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# *Pitman Medical*

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## **A New Look at Nutrition**

**Mary Crowley, M.Sc., M.C.Path.**

'We have no natural instinct for what is good food. . . ' Nutrition, the science of food and the relation of the nutrients in food to health and disease, is a subject which ultimately concerns all of us. In this book the author deals with the processes involved in the utilization of nutrients and the relationship between diet and disease. The basic facts of nutrition are set out together with a clear description of those food substances which are necessary to good health; the way the body uses them; the effects on health of either deficiencies or surfeits; and their interdependence. The author gives examples of the way in which such diseases, both common and rare, can be prevented and gives actual examples of their application. She looks at education in the light of the public, the medical student, the hospital, and the underdeveloped countries, and ends by stating her attitude to the current ideas on optimum nutrition, the proposed solution to optimum health. Over one third of the world's population are undernourished, malnourished or both. With the present rate of population growth and the comparative lack of growth in food supplies, the problem of nutrition and disease is bound to increase and could become acute. In fact, the prevention of nutritional disorders might soon be as important as the prevention of infectious diseases was in the past.

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- 4 Education
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# ANIMAL PRODUCTION

## JOURNAL OF THE BRITISH SOCIETY OF ANIMAL PRODUCTION

### *Contents of Volume 9, Part 4, November 1967 include the following:*

- PRESCOTT and LAMMING. The influence of castration on the growth of male pigs in relation to high levels of dietary protein.
- DAVIES and OWEN. The intensive rearing of lambs. 1. Some factors affecting performance in the liquid feeding period.
- OWEN, DAVIES, MILLER and RIDGMAN. The intensive rearing of lambs. 2. Voluntary food intake and performance on diets of varying oat-husk and beef tallow content.
- FRAPE and HOCKEN. The effect of pattern of daily feeding of pregnant sows on apparent digestibility.
- HOLMES and MOUNT. Heat loss from groups of growing pigs under various conditions of environmental temperature and air movement.
- BOND, KELLY and HEITMAN, Jr. Physiological response of swine to cycling environmental conditions.
- ULYATT, BLAXTER and McDONALD. The relations between the apparent digestibility of roughages in the rumen and lower gut of sheep, the volume of fluid in the rumen and voluntary feed intake.
- FORBES and ROBINSON. The effect of source and level of dietary protein on the performance of in-lamb ewes.
- DONALD and READ. The performance of Finnish Landrace sheep in Britain.
- DALTON. Selection for growth in mice on two diets.
- KAY, WALKER and MCKIDDIE. The effect of ammonium acetate on the yield and composition of milk from heifers.
- WEBSTER and PARK. The effect of jute coats on the heat losses of two breeds of sheep exposed to different environments.
- JACKSON. The allometric relationship between carcass muscle and carcass bone in Scottish Blackface wether sheep.
- JAMIESON and ROBERTSON. Cattle transferrins and milk production.

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- COBIC. Castration experiments with Yugoslav Simmental Cattle. I. The effect of castration on growth and live weight gains.
- WILLIS and PRESTON. The performance of different breeds of beef cattle in Cuba.
- MILLER. Some responses of hill ewes and lambs to artificial shelter.
- SLEE and HALLIDAY. Some effects of cold exposure, nutrition and experimental handling on serum free fatty acid levels in sheep.
- GALAL. Estimates of genetic parameters of growth rate in sheep with reference to the method of estimation.
- OWEN and RIDGMAN. Further studies of the effect of dietary energy content on the voluntary intake of pigs.
- CHAMBERLAIN and LUCAS. The nutritive value of separated milk for pigs. I. A comparison of two diets containing separated milk with a standard all-meal diet.
- HINKS. The use of station and field tests for the improvement of milking performance in dairy cattle. I. Variation in milk yield and butterfat in test station records.
- SYKES and SLEE. Acclimatization of Scottish Blackface sheep to cold. 2. Skin temperature, heart rate, respiration rate, shivering intensity and skinfold thickness.
- KAY, BOWERS and MCKIDDIE. The protein requirements of rapidly growing steers.
- RUSSEL, GUNN and DONEY. Components of weight loss in pregnant hill ewes during winter.
- RUSSEL, GUNN, SKEDD and DONEY. Relationships between chemical and physical composition of Scottish Blackface ewes.
- BURT. A note on the effect of giving milk substitute only once a day to early-weaned calves.
- CRESSWELL, GILL and FRASER. A note on the use of skim-milk in the feeding of store-lambs.

