emulsion	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard tablespoon = ½ one fluid ounce.
A standard teaspoon = ⅛ one fluid ounce.

Table A III.—continued on next page.

I.	II.			III.		
Total quantity to make up—	Fresh Milk.			Boiled Water.		
Volume.	Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	3	6	..	2	4	..
10	6	12	..	4	8	..
15	9	18	..	6	12	..
20	12	24	..	8	16	..
25	15	30	..	10	20	..
30	18	36	..	12	24	..
35	21	42	..	14	28	..
40	24	48	..	16	32	..

Table A III.

Milk Proportion.		Percentage Composition. C.	F.	P.		Caloric Value (per ounce).
Milk—3 parts.	Final Solution =	6·7 ..	3·0 ..	2·1	(with added carb. and fat.)	18·13
Water—2 parts.		6·7 ..	2·1 ..	2·1	(with carb. but no fat.)	15·76
Milk—$\frac{3}{5}$ths of Total Solution.		3·0 ..	2·1 ..	2·1	(with no carb. or fat.)	11·45

IV.—Carbohydrate. (1)										V.—Fat. (2)									VI.				
Sugars.					Dextri-Maltoses.					50%.						80%.			Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. Containing Carb. 40% and Fat 50%.		
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliott's Emulsion.			Butter.								
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·185	..	1½	..	2	·312	..	2½	·2	..	2¾	·09	..	¾	·09	..	¾	·05	..	½	·149	..	1½	·09	..	¾
·37	..	3¼	1	..	·62	1	1¼	·4	1	1½	·18	..	1½	·18	..	1¼	·11	..	1	·31	..	3¼	·18	..	1¼
·55	1	1	1	2	·93	2	..	·6	2	..	·27	..	2¼	·27	..	2	·16	..	1½	·44	1	1	·27	..	2
·74	1	2½	2	..	1·25	2	2½	·8	2	2¾	·36	..	3¼	·36	..	2¾	·22	..	2	·59	1	2½	·36	..	2¾
·92	2	¼	2	2¼	1·56	3	1¼	1	3	1½	·45	1	..	·45	..	3½	·28	..	2½	·74	2	..	·45	..	3½
1·11	2	2	3	¼	1·87	4	..	1·2	4	¼	·54	1	¾	·54	1	¼	·33	..	3	·89	2	2	·54	1	¼
1·29	2	3½	3	2¼	2·18	4	2½	1·4	4	3	·63	1	1½	·63	1	1	·39	..	3½	1·04	2	3¼	·63	1	1
1·48	3	1¼	4	¼	2·5	5	1¼	1·6	5	1¾	·72	1	2¼	·72	1	2½	·44	1	..	1·19	3	1	·72	1	2½

(1) *Carbohydrates.*—The quantities for use when no added fat, or Emulsion containing no sugar is also being given. The quantities of each carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lower proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoons = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Tables A IV. for use are either in Columns II., III., IV. (one of sugars or dextri-maltoses), V. (one of the 50 per cent. cod liver oil emulsions), Columns II., III., VI.

This mixture is usually ordered for normal baby between the ages of six and eight months but may be given after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion ..	1 oz. = 9 standard teaspoons.
Juvenol Emulsion ..	
Butter	
Elliot's Emulsion ..	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard tablespoon = ½ one fluid ounce.
A standard teaspoon = ⅛ one fluid ounce.

Table A IV.—continued on next page.

I.	II.			III.		
Total quantity to make up—	Fresh Milk.			Boiled Water.		
Volume.	Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	3½	6	3	1⅔	3	1
10	6⅔	13	2	3⅓	6	2
15	10	20	..	5	10	..
20	13½	27	..	6⅔	13	..
25	16¾	33	2	8¼	16	2
30	20	40	..	10	20	..
35	23½	47	..	11½	23	..
40	27	54	..	13	26	..

Table A IV.

Milk Proportion.		Percentage Composition. C. F. P.	Caloric Value (per ounce.
Milk—2 parts.	Final Solution =	6·6 .. 2·6 .. 2·3 (with carb. and fat added.)	17·2
Water—1 part.		6·6 .. 2·3 .. 2·3 (with carb. added.)	16·4
Milk—⅔rds of Total Solution.		3·3 .. 2·3 .. 2·3 (with no carb. or fat added.)	12·6

IV.—Carbohydrate. (1)										V.—Fat. (2)								VI.					
Sugars.					Dextri-Maltoses.					50%.						80%.							
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.			Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. (Containing 40% Carb. and Fat 50%).		
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·162	..	1½	..	1¾	·203	..	2¼	·177	..	2¼	·026	..	¼	·026	..	..	·016	..	..	·152	..	1¾	·026	..	..
·325	..	3	..	3½	·405	..	2½	·354	1	¾	·05	..	½	·05	..	¼	·03	..	¼	·3	..	3¼	·05	..	¼
·48	1	¼	1	1¼	·608	1	3	·53	1	3	·07	..	¾	·07	..	½	·04	..	½	·46	1	1	·07	..	½
·64	1	1½	1	3	·81	2	¼	·7	2	1½	·1	..	1	·1	..	¾	·06	..	¾	·6	1	2¼	·1	..	¾
·81	1	3¼	2	1	1	2	3½	·88	3	..	·13	..	1	·13	..	1	·08	..	1	·76	2	¼	·13	..	1
·97	2	¾	2	5½	1·22	3	2	1·06	3	2¼	·15	..	1¼	·15	..	1¼	·09	..	1¼	·91	2	2	·15	..	1¼
1·13	2	2¼	3	½	1·42	4	..	1·24	4	½	·18	..	1½	·18	..	1½	·11	..	1	1·07	2	3¾	·18	..	1½
1·3	2	3½	3	2¼	1·62	4	2¾	1·42	4	3	·2	..	1¾	·2	..	1¾	·13	..	1	1·22	3	1¼	·2	..	1¼

(1) *Carbohydrates.*—The quantities for use when no added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lower proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints—1 quart.

For daily amounts (see Table A).

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.
Only standard measures must be used.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table A V. for use are either in Columns II., III., IV. (one of the dextri-maltoses).

This mixture is usually ordered for normal baby between the ages of eight and nine months, but may be given before or after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion, Juvenol Emulsion, Butter	1 oz. = 9 standard teaspoons.
Elliot's Emulsion, New Zealand Emulsion	1 oz. = 8 standard teaspoons.

A standard tablespoon = $\frac{1}{2}$ one fluid ounce.

A standard teaspoon = $\frac{1}{8}$ one fluid ounce.

Table A. V.

Milk Proportion.	Percentage Composition.			Caloric Value (per ounce).
	C.	F.	P.	
Milk—3 parts.				
Water—1 part.	Final solution = 6·5 ..	2·6 ..	2·6 (with Carb. added).	17·4
Milk—$\frac{3}{4}$ths of total solution.	3·75 ..	2·6 ..	2·6 (with no Carb. added).	14·2

I.	II.			III.			IV.—Carbohydrate. (1)									
							Sugars.					Dextri-Maltoses.				
Quantity to Make Up.	Fresh Milk.			Boiled Water.			Cane or Milk Sugar.	Cane Sugar.		Milk Sugar.		Mellin's Food.			Maltogen.	
Volume.	Volume.			Volume.			Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	$3\frac{3}{4}$	7	2	$1\frac{1}{4}$	2	2	·137	..	$1\frac{1}{4}$	..	$1\frac{1}{2}$	·17	..	2	·14	..	2
10	$7\frac{1}{2}$	15	..	$2\frac{1}{2}$	5	..	·27	..	$2\frac{1}{2}$	..	3	·34	1	..	·29	1	..
15	$11\frac{1}{4}$	22	2	$3\frac{3}{4}$	7	2	·41	..	$3\frac{3}{4}$	1	$\frac{1}{2}$	·51	1	2	·44	1	2
20	15	30	..	5	10	..	·54	1	$\frac{3}{4}$	1	2	·68	2	..	·59	2	..
25	$18\frac{3}{4}$	37	2	$6\frac{1}{4}$	12	2	·68	1	2	1	$3\frac{1}{2}$	·86	2	2	·74	2	2
30	$22\frac{1}{2}$	45	..	$7\frac{1}{2}$	15	..	·82	1	$3\frac{1}{2}$	2	1	1·0	3	..	·89	3	..
35	$26\frac{1}{4}$	52	2	$8\frac{3}{4}$	17	2	·96	2	..	2	$2\frac{1}{2}$	1·29	3	2	1·0	3	2
40	30	60	..	10	20	..	1·10	2	2	3	..	1·37	4	..	1·19	4	..

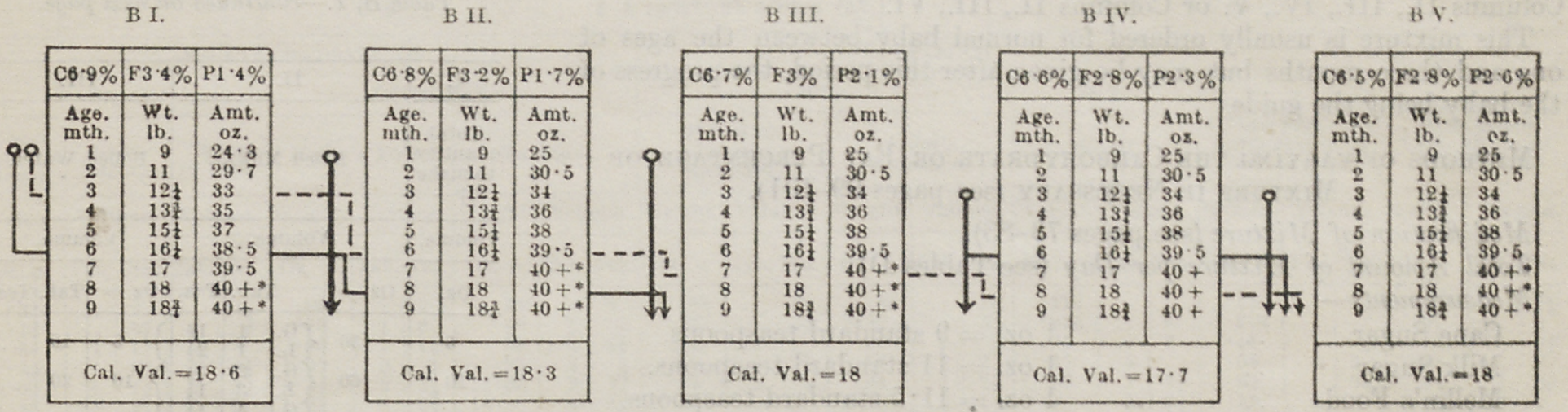
(1) *Carbohydrates.*—The quantities for use when no added fat, or Emulsion containing no sugar, is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lowered proportionately.

Only standard measures must be used.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

Group B.—Tables B.—Dried Cow's Milk Mixtures. Percentages in Dried Milk being taken as—
C. 43%, F. 25%, *P.* 23%.



B I.

C6·9%	F3·4%	P1·4%
Age. mth.	Wt. lb.	Amt. oz.
1	9	24·3
2	11	29·7
3	12¼	33
4	13¾	35
5	15¼	37
6	16½	38·5
7	17	39·5
8	18	40+*
9	18¾	40+*
Cal. Val.=18·6		

B II.

C6·8%	F3·2%	P1·7%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25
2	11	30·5
3	12¼	34
4	13¾	36
5	15¼	38
6	16½	39·5
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=18·3		

B III.

C6·7%	F3%	P2·1%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25
2	11	30·5
3	12¼	34
4	13¾	36
5	15¼	38
6	16½	39·5
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=18		

B IV.

C6·6%	F2·8%	P2·3%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25
2	11	30·5
3	12¼	34
4	13¾	36
5	15¼	38
6	16½	39·5
7	17	40+
8	18	40+
9	18¾	40+
Cal. Val.=17·7		

B V.

C6·5%	F2·8%	P2·6%
Age. mth.	Wt. lb.	Amt. oz.
1	9	25
2	11	30·5
3	12¼	34
4	13¾	36
5	15¼	38
6	16½	39·5
7	17	40+*
8	18	40+*
9	18¾	40+*
Cal. Val.=18		

* More than 8-oz. feedings. May need educational diet and extra food, especially in winter months.

"Age" = Age at end of x months after birth.

"Weight" = Average weight for normal baby.

"Amount" = Amount in ounces of mixture which should be offered to obtain full caloric needs.

"Cal. Val." = Caloric value per ounce of mixture when final solution is given.

The various lines or "pathways" between and connecting the different columns represent the more common courses followed in grading the feedings from one mixture to the next according to age of infant, digestibility, and balance of the mixture. Other "pathways" may be chosen as the general routine or as routine for individual infants as occasion demands.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table B. *I.* for use are either in Columns II., III., IV., V. or Columns II., III., VI.

This mixture is usually ordered for normal baby between the ages of one and three months but may be given after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).
Total Amount of Mixture per Day (see Tables D).
Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion	1 oz. = 9 standard teaspoons.
Juvenol Emulsion ..	
Butter	
Elliot's Emulsion ..	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard tablespoon = $\frac{1}{2}$ one fluid ounce.
A standard teaspoon = $\frac{1}{8}$ one fluid ounce.

Table B. I.—continued on next page.

I.	II.				III.		
Total quantity to make up—	Dried Milk.				Boiled Water.		
Volume.	Volume.				Volume.		
Oz.	Oz. =		Tab.	Tea.	Oz. =	Tab.	Tea.
5	·30	G.	1	1¾	5	10	..
		L.	1	2½			
10	·60	G.	2	3½	10	20	..
		L.	3	1¼			
15	·91	G.	4	1¼	15	30	..
		L.	5	..			
20	1·22	G.	5	3	20	40	..
		L.	6	2½			
25	1·5	G.	7	1	25	50	..
		L.	8	1¼			
30	1·82	G.	8	2¾	30	60	..
		L.	9	3¾			
35	2·13	G.	10	½	35	70	..
		L.	11	2½			
40	2·43	G.	11	2½	40	80	..
		L.	13	1¼			

Table B. I.

	Percentage Composition. C.	F.	P.		Caloric Value (per ounce.)
Final Solution =	6·9 ..	3·4 ..	1·4	(with added fat.)	18·6
	6·9 ..	1·5 ..	1·4	(without added fat.)	13·6

IV.—Carbohydrate. (1)										V.—Fat. (2)										VI.				
Sugars.					Dextri-Maltoses.					50%.						80%.				Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. (Containing Carb. 40% and Fat 50%).		
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.		Maltogen.			Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.								
Weight.	Volume.		Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.			Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·214	..	2	..	2¼	·268	..	3	·233	..	3	·188	..	1½	·188	..	1½	·117	..	1	·139	..	1½	·188	..	1½
·42	..	3¾	1	¾	·53	1	2	·46	1	2¼	·37	..	3¼	·37	..	3	·235	..	2	·278	..	3	·37	..	3
·64	1	1¾	1	3	·80	2	1¼	·69	2	1¼	·56	1	1	·56	1	½	·35	..	3	·41	1	½	·56	1	1½
·85	1	3¾	2	1¼	1·07	3	¼	·93	3	½	·75	1	2¾	·75	1	2	·47	1	..	·55	1	2	·75	1	2
1·07	2	1½	2	3¾	1·34	3	3¼	11·63	3	3¾	·94	2	½	·94	1	3½	·58	1	1¼	·69	1	3½	·94	1	3½
1·28	2	3½	3	2	1·61	4	2½	14	4	2¾	1·13	2	2	1·13	2	1	·7	1	2¼	·83	2	1	1·13	2	1
1·5	3	1½	4	¼	1·87	5	1¾	16·3	5	2	1·31	2	3¾	1·31	2	2½	·82	1	3¼	·97	2	2½	1·31	2	2½
1·7	3	3¼	4	2¾	2·14	6	½	18·6	6	1	1·5	3	1½	1·5	3	..	·94	2	¼	1·11	3	..	1·5	3	..

(1) *Carbohydrates.*—The quantities for use when *no* added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lowered proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.
G. = Full cream Glaxo.
L. = Lactogen.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table B *II.* for use are either in Columns II., III., IV. (one of sugars or dextri-maltoses), V. (one of 50 per cent. cod liver oil emulsions), or Columns II., III., VI.

This mixture is usually ordered for normal baby between the age of one and six months but may be given after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion ..	1 oz. = 9 standard teaspoons.
Juvenol Emulsion ..	
Butter	
Elliot's Emulsion ..	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard tablespoon = $\frac{1}{2}$ one fluid ounce.
A standard teaspoon = $\frac{1}{8}$ one fluid ounce.

Table B. II.—continued on next page.

I.	II.			III.		
Total quantity to make up—	Dried Milk.			Boiled Water.		
Volume.	Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	·37	G. 1 L. 2	3 ..	5	10	..
10	·74	G. 3 L. 4	2 ¼	10	20	..
15	1·11	G. 5 L. 6	1 ½	15	30	..
20	1·48	G. 7 L. 8	.. ½	20	40	..
25	1·85	G. 8 L. 10	3 ¾	25	50	..
30	2·22	G. 10 L. 12	2½ 1	30	60	..
35	2·59	G. 12 L. 14	1¼ 1	35	70	..
40	2·96	G. 14 L. 16	¼ 1	40	80	..

Table B. II.

	Percentage Composition. C.	F.	P.		Caloric Value (per ounce.)
Final Solution =	6·8 ..	3·2 ..	1·7	(with added fat)	18·3
	6·8 ..	1·8 ..	1·7	(without added fat)	14·3

IV.—Carbohydrate. (1)										V.—Fat. (2)									VI.					
Sugars.					Dextri-Maltoses.					50%.						80%.			Sugar of Milk. (When Emulsion containing Carb. 40% is used.)			Emulsion. (Containing Carb. 40% and Fat 50%.)		
Cane or Milk Sugar.	Cane Sugar.		Milk Sugar.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.								
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·181	..	1½	..	2	·226	..	2½	·196	..	2½	·135	..	1	·135	..	1	·843	..	¾	·127	..	1¼	·135	..	1
·36	..	3¼	1	..	·45	1	1½	·39	1	1¼	·27	..	2¼	·27	..	2	1·69	..	1½	·25	..	2¼	·27	..	2
·54	1	¾	1	2	·67	1	3¾	·59	2	..	·40	..	3½	·40	..	3¼	2·63	..	2½	·381	1	..	·40	..	3¼
·72	1	2½	2	..	·90	2	2¼	·78	2	2½	·53	1	¾	·53	1	¼	3·37	..	3	·50	1	1½	·53	1	¼
·90	2	..	2	2	1·13	3	1	·98	3	1¼	·67	1	2	·67	1	1½	4·22	..	3¾	·63	1	3	·67	1	1¼
1·08	2	1¾	3	..	1·35	3	3½	1·18	4	..	·81	2	3¼	·81	1	2½	5·06	1	¼	·76	2	¼	·81	1	2½
1·27	2	3¼	3	2	1·58	4	2	1·37	4	2½	·94	2	½	·94	1	3½	5·9	1	1¼	·88	2	1¾	·94	1	3¼
1·45	3	1	4	..	1·81	5	¾	1·57	5	1	1·08	2	1¾	1·08	2	½	6·75	1	2	1·01	3	..	1·08	2	0½

(1) *Carboh drates.*—The quantities for use when no added fat, or Emulsion containing no sugar is also being given. The quantities of each Carbohydrat mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lowe proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.
G. = Full cream Glaxo.
L. = Lactogen.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table B *III.* for use are either in Columns II., III., IV., V., or Columns II., III., VI.

This mixture is usually ordered for normal baby between the ages of five and six months but may be given before or after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion ..	1 oz. = 9 standard teaspoons.
Juvenol Emulsion ..	
Butter	
Elliot's Emulsion ..	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard teaspoon = $\frac{1}{8}$ one fluid ounce.
A standard tablespoon = $\frac{1}{2}$ one fluid ounce.

Table B. III.—continued on next page.

I.	II.				III.		
Total quantity to make up—	Dried Milk.				Boiled Water.		
Volume.	Volume.				Volume.		
Oz.	Oz. =	—	Tab.	Tea.	Oz. =	Tab.	Tea.
5	·45	G.	2	½	5	..	..
		L.	2	2			
10	·91	G.	4	1¼	10	..	..
		L.	5	..			
15	1·37	G.	6	2	15	..	..
		L.	7	2			
20	1·8	G.	8	2½	20	..	..
		L.	10	..			
25	2·28	G.	10	3¼	25	..	..
		L.	12	2			
30	2·74	G.	13	..	30	..	..
		L.	15	..			
35	3·2	G.	15	½	35	..	..
		L.	17	2			
40	3·6	G.	17	1¼	40	..	..
		L.	20	..			

Table B III.

	Percentage Composition. C.	F.	P.	Caloric Value per ounce.
Final Solution =	6·7 ..	3·0 ..	2·1 (with added fat).	18·12
	6·7 ..	2·28 ..	2·1 (without added fat).	16·24

IV.—Carbohydrate. (1)										V.—Fat. (2)									VI.					
Sugars.					Dextri-Maltoses.					50%.					80%.				Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. (Containing Carb. 40% and Fat 50%).		
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.								
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·139	..	1¼	..	1½	·174	..	2	·15	..	2	·072	..	¾	·072	..	½	·045	..	¼	·111	..	1¼	·072	..	½
·27	..	2½	..	3	·34	1	..	·30	1	..	·14	..	1¼	·14	..	1	·09	..	½	·22	..	2½	·14	..	1
·41	..	3¾	1	½	·52	1	2	·45	1	2¼	·21	..	2	·21	..	1¾	·13	..	1¼	·33	..	3¾	·21	..	1¾
·55	1	1	1	2	·69	2	..	·6	2	¼	·28	..	2½	·28	..	2¼	·18	..	1½	·44	1	¾	·28	..	2¼
·69	1	2¼	1	3½	·86	2	2	·75	2	2¼	·36	..	3¼	·36	..	2¾	·22	..	2	·55	1	2	·36	..	2¾
·83	1	3½	2	1	1·04	3	..	·9	3	½	·43	..	3¾	·43	..	3¼	·27	..	2¼	·66	1	3¼	·43	..	3¼
·97	2	¼	2	2¾	1·21	3	2	1·05	3	2¾	·5	1	½	·5	1	..	·31	..	2¾	·77	2	¼	·5	1	..
1·11	2	2	3	..	1·39	4	..	1·20	4	¾	·57	1	1	·57	1	½	·36	..	3¼	·88	2	1½	·57	1	½

(1) *Carbohydrates.*—The quantities for use when no added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lowered proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

For daily amounts (see Tables D).

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.
G. = Full cream Glaxo.
L. = Lactogen.

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table B. *IV.* for use are either in Columns II., III., IV. (one of the dextri-maltoses), V. (one of 50 per cent. cod liver oil emulsions), or Columns II., III., VI.

This mixture is usually ordered for normal baby between the ages of six and eight months but may be given before or after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion	1 oz. = 9 standard teaspoons.
Juvenol Emulsion	
Butter	
Elliot's Emulsion	1 oz. = 8 standard teaspoons.
New Zealand Emulsion ..	

A standard tablespoon = ½ one fluid ounce.
A standard teaspoon = ⅛ one fluid ounce.

Table B IV.—continued on next page.

I.	II.				III.		
Total quantity to make up—	Dried Milk.				Boiled Water.		
Volume.	Volume.				Volume.		
Oz.	Oz. =	—	Tab.	Tea.	Oz. =	Tab.	Tea.
5	·5	G.	2	1½	5	10	..
		L.	2	3			
10	1	G.	4	3	10	20	..
		L.	5	2			
15	1·5	G.	7	½	15	30	..
		L.	8	1			
20	2	G.	9	2	20	40	..
		L.	11	..			
25	2·5	G.	11	3½	25	50	..
		L.	13	3			
30	3	G.	14	1	30	60	..
		L.	16	2			
35	3·5	G.	16	2½	35	70	..
		L.	19	1½			
40	4	G.	19	..	40	80	..
		L.	22	..			