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# THE BRITISH JOURNAL OF NUTRITION

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**Papers should be accompanied by a signed statement to the effect that the author accepts the conditions laid down in Directions to Contributors.** Special attention is directed to the sections below about the preparation of the typescript, and care in this matter will hasten publication.

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**General.** Submission of a paper to the Editorial Board will be held to imply that it represents the results of original research not previously published; that it is not under consideration for publication elsewhere; and that if accepted for the *British Journal of Nutrition* it will not be published elsewhere in the same form, in English or any other language, without the consent of the Editorial Board.

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these and other details (mentioned below) in the preparation of the typescript before it is sent to the Editors will shorten the time required for publication: the need for undue amounts of editorial revision caused by badly prepared typescript will lead to delay in publication. Papers on specialized aspects of the subject should be so presented as to make them intelligible, without undue difficulty, to the ordinary reader of the *Journal*. Sufficient information should be given to permit repetition of the published work by any competent reader of the *Journal*.

Papers should be in double-spaced typing on one side of sheets of uniform size with large margins. Top copies only should be submitted, packed flat. The paper should be written in English, the spelling being that of the *Oxford English Dictionary*, and should, in general, be divided into the following parts. (a) *Synopsis*: each paper must open with a synopsis not more than 5% of the length of the following text. This synopsis should aim at giving a picture in miniature of the entire article. The past tense should be used in referring to the author's experimental work. The present tense may be used where reference to existing knowledge is necessary, or where the author is stating what is shown or concluded. The change of tense should clearly differentiate the author's contribution from what is already known. The sequence in the synopsis should be the same as that in the paper. It is desirable to divide the synopsis into a series of numbered paragraphs, giving, where relevant, the following information: a succinct account of the experimental work with essential facts about apparatus, chemicals, methods and animals; the results, singling out new information; the conclusions from the results. (b) *Introductory paragraph*: it is not now customary to introduce a paper with a full account of the relevant literature, but the introductory paragraph should help the reader by indicating briefly the nature of the question asked and the reasons for asking it. The answer obtained should be indicated if it is possible to do so shortly. (c) *Experimental methods adopted*: with chemical papers the experimental part will normally appear

towards the end, but with other types of publication Methods should appear after the introduction. (d) *Results*: these should be given as concisely as possible, with the help of figures or tables. (e) *Discussion*: it is desirable that the presentation of the results and the discussion of their significance should be considered separately. (f) *References*: these should be given in the text thus: Barnett & Robinson (1942), (Culbertson & Thomas, 1933); where a paper to be cited has more than two authors, the names of all the authors should be given when reference is first made, e.g. (Osborne, Mendel & Ferry, 1919); subsequent citations should appear thus (Osborne *et al.* 1919). Where more than one paper by the same authors has appeared in one year the reference should be given as follows: Osborne & Mendel (1914a); Osborne & Mendel (1914b); or Osborne & Mendel (1914a, b); (Osborne & Mendel 1914a, 1916; Barnett & Robinson, 1942). Where the lists of authors of two papers appearing in the same year begin with the same name but differ subsequently, references after the first full reference should include sufficient names to differentiate between the two papers, e.g. Thomas, Smith *et al.* (1960), Thomas, Wilson *et al.* (1960). At the end of the paper references should be given in alphabetical order according to the name of the first author of the publication quoted, names with prefixes being entered under the prefix, and should include the author's initials: the title of the paper should not be included. Titles of journals should be abbreviated as in the *World List of Scientific Periodicals*, 1963-5, 4th ed., London: Butterworths. Examples of such abbreviations will be found in the current numbers of the *British Journal of Nutrition*. References to books and monographs should include the town of publication and the name of the publisher, as well as the date of publication and the number of the edition to which reference is made. Thus:

- Ahrens, E. H. Jr, Hirsch, J., Insull, W. Jr & Peterson, M. L. (1958). In *Chemistry of Lipids as Related to Atherosclerosis*, p. 222. [I. H. Page, editor.] Springfield, Ill.: C. C. Thomas.
- Barnett, J. W. & Robinson, F. A. (1942). *Biochem. J.* **36**, 364.
- Culbertson, C. C. & Thomas, B. H. (1934). *Rep. Iowa agric. Exp. Stn* 1933-4, p. 51.
- Doisy, E. A., Somogyi, M. & Shaffer, P. A. (1923). *J. biol. Chem.* **55**, xxxi.
- Fairey, N. H. (1938). *Nature, Lond.* **142**, 1156.
- Hennessy, D. J. (1941). *Ind. Engng Chem. analyt. Edn.* **13**, 216.
- King, H. (1941). *J. chem. Soc.* p. 338.
- Osborne, T. B. & Mendel, L. B. (1914a). *J. biol. Chem.* **17**, 325.
- Osborne, T. B. & Mendel, L. B. (1914b). *J. biol. Chem.* **18**, 1.
- Osborne, T. B. & Mendel, L. B. (1916). *Biochem. J.* **10**, 534.
- Osborne, T. B., Mendel, L. B. & Ferry, E. L. (1919). *J. biol. Chem.* **37**, 233.
- Starling, E. H. (1915). *Principles of Human Physiology*, 2nd ed. London: J. and A. Churchill.

**Units.** Results should be presented in metric units; exceptionally it may also be necessary to include other units in parentheses after the metric units.

Time should be given according to the 24 h clock.

**Statistical Treatment of Results.** In general it is not

necessary to publish all the individual results of replicated tests. A statement of the number, their mean value and some appropriate measure of their variability is usually sufficient.

The methods of analysis followed should be indicated, but statistical details, such as tables of analysis of variance, should be given only if they are relevant to the discussion. A statement that the difference between the means for two groups of values is statistically significant should include an indication of the level of significance attained.

**Illustrations.** As a rule illustrations should be about twice the size of the finished block, each on a separate sheet, not larger overall than the sheets on which the paper itself is typed, and packed flat. Legends should be typed on a separate sheet and numbered correspondingly with the relevant illustrations. Each illustration, with its legend, should be comprehensible without reference to the text. The approximate position of each should be given in the text.

Diagrams and line drawings, which must all be originals, should be drawn in indian ink on Bristol board or on cartridge, tracing or faintly blue-lined paper. For general guidance in preparing diagrams, it is suggested that for a figure measuring 9 in × 6 in all lines, axes and curves should have a thickness of 0.4 mm, thus —. In curves presenting experimental results the determined points should be clearly shown, the symbols used being, in order of preference, ○ ●, △ ▲, □ ■, × +. For a 9 in × 6 in figure, the diameter of the circles, the vertical height of the squares and equilateral triangles and the span of the crosses should be ½ in. Curves and symbols should be drawn with a mechanical aid and not freehand, and should not extend beyond the experimental points. Scale marks on the axes should be on the inner side of each axis, ½ in long, and should extend beyond the last experimental point. For plates, glossy photographs are required and clips should not be used.

A flyleaf of tracing paper should be firmly attached to each illustration. On it should be written in ink: (a) the title of the paper and names of the authors; (b) the figure or plate number; (c) the figures and lettering which are to appear on the finished block, in their correct positions relative to the illustration.

The size of photomicrographs may have to be altered in printing. To avoid mistakes the magnification will be shown by a scale on the photograph itself, e.g. thus  $\frac{1\mu\text{m}}{\text{---}}$ . The scale with the appropriate unit should be drawn by the author on the flyleaf and will be inserted by the Press.

**Chemical Formulas.** These should be written as far as possible on a single horizontal line. With inorganic substances, formulas may be used, particularly in the experimental portion, at the discretion of the editors. With salts it must be stated whether or not the anhydrous material is used, e.g. anhydrous  $\text{CuSO}_4$ , or which of the different crystalline forms is meant, e.g.  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ,  $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ .

**Description of Solutions.** Solutions of common acids, bases and salts are preferably defined in terms of normality (N) or molarity (M), e.g. N-HCl; 0.1M- $\text{NaH}_2\text{PO}_4$ . The term ‘%’ must be used in its correct sense, i.e. g/100 g of solution. 10% HCl means 10 g of hydrogen chloride in 100 g of aqueous solution, and should never be used to indicate a tenfold dilution of

laboratory concentrated hydrochloric acid. For 'per cent by volume', i.e. ml/100 ml, the term '% (v/v)' may be used. To indicate that a given weight of substance is contained in 100 ml of solution, the term '% (w/v)' may be used.