Table B. IV.

	Percentage Composition. C.	F.	P.	Caloric Value per ounce.
Final Solution =	6·6 ..	2·8 ..	2·3 (with added fat).	17·7
	6·6 ..	2·5 ..	2·3 (without added fat).	16·9

IV.—Carbohydrate. (1)										V.—Fat. (2)									VI.					
Sugars.					Dextri-Maltoses.					50%.					80%.				Sugar of Milk. (When Emulsion containing 40% Carb. is used).			Emulsion. (Containing Carb. 40% and Fat 50%).		
Cane or Milk Sugar.	Cane Sugar.		Sugar of Milk.		Mellin's Food.			Maltogen.		Hypol or Juvenol Emulsion.			Elliot's Emulsion.		Butter.									
Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.	Weight.	Volume.		Weight.	Volume.	Weight.	Volume.			Volume.			Volume.		
Oz. =	Tab.	Tea.	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·115	..	1	..	1¼	·144	..	1½	·125	..	1½	·025	..	..	·025	..	..	·015	..	..	·1	..	1	·025	..	..
·23	..	2	..	2½	·28	..	3¼	·25	..	3¼	·05	..	½	·05	..	¼	·03	..	¼	·21	..	2¼	·05	..	¼
·34	..	3	..	3¾	·43	1	1	·37	1	1	·075	..	¾	·07	..	½	·04	..	¼	·32	..	3½	·07	..	½
·46	1	..	1	1	·57	1	2¼	·5	1	2¾	·1	..	1	·1	..	½	·06	..	½	·42	1	¾	·1	..	¾
·57	1	1	1	2¼	·71	2	¼	·62	2	¼	·12	..	1	·12	..	1	·07	..	½	·53	1	1¼	·12	..	1
·69	1	2	1	3½	·86	2	2	·75	2	2	·15	..	1¼	·15	..	1	·09	..	¾	·64	1	3	·15	..	1
·8	1	3¼	2	¾	1	2	3½	·87	2	3¾	·17	..	1½	·17	..	1¼	·1	..	1	·75	2	¼	·17	..	1¼
·92	2	¼	2	2	1·15	3	1¼	1	3	1½	·2	..	1¾	·2	..	1½	·12	..	1	·85	2	1¼	·2	..	1½

(1) *Carbohydrates.*—The quantities for use when no added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrates mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lowered proportionately.

(2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Only standard measures must be used.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.
G. = Full cream Glaxo.
L. = Lactogen.

For Daily Amounts (see Tables D).

Usual Ingredients Chosen for Mixtures.

The usual ingredients chosen from Table B *V.* for use are either in Columns II., III., IV. (one of the dextri-maltoses).

This mixture is usually ordered for normal baby between the ages of eight and nine months, but may be given before or after this period, the progress of the baby being the guide.

Methods of varying the Carbohydrate or Fat Percentage of Mixture if Necessary (see pages 99–101).

Modification of Mixture (see pages 73–83).

Total Amount of Mixture per Day (see Tables D).

Measurements—

Cane Sugar	1 oz. = 9 standard teaspoons.
Milk Sugar	1 oz. = 11 standard teaspoons.
Mellin's Food	1 oz. = 11·5 standard teaspoons.
Maltogen	1 oz. = 13·5 standard teaspoons.
Hypol Emulsion	1 oz. = 9 standard teaspoons.
Juvenol Emulsion	
Butter	
Elliot's Emulsion	1 oz. = 8 standard teaspoons.
New Zealand Emulsion	

A standard tablespoon = $\frac{1}{2}$ one fluid ounce.

A standard teaspoon = $\frac{1}{8}$ one fluid ounce.

Table B. V.

Percentage Composition. C. F. P. Caloric Value (per ounce.)

Final Solution = 6·5 .. 2·8 .. 2·6 (with no added fat) .. 18 (approx.).

I.	II.			III.			IV.—Carbohydrate. (1)									
							Sugars.					Dextri-maltroses.				
Quantity to Make Up.	Dried Milk.			Boiled Water.			Cane or Milk Sugar.	Cane Sugar.		Milk Sugar.		Mellin's Food.			Maltogen.	
Volume.	Volume.			Volume.			Weight.	Volume.		Volume.		Weight.	Volume.		Weight.	Volume.
Oz.	Oz.	Tab.	Tea.	Oz.	Tab.	Tea.	Oz.	Tab.	Tea.	Tab.	Tea.	Oz.	Tab.	Tea.	Oz.	Tab. Tea.
5	·565	G. 2 L. 3	2¾ ¼	5	10	..	·082	..	¾	..	1	·104	..	1	·89	.. 1
10	1·13	G. 5 L. 6	1½ ¾	10	20	..	·16	..	1½	..	1¾	·20	..	2¼	1·78	.. 2¼
15	1·69	G. 8 L. 9	¼ 1¼	15	30	..	·24	..	2¼	..	2¾	·30	..	3½	2·67	.. 3½
20	2·26	G. 10 L. 12	3 1¾	20	40	..	·32	..	3	..	3½	·40	1	¾	3·56	1 ¾
25	2·82	G. 13 L. 15	1¾ 2	25	50	..	·41	..	3¾	1	½	·51	1	1¾	4·46	1 2
30	3·39	G. 16 L. 18	¼ 2½	30	60	..	·49	1	¼	1	1¼	·61	1	3	5·35	1 3¼
35	3·95	G. 18 L. 21	3 3	35	70	..	·57	1	1	1	2¼	·71	2	¼	6·23	2 ¼
40	4·52	G. 21 L. 24	1¾ 3¼	40	80	..	·65	1	2	1	3¼	·81	2	1¼	7·12	2 1¼

(1) *Carbohydrates.*—The quantities for use when *no* added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lowered proportionately. (2) *Fats.*—The quantities for use when Emulsion contains *no* sugar.

Only standard measures must be used.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.
G. = Full cream Glaxo.
L. = Lactogen.

Group C.—Tables C.—Special Cow's Milk Mixtures—Percentages in Cow's Milk being taken as—
C. 5%, F. 3·5%, P. 3·6%.
Percentages in Condensed Milk being taken as—
C. 54%, F. 9·2%, P. 9·3%.

C I. Split Proteins with Emulsion.

C6·9%	F3·4%	P1·4%
Age. mth.	Wt. lb.	Amt. oz.
1	9	24·3
2	11	29·7
3	12¼	33
4	13¾	35
5	15¼	37
6	16¼	38·5
7	17	39·5
8	18	40+*
9	18¾	40+*
Cal. Val. = 18·6		

C II. Split Proteins with "Top" Milk.

C7·2%	F3·3%	P1·4%
Age. mth.	Wt. lb.	Amt. oz.
1	9	23·7
2	11	28·9
3	12¼	32·2
4	13¾	34
5	15¼	36
6	16¼	37·6
7	17	38·4
8	18	39·7
9	18¾	40+*
Cal. Val. = 18·9		

C III. "Top" Milk.

C6·9%	F3·4%	P1·4%
Age. mth.	Wt. lb.	Amt. oz.
1	9	24·3
2	11	29·7
3	12¼	33
4	13¾	35
5	15¼	37
6	16¼	38·5
7	17	39·5
8	18	40+*
9	18¾	40+*
Cal. Val. = 18·6		

C IV. Condensed Milk (1 in 8 vol.)

C 8%	F 1·37%	P 1·38%
Age. mth.	Wt. lb.	Amt. oz.
Only a temporary mixture at any age. Additional fat needed to raise calorific value and give vitamin		
Cal. Val. = 14·5		

C V. "Lactone Syrup" Mixture.

C8%	F3·3%	P3·3%
Age. mth.	Wt. lb.	Amt. oz.
1	9	20·5
2	11	25
3	12¼	27·8
4	13¾	29·3
5	15¼	31·2
6	16¼	32·5
7	17	33·2
8	18	34·3
9	18¾	35·7
Cal. Val. = 21·8		

* More than 8-oz. feedings. May need educational diet and extra food, especially in winter months.

"Age" = Age at end of x months after birth.
"Weight" = Average weight for normal baby.
"Amount" = Amount in ounces of mixture which should be offered to obtain full caloric needs.
"Cal. Val." = Caloric value per ounce of mixture when final solution is given.

The perpendicular lines represent the usual ages at which the various mixtures are prescribed.

Table C I.—Split

Percentage Composition.
C. 6·9% F. 3·4% P. 1·4%

I.	II.			III.			IV.			V.			VI. (1)		
To make—	Fresh Milk.			Whey.			Lime Water.			Boiled Water.			Sugar of Milk.		
Volume.	Volume.			Volume.			Volume.			Volume.			Weight.	Volume.	
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	1½	3	..	1⅔	3	1¼	¼	..	2	5	10	..	·19	..	2
10	3	6	..	3⅓	6	2½	½	1	..	10	20	..	·38	1	..
15	4½	9	..	5	10	..	¾	1	2	15	30	..	·56	1	2¼
20	6	12	..	6⅔	13	1¼	1	2	..	20	40	..	·75	2	¼
25	7½	15	..	8⅓	16	2½	1¼	2	2	25	50	..	·95	2	2¼
30	9	18	..	10	20	..	1½	3	..	30	60	..	1·14	3	½
35	10½	21	..	11⅔	23	1¼	1¾	3	2	35	70	..	1·33	3	2½
40	12	24	..	13⅓	26	2½	2	4	..	40	80	..	1·52	4	¾

(1) *Carbohydrates.*—The quantities for use when no added fat or Emulsion containing no sugar is also being given. The quantities of each Carbohydrate mentioned are the *total amounts* for use when *only one kind* is being given. If a mixture of more than one kind is given, the quantities of each must be lower proportionately.

Only standard measures must be used.

Proteins with Emulsion.

Caloric Value (per ounce).
18·6.

VII. (2)									VIII.					
50%.						80%.			Sugar of Milk.			Emulsion. (Containing 40% Carb., and 50% Fat.)		
Hypol or Juvenol Emulsion.			Elliot's Emulsion.			Butter.			(When Emulsion containing 40% Carb.)					
Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.		Weight.	Volume.	
Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
·196	..	1¾	·196	..	1½	·123	..	1	·114	..	1¼	·196	..	1½
·39	..	3½	·39	..	3	·246	..	2	·22	..	2½	·39	..	3
·58	1	1¼	·58	1	¾	·369	..	3¼	·33	..	3	·58	1	¾
·78	1	3	·78	1	2¼	·49	1	¼	·44	1	1	·78	1	2¼
·98	2	¾	·98	1	3¾	·61	1	1½	·55	1	2	·98	1	3¾
1·17	2	2½	1·17	2	1½	·73	1	2¼	·67	1	3¼	1·17	2	1¼
1·37	3	¼	1·37	2	3	·86	1	3¾	·78	2	½	1·37	2	3
1·57	3	2	1·57	3	½	·98	2	¼	·89	2	1¼	1·57	3	½

(2) *Fats.*—The quantities for use when Emulsion contains no sugar.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, ,, = 40 ,, ,, = 1 pint.
40 ,, ,, = 80 ,, ,, = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

(Adopted from Sir Truby King's Teachings.)

Percentage and Caloric Value of this Mixture with a Setting—
(Cow's Milk C5. 3.5 3.5.)

Hours Set.	Sugar.	Fat.	Protein.	Calories per Ounce.
1	7·2	1·7	1·4	14·7
2	7·2	2	1·4	15·6
3	7·2	2·4	1·4	16·6
4	7·2	2·6	1·4	17·1
5	7·2	2·8	1·4	17·5
6	7·2	2·9	1·4	18
7	7·2	3·3	1·4	18·9

N.B.—(Pages 73-78.—Adaption of Fat for Baby's Use).

Table C II.—Split Proteins with Top Milk.

Percentage Composition.

C.	F.	P.
7·2	3·3	1·4

Caloric Value (per ounce).
18·9.

To Make—	Set the following Amount of Milk for seven hours.			Take "Top" Milk.			Whey.			Lime Water.			Boiled Water to—			Sugar of Milk.		
Volume.	Volume.			Volume.			Volume.			Volume.			Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.
5	7	14	..	1½	3	..	1⅔	3	1¼	¼	..	2	5	10	..	·19	..	2
10	13	26	..	3	6	..	3⅓	6	2½	½	1	..	10	20	..	·38	1	..
15	20	40	..	4½	9	..	5	10	..	¾	1	2	15	30	..	·56	1	2¼
20	27	54	..	6	12	..	6⅔	13	1¼	1	2	..	20	40	..	·75	2	¼
25	33	66	..	7½	15	..	8⅓	16	2½	1¼	2	2	25	50	..	·95	2	2¼
30	40	80	..	9	18	..	10	20	..	1½	3	..	30	60	..	1·14	3	½
35	47	94	..	10½	21	..	11⅔	23	1¼	1¾	3	2	35	70	..	1·33	3	2¼
40	54	108	..	12	24	..	13⅓	26	2½	2	4	..	40	80	..	1·52	4	¾

Only Standard Measures must be used.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, = 40 ,, ,, = 1 pint.
40 ,, = 80 ,, ,, = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea. = Teaspoon.
For daily amounts (see Tables D).

(Adopted from Sir Truby King's Teachings.)

Hours Set.	Sugar.	Fat.	Protein.	Calories. per oz.
1	6·9	2·2	1·4	15·5
2	6·9	2·7	1·4	16·8
3	6·9	2·9	1·4	17·4
4	6·9	3·0	1·4	17·6
5	6·9	3·1	1·4	17·9
6	6·9	3·2	1·4	18·1
7	6·9	3·4	1·4	18·6

Table C III.—"Top" Milk Mixture.

Percentage Composition.

C.	F.	P.
6·9%	3·4%	1.4%

Caloric Value (per ounce).
18.6.

To Make—	Set the following Amount of Milk for seven hours.			Take "Top" Milk.			Lime Water.			Boiled Water to—			Sugar of Milk.		
Volume.	Volume.			Volume.			Volume.			Volume.			Volume.		
Oz.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz. =	Tab.	Tea.	Oz.	Tab.	Tea.
5	7	14	..	2	4	..	¼	..	2	2¾	5	2	·25	..	2½
10	13	26	..	4	8	..	½	1	..	5½	11	..	·5	1	1
15	20	40	..	6	12	..	¾	1	2	8¼	16	2	·7	2	..
20	27	54	..	8	16	..	1	2	..	11	22	..	·9	2	2½
25	33	66	..	10	20	..	1¼	2	2	13¾	27	2	1·25	3	1½
30	40	80	..	12	24	..	1½	3	..	16½	33	..	1·5	4	..
35	47	94	..	14	28	..	1¾	3	2	19¼	38	2	1·7	4	3
40	54	108	..	16	32	..	2	4	..	22	44	..	2	5	1½

Only standard measures must be used.

1 liquid oz. = 2 standard tablespoonsfuls = 8 standard teaspoons.
20 ,, = 40 ,, ,, = 1 pint.
40 ,, = 80 ,, ,, = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea = teaspoon.
For daily amounts (see Tables D).

Table C IV.—Condensed Milk Mixture.

Proportion.	Percentage Composition.			Caloric Value (per ounce).
	C.	F.	P.	
1 in 8 volume measure.	8 ..	1·37 ..	1·38	14·5

The percentage composition of the condensed milk being calculated as C. 54%, F. 9·2%, P. 9·3%.

To Make Up.	Condensed Milk.				Boiled Water.		
Volume.	Weight.	Volume.			Volume.		
Oz.	Oz.	Oz.	Tab.	Tea.	Oz.	Tab.	Tea.
5	·743	·56	1	½	4·44	8	3½
10	1·49	1·14	2	1	8·88	17	3
15	2·2	1·68	3	1½	13·3	26	2
20	2·9	2·2	4	2	17·7	35	2
25	3·7	2·8	5	2½	22·2	44	1
30	4·4	3·3	6	3	26·6	53	1
35	5·2	3·9	7	3½	31·1	62	..
40	5·9	4·8	9	..	35·5	71	..

1 oz. (by volume) condensed milk = 1·34 oz. by weight.
1 oz. (by volume) condensed milk = 2 standard tablespoons.

Only standard measures must be used.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, = 40 ,, ,, = 1 pint.
40 ,, = 80 ,, ,, = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

For daily amounts (see Table D).

Table C V.

Proportion.	Percentage Composition.	Caloric Value (per ounce).
1 oz. lactone syrup with maltose 20 oz. boiled milk or lactone syrup.	C. 8 .. F. 3·3 .. P. 3·3	(When using cow's milk with the following percentage values :— C. 5, F. 3·5, P. 3·5.) = 21·8.

To Make Up.	Lactone Syrup with Maltose.			Boiled Milk.		
Oz.	Oz.	Tab.	Tea.	Oz.	Tab.	Tea.
5	·238	..	1½	4·76	9	2
10	·476	..	3	9·52	19	..
15	·715	1	½	14·3	28	2
20	·952	1	2	19·0	38	..
25	1·19	1	3½	23·8	47	2
30	1·43	2	1	28·6	57	..
35	1·67	2	2½	33·3	66	2
40	1·9	3	..	38·1	76	..

Only standard measures must be used.

1 liquid oz. = 2 standard tablespoonfuls = 8 standard teaspoons.
20 ,, = 40 ,, .. = 1 pint.
40 ,, = 80 ,, .. = 2 pints = 1 quart.

Oz. = ounce.
Tab. = tablespoon.
Tea. = teaspoon.

For daily amounts (see Tables D).

TABLES D.

Tables for Guidance in deciding the Total Quantities in Ounces of Cows' Milk Mixtures to be prepared for use in Twenty-four Hours, for Infants up to Nine Months of Age within the usual expected Range Weights at the different Months of Age.

Standard Height-Weight-Age Table for Children from Birth to School Age.

Compiled by Robert M. Woodbury, Ph. D., Child's Bureau, U.S. Department of Labour.

Girls.

Height in Inches.	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
AGE.	WEIGHT IN POUNDS.																													
1m	8	9	10	11	12	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3m	..	10	11	12	13	14	15	16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6m	..	..	..	13	14	15	16	17	19	19	21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9m	..	..	..	..	14	15	17	18	19	20	21	22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12m	..	..	..	..	..	..	17	18	19	20	21	22	23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18m	..	..	..	..	..	..	..	..	19	20	21	23	24	25	26	29	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24m	..	..	..	..	..	..	..	..	..	..	21	23	24	25	26	29	30	31	..	..	..	..	..	..	..	..	..	..	..	..
30m	..	..	..	..	..	..	..	..	..	..	..	23	24	25	26	29	30	31	33	34	..	..	..	..	..	..	..	..	..	..
36m	..	..	..	..	..	..	..	..	..	..	..	..	25	26	27	29	30	31	33	34	35	..	..	..	..	..	..	..	..	..
48m	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29	30	31	33	34	36	37	39	40	..	..	..	..	..	..
60m	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	32	33	34	36	37	39	41	42	..	..	..	..	..
72m	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	34	36	37	39	41	42	45	47	50	52	..

Tables D.—Standard Height-Weight-Age Table for Children from Birth to School Age—continued.

Boys.

Height in Inches.	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
AGE.	WEIGHT IN POUNDS.																													
1m	8	9	10	11	12	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3m	..	10	11	12	13	14	15	16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6m	..	..	..	13	14	15	17	18	19	20	22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9m	..	..	..	..	..	16	17	18	19	21	22	23	24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12m	..	..	..	..	..	..	18	19	20	21	22	23	24	26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18m	..	..	..	..	..	..	..	..	20	21	22	23	24	26	27	29	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24m	..	..	..	..	..	..	..	..	..	..	22	23	25	26	27	29	30	32	..	..	..	..	..	..	..	..	..	..	..	..
30m	..	..	..	..	..	..	..	..	..	..	..	24	25	26	27	29	31	32	33	35	..	..	..	..	..	..	..	..	..	..
36m	..	..	..	..	..	..	..	..	..	..	..	..	..	26	27	29	31	32	33	35	36	..	..	..	..	..	..	..	..	..
48m	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29	31	32	33	35	36	38	39	41	..	..	..	..	..	..
60m	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32	34	35	36	38	39	41	43	45	..	..	..	..
72m	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	36	38	39	41	43	45	48	50	52	55

Normal children should make regular annual gains in weight and height. These tables should be used as a means in checking up on the child's development. Take the age to the nearest month, height of to nearest inch, and weight to nearest pound.

There is at present no complete Height–Weight–Age Table for Australian Children, so this Table, compiled by R. M. Woodbury, Ph.D., is taken as a guide.

Table D 1.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the First Month of Age.																				Total quantities in ounces of mixture in 24 hours.
7	50	350	12·5	13	13·5	14	14·6	15·2	15·9	16·7	17·5	18·4	19·4	20·6	21·9	23·3	25	26·9	29	
7·5	50	375	13·4	13·9	14·4	15	15·6	16·3	17	17·8	18·7	19·7	20·8	22	23·4	25	26·8	28·8	..	
8	50	400	14·3	14·8	15·4	16	16·7	17·4	18·2	19	20	21	22·2	23·5	25	26·7	28·6	..	..	
8·5	50	425	15·2	15·7	16·3	17	17·7	18·5	19·3	20·2	21·2	22·3	23·6	25	26·5	28·3	..	..	..	
8·75	**50**	**437**	15·6	16·2	16·8	17·5	18·2	19	19·9	20·8	**21·9**	**23**	**24·3**	**25·7**	27·3	29·2	..	..	..	
9	**50**	**450**	16·1	16·7	17·3	18	18·7	19·5	20·5	21·4	**22·5**	**23·7**	**25**	**26·4**	28	..	..	..	..	
9·25	**50**	**462**	16·5	17	17·8	18·5	19·3	20	21	22	**23**	**24·3**	**25·7**	**27·2**	28·9	..	..	..	..	
9·5	50	475	17	17·6	18·3	19	19·8	20·6	21·6	22·6	23·7	25	26·4	27·9	29·7	..	..	..	..	
10	50	500	17·8	18·5	19·2	20	20·8	21·8	22·6	23·8	25	26·3	27·8	29·4	..	..	..	..	..	
10·5	50	525	18·7	19·4	20·2	21	21·9	22·8	23·9	25	26·2	27·6	29·1	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 2.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the Second Month of Age.																				Total quantities in ounces of mixture in 24 hours.
9	50	450	16	16·7	17·3	18	18·7	19·5	20·5	21·4	22·5	23·7	25	26·4	28	30	32	34·6	37·5	
9·5	50	475	17	17·6	18·3	19	19·8	20·6	21·6	22·6	23·7	25	26·4	27·9	29·3	31·6	33·9	36·5	39·6	
10	50	500	17·8	18·5	19·2	20	20·8	21·8	22·6	23·8	25	26·3	27·5	29·4	31·3	33·3	35·7	38·5	..	
10·5	50	**525**	18·7	19·4	20·2	21	21·9	22·8	23·9	25	**26·2**	**27·6**	**29·1**	**30·9**	32·8	34·9	37·5	..	..	
11	50	**550**	19·6	20·4	21·2	22	22·9	23·9	25	26·2	**27·5**	**28·9**	**30·5**	**32·4**	34·4	36·7	39·2	..	..	
11·5	50	**575**	20·6	21·3	22	23	24	25	26·2	27·4	**28·8**	**30·3**	**32**	**33·9**	35·9	38·4	..	..	..	
12	50	600	21·4	22·2	23	24	25	26	27·3	28·6	30	31·6	33·3	35·3	37·5	40	..	..	..	
12·5	50	625	22·3	23	24	25	26	27·2	28·4	29·7	31·3	32·9	34·7	36·7	39	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 3.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the Third Month of Age.																				Total quantities in ounces of mixture in 24 hours.
10·5	50	525	18·7	19·4	20·2	21	21·9	22·8	23·9	25	26·2	27·6	29	30·9	32·8	34·9	37·5	40·3	..	
11	50	550	19·6	20·4	21·2	22	22·9	23·9	25	26·2	27·5	28·9	30·5	32·4	34·4	36·7	39·2	..	..	
11·5	50	575	20·6	21·3	22	23	24	25	26·2	27·4	28·8	30·3	32	33·9	35·9	38·4	..	..	..	
12	50	**600**	21·4	22·2	23	24	25	26	27·3	28·6	**30**	**31·6**	**33·3**	**35·3**	37·5	40	..	..	..	
12·25	50	**612**	21·9	22·7	23·6	24·5	25·5	26·6	27·8	29·2	**30 6**	**32·2**	**34**	**36**	38·3	..	..	..	..	
12·5	50	**625**	22·3	23	24	25	26	27·2	28·4	29·7	**31·3**	**32·9**	**34·7**	**36·7**	39	..	..	..	..	
13	50	650	23·2	24	25	26	27	28·3	29·5	30·9	32·5	34·2	36	38·3	..	..	..	..	..	
13·5	50	675	24·1	25	26	27	28	29·3	30·7	32	33·7	35·5	37·5	39·7	..	..	..	..	..	
14	50	700	25	25·9	26·9	28	29·2	30·4	31·8	33·3	35	36·9	38·9	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 4.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the Fourth Month of Age.																				Total quantities in ounces of mixture in 24 hours.
11·75	47	552	19·7	20·5	21·2	22	23	24	25	26·3	27·6	29	30·7	32·5	34·5	36·8	38·4	..	..	
12	47	564	20	20·9	21·7	22·5	23·5	24·5	25·6	26·9	28·2	29·7	31·3	33·2	35·3	37·6	40	..	..	
12·5	47	588	21	21·8	22·6	23·5	24·5	25·5	26·7	28	29·4	30·9	32·6	34·6	36·7	39·2	..	..	..	
13	47	611	21·8	22·7	23·5	24·4	25·5	26·6	27	29	30·5	32·2	33·9	36	38·2	..	..	..	..	
13·5	47	**634**	22·6	23·5	24·4	25·3	26·4	27·5	28·8	30·2	**31·7**	**33·4**	**35·2**	**37·3**	39·6	..	..	..	..	
13·75	47	**647**	23	23·9	24·9	25·9	26·9	28	29·3	30·8	**32·3**	**34**	**35·9**	**38**	40	..	..	..	..	
14	47	**658**	23·5	24·4	25·3	26·3	27·4	28·6	29·9	31·4	**32·9**	**34·7**	**36·5**	**38·7**	..	..	..	..	..	
14·5	47	682	24·3	25·3	26·2	27·3	28·4	29·6	31	32·4	34	35·9	37·9	40	..	..	..	..	..	
15	47	705	25·2	26	27	28·2	29·4	30·7	32	33·6	35·2	37	39·2	..	..	..	..	..	..	
15·5	47	728	26	27	28	29	30·3	31·6	33	34·7	36·4	38·3	40	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 5.

Usual range of expected weights at the end of the Fifth Month of Age. Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
13	45	585	20·9	21·7	22·5	23·4	24·4	25·4	26·6	27·8	29·2	30·8	32·5	34·4	36·5	39	..	..	..	Total quantities in ounces of mixture in 24 hours.
13·5	45	607	21·7	22·5	23·4	24·3	25·3	26·4	27·6	28·9	30·4	32	33·8	35·7	38	..	..	..	..	
14	45	630	22·5	23·3	24·2	25·2	26·2	27·4	28·6	30	31·5	33	35	37	39·3	..	..	..	..	
14·5	45	652	23·3	24	25	26	27·2	28·4	29·7	31	32·6	34·4	36·2	38·4	..	..	..	..	..	
15	45	**675**	24	25	26	27	28	29·3	30·7	32	**33·7**	**35**	**37·5**	**39·6**	..	..	..	..	..	
15·25	45	**686**	24·5	25·4	26·4	27·4	28·6	29·9	31·2	32·7	**34·3**	**36**	**38·2**	**40**	..	..	..	..	..	
15·5	45	697	24·9	25·8	26·8	27·9	29	30·3	31·7	33·2	34·9	36·7	38·7	..	..	..	..	..	..	
16	45	720	25·7	26·7	27·7	28·8	30	31·3	32·7	34·3	36	37·9	40	..	..	..	..	..	..	
16·5	45	742	26·5	27·5	28·6	29·7	30·9	32·3	33·7	35·4	37	39	..	..	..	..	..	..	..	
17	45	765	27·3	28·3	29·4	30·6	31·9	33·3	34·8	36·4	38·2	40	..	..	..	..	..	..	..	
17·5	45	787	28	29	30·3	31·5	32·8	34·2	35·8	37·5	39·3	41·4	..	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 6.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the Sixth Month of Age.																				Total quantities in ounces of mixture in 24 hours.
13·75	44	605	21·6	22·4	23·3	24·2	25·2	26·3	27·5	28·8	30·3	31·9	33·6	35·6	37·8	40·3	..	..	..	
14	44	616	22	22·8	23·7	24·7	25·7	26·8	28	29·3	30·8	32·4	34·2	36·3	38·5	..	..	..	..	
14·5	44	638	22·8	23·6	24·5	25·5	26·6	27·7	29	30·4	31·9	33·6	35·4	37·5	39·9	..	..	..	..	
15	44	660	23·6	24·5	25·4	26·4	27·5	28·7	30	31·4	33	34·7	36·7	38·8	..	..	..	..	..	
15·5	44	682	24·4	25·3	26·2	27·3	28·5	29·7	31	32·5	34	35·9	37·9	40·2	..	..	..	..	..	
16	44	**704**	25	26	27	28	29·3	30·6	32	33·5	**35·2**	**37**	**39**	**41·4**	..	..	..	..	..	
16·5	44	**726**	25·9	26·9	27·9	29	30·3	31·5	33	34·5	**36·3**	**38·2**	**40·3**	**42·7**	..	..	..	..	..	
17	44	748	26·7	27·7	28·8	29·9	31	32·5	34	35·6	37·4	39·3	..	..	..	..	..	..	..	
17·5	44	770	27·5	28·5	29·6	30·8	32	33·5	35	36·7	38·5	40·5	..	..	..	..	..	..	..	
18	44	792	28·3	29·3	30·4	31·7	33	34·4	36	37·7	39·6	..	..	..	..	..	..	..	..	
18·5	44	814	29	30	31·3	32·6	33·9	35·4	37	38·7	..	..	..	..	..	..	..	..	..	
18·75	44	825	29·5	30·6	31·7	33	34·4	35·9	37·5	39·3	..	..	..	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 7.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the Seventh Month of Age.																				Total quantities in ounces of mixture in 24 hours.
15	43	645	23	23·9	24·8	25·8	26·9	28	29·3	30·7	32·3	34	35·9	37·9	40·3	43	..	..	..	
15·5	43	667	23·8	24·7	25·6	26·7	27·8	29	30·3	31·7	33·3	35	37	39·2	41·7	44·4	..	..	..	
16	43	688	24·6	25·5	26·5	27·5	28·7	29·9	31·3	32·8	34·4	36·2	38·3	40·5	43	..	..	..	..	
16·5	43	710	25·3	26·3	27·3	28·4	29·6	30·9	32	33·8	35·5	37·4	39·4	41·8	44·3	..	..	..	..	
16·75	43	**720**	25·7	26·7	27·7	28·8	30	31·3	32·7	34·3	**36**	**37·9**	**40**	**42·3**	..	..	..	..	..	
17	43	**731**	26	27	28	29·2	30·4	31·8	33·2	34·8	**36·5**	**38·4**	**40·7**	**43**	..	..	..	..	..	
17·5	43	**752**	26·8	27·9	28·9	30	31·3	32·7	34·2	35·8	**37·6**	**39·6**	**41·8**	**44·2**	..	..	..	..	..	
18	43	774	27·6	28·7	29·8	31	32·3	33·7	35·2	36·9	38·7	40·7	43	..	..	..	..	..	..	
18·5	43	795	28·4	29·5	30·5	31·8	33	34·5	36	37·8	39·7	41·8	44·2	..	..	..	..	..	..	
19	43	817	29·2	30·3	31·4	32·7	34	35·5	37	38·9	40·8	43	..	..	..	..	..	..	..	
19·5	43	838	29·9	31	32·2	33·5	34·9	36·4	38	39·9	41·9	44	..	..	..	..	..	..	..	
20	43	860	30·7	31·8	33	34·4	35·8	37·4	39	40·9	43	..	..	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 8.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
Usual range of expected weights at the end of the Eighth Month of Age. 15	42	630	22·5	23·3	24·2	25·2	26·2	27·4	28·6	30	31·5	33·2	35	37	39·4	42	45	..	..	Total quantities in ounces of mixture in 24 hours.
15·5	42	651	23·3	24	25	26	27	28·3	29·6	31	32·6	34·3	36·2	38·3	40·7	43·4	..	..	..	
16	42	672	24	24·9	25·9	26·9	28	29·2	30·5	32	33·6	35·3	37·3	39·5	42	44·8	..	..	..	
16·5	42	693	24·7	25·7	26·7	27·7	28·9	30	31·5	33	34·6	36·5	38·5	40·8	43·3	..	..	..	..	
17	42	714	25·5	26·5	27·5	28·6	29·7	31	32·4	34	35·7	37·6	39·6	42	44·6	..	..	..	..	
17·5	42	**735**	26·3	27·2	28·3	29·4	30·6	31·9	33·4	35	**36·7**	**38·6**	**40·8**	**43·2**	..	..	..	..	..	
18	42	**756**	27	28	29	30·2	31·5	32·9	34·3	36	**37·7**	**39·7**	**41·9**	**44·4**	..	..	..	..	..	
18·5	42	**777**	27·7	28·7	29·9	31	32·3	34·8	35·3	37	**38·8**	**40·8**	**43·2**	..	..	..	..	..	..	
19	42	798	28·5	29·5	30·7	31·9	33·2	34·7	36·3	38	39·9	42	44·3	..	..	..	..	..	..	
19·5	42	818	29·2	30·3	31·5	32·7	34	35·6	37·2	39	40·8	43	..	..	..	..	..	..	..	
20	42	840	30	31	32·3	33·6	35	36·5	38·2	40	42	44·2	..	..	..	..	..	..	..	
20·5	42	862	30·8	31·9	33	34·5	35·9	37·5	39·2	41	43	..	..	..	..	..	..	..	..	
21	42	882	31·5	32·7	33·9	35·3	36·7	38·3	40	42	44	..	..	..	..	..	..	..	..	

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

Table D 9.

Weight in Pounds.	Calories per Pound Body Weight.	Total Calories for 24 hours.	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	Calories per Ounce of Mixture.
15·5	42	651	23·3	24	25	26	27	28·3	29·6	31	32·6	34·3	36·2	38·3	40·7	43·4	..	..	..	Usual range of expected weights at the end of the ninth Month of Age.
16	42	672	24	24·9	25·9	26·9	28	29·2	30·5	32	33·6	35·3	37·3	39·5	42	44·8	..	..	..	
16·5	42	692	24·7	25·7	26·7	27·7	28·9	30	31·5	33	34·6	36·5	38·5	40·8	43·3	..	..	..	..	
17	42	714	25·5	26·5	27·5	28·6	29·7	31	32·4	34	35·7	37·6	38·6	42	44·6	..	..	..	..	
17·5	42	735	26·3	27·2	28·3	29·4	30·6	31·9	33·4	35	36·7	38·6	40·8	43·2	..	..	..	..	..	
18	42	**756**	27	28	29	30·2	31·5	32·9	34·3	36	**37·7**	**39·7**	**41·9**	**44·4**	..	..	..	..	..	
18·5	42	**777**	27·7	28·7	29·9	31	32·3	34·8	35·3	37	**38·8**	**40·8**	**43·2**	**45·7**	..	..	..	..	..	
19	42	**798**	28·5	29·5	30·7	31·9	33·2	34·7	36·3	38	**39·9**	**42**	**44·3**	..	..	..	..	..	..	
19·5	42	**818**	29·2	30·3	31·5	32·7	34	35·6	37·2	39	**40·8**	**43**	**45·4**	..	..	..	..	..	..	
20	42	840	30	31	32·3	33·6	35	36·5	38·2	40	42	44·2	..	..	..	..	..	..	..	
20·5	42	862	30·8	31·9	33	34·5	35·9	37·5	39·2	41	43	45	..	..	..	..	..	..	..	
21	42	882	31·5	32·7	33·9	35·3	36·7	38·3	40	42	44	..	..	..	..	..	..	..	..	
21·5	42	903	32·3	33·4	34·7	36	37·6	39·3	41	43	45	..	..	..	..	..	..	..	..	
22	42	924	33	34·2	36·4	37	38·5	40·2	42	44	..	..	..	..	..	..	..	..	..	Total quantity in ounces of mixture in 24 hours.

Note.—To calculate the quantity for *one* feeding divide the total quantity by the number of feedings in 24 hours.

N.B.—The black figures indicate the most usual weights and quantities.

METHODS OF ADAPTING COW'S MILK MIXTURE FOR USE IN FEEDING INDIVIDUAL CASES OF WELL BABIES.

N.B.—The infectious, diarrhoeal cases, dyspepsias and malnutrition cases, need special modification of mixtures, depending on the needs of the individual case as diagnosed and treated by the child's medical practitioner. Methods of adaption of cow's milk for such infants are not necessarily included below. They may be added in the memorandum notes by the student.

There is an inter-relation and inter-reaction between the different food elements, and this must be taken into account when modifying the mixtures, but it is necessary to know very definitely, the behaviour in the infantile economy of the different food elements in cow's milk and the effect of modifying them so as to influence that behaviour.

A.—To Adapt Carbohydrate to the Baby's Use.

Digestion of Carbohydrates.

Starches.	Milk Sugar.	Cane Sugar.
↓	↓	↓
Dextrins.	Dextrose. Galactose.	Dextrose. Laevulose.
↓		
Maltrose.		
↓		
Dextroses.		

	Fermentability.	*Absorbability.*
Dextrose.	Least easily fermentable.	Most easily absorbed.
Laevulose } Galactose }	More readily fermentable.	Less easily absorbed.

Sugars.—The amount may be increased or decreased, or some of sugar may be substituted by another sugar, a dextri-maltose, a dextrin-dextrose, a starch, or a mixture of these.

The amount of milk may be increased or decreased.

Starch is less laxative than other carbohydrates because of less fermentation in the bowel at one time. Hence in older babies and in stronger protein mixtures the use of some form of starch, or dextri-dextrose or dextri-maltose preparation or a mixture of some of these is often advocated. The use of starch solutions, except in very weak dilutions, is not usually advocated in very young babies.

The following are the most usual carbohydrates chosen for use. (For percentage composition and caloric values, see list) :—

Starch.—Flour, patent barley, or rice preparations.

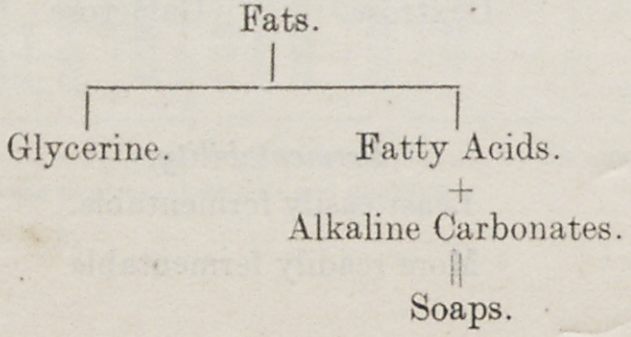
Dextrin-dextrose.—Combinations of dextrin and dextrose, e.g., corn cob syrup.

Dextri-maltose.—Mellin's Food : Maltogen.

Sugars.—Cane sugar, milk sugar.

B.—To Adapt Fats to the Baby's Use.

Normal Digestion of Fats.



Adaption greatly depends on *Medium* in which the fats are given, as well as on the kinds of fats. Brenneman, of Chicago, states " It is not the fat alone, but the fat in the milieu of cow's milk that is hard to digest."

To adapt then :—

1. *Modify the Medium.*—Keep the sugar in mixture low. Reduce the curd by one of the various methods. (See " Modification of Protein in Mixture." Pages 80–83.) Reduce whey in mixture (i.e., salts as well as sugar).
2. *Homogenization of fat.**
3. *To lessen fat in mixture—*
   (*a*) Give less milk.
   (*b*) Skim the milk.—To be effective this should be done by machinery. The figures given in investigation described on page 76 show how difficult it is to lower the fat percentage by removing the top milk or skimming in the home. So many factors enter into the problem.
   (*c*) Give less or no added fat, e.g., as emulsions, &c. If set milk is being used, set for less number of hours or cease setting.
4. *To increase fat in mixture—*
   (*a*) Give more milk.
   (*b*) Give cream.
   (*c*) Give butter. N.B.—If butter is added it must be clarified first by boiling and then by skimming.

* The homogenization or viscolization process consists essentially of forcing milk through a small aperture under high pressure. When the milk is released suddenly from a region of high pressure the fat globules subdivide and are dispersed throughout the medium. Surroundng protein membranes are formed at the fat-liquid interfaces which stabilize the suspended globules and prevent their coalescence. The fat is in such a fine state of division that it cannot exert enough pressure to rise again.

(*d*) Give "*Top Milk*" *Mixture.* See mixtures C. II. and III.

The following investigation shows that it is very difficult to obtain reliable data concerning fat percentage of milk mixtures, especially with setting as so many factors influence the rising of the cream, e.g., the breed of the cow, the age of the milk, temperature of pasteurization, acidity, period of lactation, depth of vessel, area of surface of milk in vessel, homogenization of the milk, &c.

The milk after standardization to 3·5 per cent. fat was replaced in the original pint bottles, the volume being made up to exactly 20 ounces. These bottles were allowed to stand, and the top 4 ounces of each were tested in succession at one hour intervals with the following result.

Time.	Pasteurized Milk.		Unpasteurized.	
	Lower.	Upper.	Lower.	Upper.
11.45 a.m.	3·50	3·50	3·50	3·50
12.45 p.m.	3·48	3·55	3·45	3·70
1.45 ,, ...	3·47	3·60	3·00	5·50
2.45 ,, ...	3·40	3·90	3·00	5·50
3.45 ,, ...	3·30	4·30	2·82	6·20
4.45 ,, ...	3·27	4·40	2·80	6·30
5.45 ,, ...	3·20	4·70	2·75	6·50
6.45 ,, ...	3·17	4·80	2·75	6·50

This also illustrates the difficulty of lowering the fat sufficiently by skimming methods ordinarily used by nurses and mothers in the homes. That there are many factors influencing the cream line of milk is well illustrated

as follows :—A good milk should throw up about 10 per cent. of its total cream in eight hours. Comparatively slight variations in the conditions make enormous variations in the volume of cream. Thus, a milk freshly drawn and not cooled, containing 5·3 per cent. of fat, threw up 25 per cent. of the total cream in six hours, while another milk with the same percentage of fat, but which had been raised to the boiling point and cooled, only threw up 2 per cent. of the total cream in the same time. These, of course, are extreme instances, and it is found in a majority of cases that the percentage of cream thrown up in six to eight hours, divided by three, will give an approximation to the percentage of fat.

Variations of Fat in Milk on Standing.

Milk left to stand remains approximately of the same composition for short periods only—not exceeding half an hour.

Sampling from the bottom of vessel at half-hour intervals :—

Original	3·71	·03	—
½ hour	3·68		
1 ,,	3·34	·34	—
1½ hours	3·10	·24	—
2 ,,	2·95	·15	—
2½ ,,	2·90	·05	—
3 ,,	2·90	·00	—

Sampling from top of vessel at half-hour intervals :—

Original	3·65	·10	+
½ hour	3·75		
1 ,,	4·40	·65	+
1½ hours	4·15	·25	—
2 ,,	3·75	·40	—
2½ ,,	2·89	·86	—

Part of lower milk included.

Regarding "*Top Milk*," Sir Truby King gives the following information. A conical 1½ oz. dipper is warmed and inserted several times into milk to remove the fat.

Whole Milk.—Fat 3·7 per cent. Average percentage of fat in top 6 ozs. of milk, 27 ozs. with a fat of 3·7 per cent. :—

	Fat.
Set—1 hour	5·2 per cent.
,, 2 hours	6·4 ,,
,, 3 ,, ...	7·6 ,,
,, 4 ,, ...	8·2 ,,
,, 5 ,, ...	8·8 ,,
,, 6 ,, ...	9·4 ,,

Average percentage of fat in top 8 ozs. of milk, 27 ozs. with a fat 3·7 per cent.

Whole Milk.	Fat.
Set—1 hour	5·5 per cent.
,, 2 hours	6·8 ,,
,, 3 ,, ...	7·4 ,,
,, 4 ,, ...	7·7 ,,
,, 5 ,, ...	7·9 ,,
,, 6 ,, ...	8·2 ,,
,, 7 ,, ...	8·5 ,,

(*e*) Give Cod Liver Oil.

(*f*) Give Cod Liver Oil Emulsions.

The following are the most usual chosen for use. (For Percentage Composition and Caloric values, see list) :—

Hypol, Juvenol, Elliot's Clinic Emulsion, Milk Emulsion, Vimilk, Virol, Melbourne Children's Hospital Cod Liver Oil Emulsion, New Zealand Cream.

C.—To Adapt Proteins to the Baby's Use.

Normal Digestion of Protein.

Protein.
|
Peptone.
|
Amino-Acid.

(*a*) *The soluble Proteins* or *Whey Proteins* occur both relatively and absolutely less abundantly in cow's milk than in human milk and especially so in the diluted feeding.

They are not purposely modified, but may be *increased* by addition of whey to food mixtures, or *decreased* by dilution. The addition is given to balance the loss by dilution in the Split Protein Mixtures (see Tables C. I. and C. II.).

(*b*) *The Casein.*—Cow's milk contains 4–5 times as much casein as does human milk. *Coagulation of milk* occurs by the action of rennin and acids upon the casein. It naturally follows that the two milks coagulate very differently.

Cow's milk is a unique food—

1. It is ingested as a liquid and becomes a solid food.
2. It becomes for two hours an increasingly solid food, both as regards size and density of the solid portions. Curd digestion is, therefore, from the periphery, i.e., digestion begins at the outside of the curd, and then progresses inwards. The amount of fat in cow's milk has a decided effect on coagulation, but even more at the emptying time of the stomach.

Result of Brenneman's Observations.

Methods of Modification.

1. *Dilution with Boiled Water—*

   See Tables A. and B. The greater the dilution, the greater the effect.

2. *Dilution with Cereal Waters—*

   Barley Water,
   Rice Water,
   Oat Water.

   Their action is to prevent subsequent agglutination of the smaller curds into larger masses. The colloid coats the curds. These properties doubtless exist in all cereals and in pure starch, but do not exist in soluble carbohydrates, i.e., sugars and dextrins.

3. *Peptonization—*

   Changes casein into peptones which are not coagulable.

4. *Pancreatization—*

   e.g., with Benger's food. The Protein is predigested as in 3.

Resulting Curds in Stomach.

Curds of Raw Milk diluted with equal amount of water "are much smaller, softer, and more friable than undiluted milk . . . they are peculiarly thin, often membrane or ribbonlike, and all seem spongy and porous. There is a large amount of crumbly detritus."

Curds from equal parts of milk and barley water after 30 minutes "were very small, like very fine gravel, of peculiarly uniform size, with only occasional curd as large as a small pea. They were very soft, shreddy or scraggily porous, and of greenish grey colour. They were much finer than those in which an equal or treble amount of water was used as diluent."

5. *Pre-coagulation of the Milk*—

Milk is coagulated before entering stomach.

(*a*) Acids—
Butter-Milk,
Lactic Acid,
Hydrochloric Acid,
Acetic Acid or Vinegar,
Lemon Juice,
Orange Juice.

(*b*) Rennin—
Pegnin,
Chymogen,
Rennet Tablets.

Actively stirred, shaken, and beated up with milk.

No tendency to reformation of curds.

"Curds were quite uniform in size, like a coarse sand or a very fine gravel. Peculiarly soft, mushy, irregular, scraggy looking."

6. *Boiling of the Milk*—

The longer the milk boils the greater the effect on coagulation.

Pasteurization has very little effect on coagulation.

One pint boiled *five* minutes after 30 minutes. "Curds very uniform in size, majority size of a small pea, a few were a little larger, and the rest varied all the way down to fine sand. Instead of hard and rubbery they were soft, friable, scraggy, but rounded off and resembling broken-up good custard."

When boiled milk diluted with equal parts of water "Curds fine, soft, about size of coarse sand."

7. *Use of Alkalies—*

Prevent coagulation of milk by different methods of action.

(*a*) Lime Water.

(*1 oz. to 20 oz. Milk.*)

5 per cent. lime water to 30 oz. Milk. "The curds were about midway in size between those of raw and of boiled milk. They were peculiarly thin, scraggy and band like, and were so porous, soft, and friable that they could hardly be picked up without breaking."

10 per cent. lime = "the softest of any curds, very sweet taste."

2 *grains to each oz. of Milk.*

"No separation of curds and whey after 30 minutes. At the end of two hours the appearance of pale, thickened milk, with one or two larger curds."

1 *grain to each oz. of Milk—*

Gave "a soft curd in size and consistency about midway between those of raw and boiled milk."

Curds same as those with 1 grain Sodium Citrate to the oz.

Fine curd.

Fine curd.

Fine curd.

(*b*) Sodium Citrate—

Inhibiting action at first but tendency for any curds present, to increase for a period of two hours.

(*c*) Milk of Magnesia—

Useful when constipation present.

8. *Dried Milk.*

9. *Condensed Milk.*

10. *Evaporated Milk.*

D.—To Adapt Salts of Milk to Baby's Use.

There are about three times as much in cow's milk as in human milk, therefore in a general way dilutions equalize matters with exceptions.

Cow's Milk compared with Human Milk—

Calcium + in cow's milk.
Potassium — in cow's milk.
Iron — in cow's milk.
Phosphorus + but less in organic combination.

There are less salts in organic combination, than in human milk. It is difficult to estimate the amount used by the baby. Absorption and retention probably depend to a considerable extent *upon* the associated medium (i.e., the associated fats, carbohydrates and protein which are not the same as in human milk).

Iron deficiency is made up by giving cereals, broths, vegetables.

Calcium.—Adaption of cow's milk calcium depends on medium and its inter-relationship with carbohydrates, fat of cow's milk, cod liver oil and phosphorus.

Phorphorus.—Even in maximum dilutions of milk the infant is given more phosphorus than in human milk.

Compare with calcium.

Potassium Salts are three times as abundant in cow's milk as in human milk.

PROGRESS OF THE INFANT.

The suitability of a mixture for the baby depends on the *nature*, *amount* and its *digestibility*; also on the *manner of administration* to the baby. The colour of baby, its vigour, muscle tone, capacity for sleep and general contentment, and the normal gain in weight and length are other indications that the food is satisfactory.

In giving any mixture the following mothercraft details should be observed as, otherwise, false impressions concerning the suitability of composition of the mixture may be gained from symptoms really due to incorrect management.

Mothercraft Details.

1. *Regularity of feeding—three hourly*, giving six feedings in the day with an eight-hour interval at night. Specially used in very young babies. *Four hourly*, giving five feedings in the day with an eight-hour interval at night. This is the most usually suitable interval when the feeding is artificial.

2. *Manner of Feeding—Temperature of Mixture.*—This may be judged roughly by holding bottle against mother's or nurse's own cheek after standing it in a vessel of hot water for several minutes.

3. *Type of Mouthpiece.*—The size of the hole is important to regulate rate. The shape of mouthpiece used depends on the preference of the particular doctor, or nurse, but the faultless bottle with large mouthpiece, also the cherry knob mouthpiece on the smaller-mouthed bottles serve very well. If the bottle has no hole, care must be taken to allow air to escape every now and then, otherwise the mouthpiece collapses.

4. *Escape of swallowed air.*—The baby should be held in perpendicular position both during and after feeding to allow swallowed air to escape. Neglect of this simple detail may lead to great discomfort, indigestion being simulated, and the food mixture is put down as incorrect. *Posture of child during feeding.*—It should lie on mother's knee with head raised, or on bed with small pillow under head. It should lie on one side and be free of tight clothing, especially in area of stomach and should be able to kick freely.

5. Suitable facilities for *rest*, *quiet*, and *exercise*, *sunlight* and *fresh air* between meals. Regularity in routine being one of the chief causes of success in infant care.

The Nature and Amount of Mixture have been considered in other pages.

The *Digestibility* of a mixture is judged by :—

(*a*) Presence or absence of eructations, or vomiting apart from simple regurgitation.

(*b*) Presence or absence of colic ; crying ; restlessness and sleeplessness.

(*c*) Presence or absence of abnormal stools.

(*d*) Small gains, stationary weight or loss of weight ; or abnormally large increments followed by periods of no gain in weight.

(*e*) *By study of excretions.*

Excretions—(*a*) *Urine.*

Large or small amount.

Overfed— I.—Polyuria.

II.—Ammoniacal odour often scalding.

(*b*) *Stools.*

(i) An overfed baby will have large bulky motions often frequent, and may be green and curdy.

(ii) An underfed baby is generally constipated, the motions being small and dry. It may, however, have diarrhoea, with frequent motions, consisting mainly of mucus, mixed with a small amount of faecal matter.

Note Character of Stools under following headings :—

(*a*) *Too much Protein.*

(1) Number—Constipation or diarrhœa.
(2) Size—Large.
(3) Colour—Brown, or greenish-brown.
(4) Consistency—Hard, or loose, with hard curds.
(5) Reaction—Alkaline.
(6) Odour—Very offensive.
(7) Abnormal constituents, may be slime if diarrhœa, hard, tough curds, large, sinking in water, insoluble in ether.

(*b*) *Too much Fat.*

(1) Number—Constipation or diarrhœa, alternating.
(2) Size—large.
(3) Colour—White, or grey pultaceous, may glisten ; green intermixed.
(4) Consistency—greasy firm, may be soapy. If diarrhœa, watery, with small white curds.
(5) Reaction—acid or alkaline depending on relative amounts of fat and protein in diet.
(6) Odour—sour.
(7) Abnormal constituents—small white curds, dissolve in ether ; break up, float in water

(*c*) *Too much Sugar* (these stools excoriate the buttocks).

(1) Number—frequent.
(2) Size—varies (with other constituents in diet).
(3) Colour—green frothy.
(4) Consistency—loose, watery, frothy.

(5) Reaction—acid (very acid).
(6) Odour—sour.
(7) Abnormal constituents—may be slime.

(*d*) *Too little Sugar.*
Constipation.

To note Progress of Child and Suitability of Mixture by Examination of Child.

Observation.—We note the general appearance, the *colour*, the *shape* and *size* of the child, the movements of its limbs, and we feel its limbs and body and note the general firmness, turgidity, and thus make a mental note of its nutrition.

Perhaps on our record sheet we have a space for *nutrition*. We take the figure 3 as the normal. If the baby is below our standard we mark 3 — , if overfat 3 +. If much below, we place 2 or 2 — or 1. If much above, 4 or 4 + or 5.

But we do not depend merely on our own personal observation, we try to confirm our mental summing up by *accurate measurement* and comparison with tables already formed from study of numerous children.

Unfortunately in Victoria we have not our own *Height*, *Weight*, *Age*, *table*, and so for the present, depend on tables from elsewhere. (See pages 62, 63.)

Length.—(Influenced by race and sex, nutrition of mother).
Average length at birth. *English race.*
19·5 inches.
Average rate of increase of length.

Weight.—*Weight at birth* may be regarded as the weight at period of approximately 280 days after the initiation of development. (Influenced by nutrition of mother, the number of previous pregnancies ; sex ; race ; environment).

Average Weight at Birth.—Usually given as 7½ pounds. Australian child averages about 8 pounds.

Average Gain in Weight.—Decreases with age. First six months—6–8 ounces; after six months—4–6 ounces; after nine months—2–4 ounces per week.

Working on Victorian age-for-weight line, compiled at Public Health Department by the Director of Infant Welfare, Dr. Boyd-Graham shows following table:—

Average Weight at Birth and at the End of each month in the First Year, showing Average Gain per month.

Age at end of—	Weight in lb.	Average Gain per Month.
Birth	7·5	
1st month	9·3	1·36 lb.
2nd month	10·96	1·66 lb.
3rd month	12·37	1·41 lb.
4th month	13·8	1·43 lb.
5th month	15·23	1·43 lb.
6th month	16·5	1·27 lb.
7th month	17·7	1·2 lb.
8th month	18·7	1·0 lb.
9th month	19·5	·8 lb.
10th month	20·3	·8 lb.
11th month	21·0	·7 lb.
12th month	21·56	·56 lb.

METHODS OF CALCULATION.

1. *To obtain Percentage Composition, Total Caloric Value,* and *Caloric Value per ounce of Mixture,* when the amount and percentage composition of each constituent is known. (Dr. Kay and Sir T. King).

Basis of Calculations.

1 fluid ounce = 28·35 cubic centimetres.
1 ounce weight (avoirdupois) = 28·35 grams weight.
1 gram 100 per cent. Carbohydrate gives 4·1 Calories.
1 gram 100 per cent. Fat gives 9·3 Calories.
1 gram 100 per cent. Protein gives 4·1 Calories.
1 ounce (28·35 grams) Carbohydrate gives 116·2 Calories.
1 ounce (28·35 grams) Fat gives 263·5 Calories.
1 ounce (28·35 grams) Protein gives 116·2 Calories.

Therefore—

1 ounce of 1 per cent. Sugar Solution produces $\frac{116}{100} = 1\frac{1}{6}$ Calories (approx.).

1 ounce of 1 per cent. Fat Solution produces $\frac{263 \cdot 5}{100} = 2\frac{2}{3}$ Calories (approx.).

1 ounce of 1 per cent. Protein Solution produces $\frac{116}{100} = 1\frac{1}{6}$ Calories (approx.).

(1) For each constituent take the percentages of Carbohydrate, Fat, and Protein (hereafterwards designated as C, F, and P), and separately multiply these percentages by the weight in ounces of the constituent.

(2) To obtain *Percentage Compositions* separately add up the total products of multiplication for C, F, and P for all the constituents, divide these sums by the total number of fluid ounces in the mixture, and obtain the percentage composition (approximately).

(3) To obtain *Total Caloric Value* of Mixture—

Multiply the sum total of products for C by 1·16 (approximately $1\frac{1}{6}$).
,, ,, ,, F by 2·63 (approximately $2\frac{2}{3}$).
,, ,, ,, P by 1·16 (approximately $1\frac{1}{6}$).

Add up the three results and obtain the *Total Caloric Value of the Mixture.*

(4) *To obtain Caloric Value per ounce.*—Divide the *Total* Calories of Mixture by Total number of fluid ounces of Mixture.

Example—

Cow's Milk	13 oz.
Sugar of Milk	1 oz.
Lime Water	1 oz.
Emulsion	1 cz.
Water	16 oz.
Total	30 oz.

	C.	F.	P.	oz.	C.	F.	P.
Cow's Milk	5	3·5	3·5	13	65	45·5	45·5
Sugar of Milk	98	..	..	1	98	..	..
Lime Water	..	..	..	1	..	..	..
Emulsion	40	50	..	1	40	50	..
				16			
				30	203	95·5	45·5
Percentage Compositions = ...				..	6·7	2·2	1·5

Caloric Estimation.

Take the total addition of the columns,
i.e.—

Sugar.	*Fat.*	*Protein.*
203	95·5	45·5

Multiply the *Sugar*	203 by $1\frac{1}{6}$	=	$203 \times 1 = 203$ $203 \times \frac{1}{6} = 33{\cdot}8$	}	Calories from C.
,, *Fat*	95·5 by $2\frac{2}{3}$	=	$95{\cdot}5 \times 2 = 191$ $95 \times \frac{2}{3} = 63{\cdot}6$	}	Calories from F.
,, *Protein*	45·5 by $1\frac{1}{6}$	=	$45{\cdot}5 \times 1 = 45{\cdot}5$ $45{\cdot}5 \times \frac{1}{6} = 7{\cdot}5$	}	Calories from P.
	Total Calories		= 544·4		

Caloric Value per oz. of Mixture.

$$= \frac{\text{Total Calories.}}{\text{Amount of Mixture in ozs.}}$$

$$= \frac{544{\cdot}4}{30} = 18{\cdot}1$$

2. Approximate methods of obtaining *Total Caloric Value of Mixture and Caloric Value per oz. of Mixture* when the amount and percentage composition of each constituent is known. (Dr. Hill).

Formula.—$(C + 2F + P) \times 1\frac{1}{4} \times Q$.

= Total Calories in the Mixture.

When Q = quantity of Mixture in fluid oz.
C = percentage of Carbohydrate in Mixture.
P = percentage of Protein in Mixture.
F = percentage of Fat in Mixture.

Example—

Take one fluid oz. of Mixture with a percentage composition of C 7 %, F 3·5 %, and P 1·5 %

C = 7
2F = 7
P = 1·5

4) 15·5
3·87

19·37 = Caloric Value per oz. of Mixture (approximately).

3. *Estimation of Caloric Value of Mixtures, when Caloric Value of volumetric measures of constituents are known.* Consult tables in which Calories per oz., and per Standard Table and Teaspoonful of substances are given, and then multiply by number of ounces of each substance in the mixture and add the results together.

4. To find the *number of ounces of the different ingredients of a mixture necessary to make a given number of ounces of a mixture of a given percentage.*

Example—

How many ounces each of—
Cow's Milk (C 5 %, F 3·5 %, P 3·5 %),
Emulsion or Cream (F 50 %),
Sugar (C 98 %)—
would be necessary to give a mixture of 10 fluid oz., containing C 7 %, F 3 %, and P 1·4 %. ?

Method of Calculation—

(*a*) Multiply the percentage of the desired Mixture by the number of ounces of the Mixture. This gives total amount of C, F, P in the mixture .. ..

C.	F.	P.
7	3	1·4
		10
70	30	14

(*b*) Divide the amount of protein thus obtained by the protein in the original milk. This figure gives the number of ounces of milk needed .. ..

14 ÷ 3·5 = 4,
i.e., 4 ozs. of milk in the 10 oz. mixture would give the required amount of protein.

C.	F.	P.
5	3·5	3·5
		4
20	14	14

(*c*) Subtract the amount of fat given by the above number of ounces of milk from the total fat of the desired mixture.

Then divide this by the percentage of fat present in the fat ingredient. This gives the number of ounces needed of the fat ingredient.

F.

4 oz. Milk = 14. Amount of Fat in 10 oz. Mixture = 30.

$30 - 14 = 16.$

We are dealing with a 50 % Fat, so that $\frac{16}{50}$ (approx.) $\frac{1}{3}$, i.e., $\frac{1}{3}$ oz. of the 50 % Fat is needed.

(*d*) Subtract the amount of sugar given by the above number of ounces of Milk, from the total amount of sugar in the desired mixture. Divide this by the percentage of Carbohydrates present in the Carbohydrate ingredient. This gives the number of ounces of the Carbohydrate ingredient needed.

C.

4 oz. Milk = 20. Carbohydrates in 10 oz. Mixture = 70.

$\therefore 70 - 20 = 50.$

We are dealing with a 98 % Carbohydrate, $\frac{50}{100}$ (approx.) $\frac{1}{2}$.

$\therefore \frac{1}{2}$ oz. of this Carbohydrate is needed.

	C.	F.	P.	ozs.	C.	F.	P.
Cow's Milk	5	3·5	3·5	4	20	14	14
Fat	..	50	..	½	..	16·6	..
Carbohydrates	98	..	..	½	49	..	..
				10)	69	30·6	14
10 oz. Solution .·. per cent. composition =					6·9	3·6	1·4

(The mixture is of course made up to 10 oz. with water.)

5. *Estimation of Protein ratio.*—The protein ratio is defined either as the ratio of the percentage of protein element to the percentage of non-protein elements present, or as the ratio of the Calories in the protein elements to the Calories in the non-protein elements in the mixture giving a different result.

Methods of Calculation—

(1) By percentages.

Example—

Breast Milk—C. 7·0. F. 3·5. P. 1·5.

Protein Ratio = 1·5 : 7 3·5 (approx.)

i.e. 1·5 : 10·5.

or, 1 : 10

(2) By Calories.

Calories from C. $7 \times 1\frac{1}{6}$
„ F. $3{\cdot}5 \times 2\frac{2}{3}$
„ P. $1{\cdot}5 \times 1\frac{1}{6}$

6) 7
1·1
8·1 Calories from C.

i.e. $7 \times 1 = 7$
$7 \times \frac{1}{6} = 1{\cdot}1$

3·5
2
3) 7·0
2·3
9·3 Calories from F.

$3{\cdot}5 \times 2 = 7{\cdot}0$
$3{\cdot}5 \times \frac{2}{3} = \frac{7}{3} = 2{\cdot}3$

6) 1·5
·2
1·7 Calories from P.

$1{\cdot}5 \times 1 = 1{\cdot}5$
$1{\cdot}5 \times \frac{1}{6} = {\cdot}2$

Protein Ratio by Calories 1·7 : 8·1 9·3
i.e. 1·7 17·4
or 1 : 10 (approx.)

6. *Method to vary the Carbohydrate or Fat percentage of Mixture in Tables A, B, and C—*

Rule.—To find the number of teaspoons required to be added to, or omitted from, Mixture in order to increase or decrease the percentage of Carbohydrate or Fat by 1 per cent., divide the number of ozs. in the Total Mixture by the following factors :—

Carbohydrates.	(Approx.)		*Factor.*	
Cane Sugar	(100 % C.)	..	11·1	(Approx.) 11)
Sugar of Milk ..	(100 % C.)	..	·2	,, 9)
Mellins Food ..	(80 % C.)	..	6·83	,, 7)
Maltogen	(92 % C.)	..	6·96	,, 7)
Fats.	(Approx.)			
Butter	(80 % Fat)	..	8·9	(Approx. 9)
Emulsions.	(Approx.)		*Factor.*	
Elliot's Clinic Emulsion	(50 % F.)	..	6·25	(Approx. 6)
Juvenol Clinic Emulsion	(50 % F.)	..	5·55	,, 6)
Hypol Clinic Emulsion	(50 % F.)	..	5·55	,, 6)

N.B.—This method of varying the percentage composition for just one ingredient as in the columns in Tables A and B (VII. in A. I.,, VI. in A. II., III., IV., also VI. in B. I., II., III., IV.) cannot be used where sugars are contained in the Emulsion, or where sugars are used with emulsion containing sugar.

N.B.—The teaspoons must be standard size, tightly packed, and levelled with a knife.

The Carbohydrate and Fat Percentage Variation Tables.

Table I.—To Vary the Percentages of Carbohydrate or Fat in the Mixtures.

In Total Amount of Mixture.	Cane Sugar. To vary Carbohydrate				Sugar of Milk. To vary Carbohydrate				Mellin's Food. To vary Carbohydrate				Maltogen. To vary Carbohydrate				Juvenol or Hypol. To vary Fat	Elliot's Emulsion. To vary Fat	Butter. To vary Fat
	1%	2%	3%	4%	1%	2%	3%	4%	1%	2%	3%	4%	1%	2%	3%	4%	1%	1%	1%
	Add or omit—				Add or omit—				Add or omit—				Add or omit—				Add or omit—	Add or omit—	Add or omit—
	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.	Tea.
Oz.																			
5	½	1	1¼	1¾	½	1	1½	2¼	¾	1½	2¼	3	¾	1½	2¼	3	1	¾	½
10	1	1¾	3¾	3½	1	2¼	3¼	4½	1½	3	4½	5¾	1½	3	4½	6	1¾	1½	1¼
15	1¼	2¼	4	5½	1½	3¼	5	6½	2¼	4½	6½	8½	2¼	4½	6½	8¾	2½	2¼	1¾
20	1¾	3½	5½	7¼	2¼	4¼	6½	8¾	2¾	5¾	8¼	11½	3	6	8¾	11¾	3½	3¼	2¼
25	2¼	4½	6¾	9	2¾	5½	8¼	10¾	3½	7¼	10¾	14½	3¾	7¼	11	14¾	4½	4	2¾
30	2¾	5½	8	10¾	3¼	6½	9¾	13	4¼	8½	13	17¼	4½	8¾	13¼	17½	5½	4¾	3¼
35	3	6¼	9½	12½	3¾	7½	11½	15¼	5	7½	15	20	5	10¼	15¼	20½	6¼	5½	4
40	3½	7¼	10¾	14½	4¼	8¾	13	17½	5¾	11½	17¼	23	5¾	11¾	17½	22½	7¼	6½	4½

These figures are approximations to the nearest quarter teaspoon.

Table II.—To Vary Percentage of Carbohydrate in Mixture.

One tightly packed levelled standard teaspoonful of the below-mentioned Carbohydrates, added to—

—	With Cane Sugar by—	Or with Milk Sugar, by—	Or with Mellin's Food, by—	Or with Maltogen by—
	%	%	%	%
1 ounce of solution, increases *Carbohydrate Percentage* in Mixture ..	11·1	9·2	6·96	6·82
2 ounces ,, ,, ,, ,, ,, ..	5·5	4·6	3·48	3·41
3 ,, ,, ,, ,, ,, ,, ..	3·6	3·0	2·32	2·27
4 ,, ,, ,, ,, ,, ,, ..	2·75	2·43	1·74	1·7
5 ,, ,, ,, ,, ,, ,, ..	2·8	1·8	1·39	1·36
6 ,, ,, ,, ,, ,, ,, ..	1·8	1·5	1·16	1·13
7 ,, ,, ,, ,, ,, ,, ..	1·58	1·3	0·99	0·98
8 ,, ,, ,, ,, ,, ,, ..	1·37	1·15	0·86	0·85
9 ,, ,, ,, ,, ,, ,, ..	1·2	1·0	0·77	0·75
10 ,, ,, ,, ,, ,, ,, ..	1·1	0·9	0·69	0·68

Table III.—To Vary the Percentage of Fat in Mixture.

One level standard teaspoonful of the below-mentioned Fats, added to—

—	With Butter by—	Or with New Zealand Cream or Elliot's Emulsion by—	Or with Hypol or Juvenol by—
	%	%	%
1 ounce of solution, increases *Fat Percentage* in Mixture ..	8·9	6·25	5·55
2 ounces " " " " ..	4·45	3·12	2·77
3 " " " " " ..	2·9	2·08	1·85
4 " " " " " ..	2·25	1·56	1·38
5 " " " " " ..	1·78	1·25	1·11
6 " " " " " ..	1·49	1·04	0·92
7 " " " " " ..	1·27	0·89	0·79
8 " " " " " ..	1·1	0·78	0·69
9 " " " " " ..	0·98	0·69	0·61
10 " " " " " ..	0·89	0·62	0·55

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