**Nomenclature of Vitamins.** The following names have been adopted by the IUPAC Commission of Nomenclature of Biological Chemistry, have been published in *Handbook for Chemical Society Authors* (Special Publication no. 14, 1961, 2nd ed., p. 200. London: The Chemical Society) and, as amended in *J. chem. Soc.* 1962, p. 5312, are accepted by the Editors of the *British Journal of Nutrition*.

#### Fat-soluble vitamins:

Present name	Name adopted
Vitamin A <sub>1</sub> or axerophthol	Retinol
Retinene	Retinal
Vitamin A acid	Retinoic acid
Vitamin A <sub>2</sub>	3-Dehydroretinol or dehydrorretinol
Retinene 2	3-Dehydroretinal or dehydrorretinal
Vitamin D <sub>2</sub> or calciferol	Ergocalciferol
Vitamin D <sub>3</sub>	Cholecalciferol
Other D vitamins derived from 7-dehydro-steroids	To be named analogously, as above
Vitamins E	$\alpha$ -, $\beta$ -, $\gamma$ -...tocopherol

Vitamin K. When 2-methyl-3-phytyl-1,4-naphthaquinone [vitamin K<sub>1</sub>] is designated by a trivial name, that name shall be phyloquinone.

Vitamins of the K<sub>2</sub> series should be designated as menaquinones-*n* (abbreviated where necessary to MK-*n*), where *n* is the number of isoprene units in the side-chain. Thus vitamin K<sub>2</sub> (35) would be menaquinone-7. The nomenclature for other naturally occurring quinones (ubiquinones plastoquinones and tocopherolquinones) and related substances should follow the Tentative Rules of the IUPAC-IUB Commission on Biochemical Nomenclature (see *Biochem. J.*, 1967, **102**, 14).

When 2-methyl-1,4-naphthaquinone (MK-o) is designated by a trivial name it may be called menaphthone.

#### Water-soluble vitamins:

Present name	Name adopted
Vitamin B <sub>1</sub> , aneurin or thiamine	Thiamine
Vitamin B <sub>2</sub> or riboflavin	Riboflavine
Vitamin PP, niacinamide or nicotinamide	Nicotinamide*
Vitamins B <sub>12</sub> (collectively)	Cobalamin†
Vitamin B <sub>12</sub> (pure substance)	Cyanocobalamin
Vitamin B <sub>12b</sub>	Hydroxocobalamin

\* The Editors of the *British Journal of Nutrition* propose always to use the name nicotinic acid and not niacin.

† The full definitive rules of nomenclature of vitamin B<sub>12</sub> and the other corrinoids will be found in *Vitamin B<sub>12</sub> und Intrinsic Faktor. 2. Europäisches Symposium Hamburg 1961* (H. C. Heinrich, editor, 1962, p. 764; Stuttgart: Ferdinand Enke Verlag) and *J. Am. chem. Soc.* 1960, **82**, 5581.

Vitamin B<sub>12c</sub>  
Vitamin C or ascorbic acid  
Inositol

Nitritocobalamin  
Ascorbic acid  
*Meso*-inositol

Vitamin B<sub>6</sub>. The term pyridoxine may be used as a group name to designate the naturally occurring pyridine derivatives with vitamin B<sub>6</sub> activity.

3-Hydroxy-4,5-dihydroxymethyl-2-methylpyridine (hitherto called pyridoxine) shall now be called pyridoxol. The 4-CHO and 4-CHNH<sub>2</sub> derivatives shall be named pyridoxal and pyridoxamine respectively.

Folic acids. The term folic acid may be used as a group name to designate the naturally occurring pteroylglutamic acids.

The pure substance hitherto known as folic acid, folacin or vitamin B<sub>9</sub> shall be named pteroylmonoglutamic acid.

Compounds analogous to pteroylmonoglutamic acid but containing several glutamic acid residues united by amide linkages may be named pteroyltriglutamic acid, pteroylheptaglutamic acid, etc.

In addition, the Editors of the *British Journal of Nutrition* wish to retain the old more comprehensive names vitamin A, vitamin D, vitamin E, vitamin K, vitamin B<sub>1</sub>, vitamin B<sub>12</sub> and vitamin C to cover the biological activity when more than one active substance are or may be concerned.

The names pantothenic acid, biotin, *p*-aminobenzoic acid and choline remain unchanged.

**Nomenclature of Enzymes.** The nomenclature should be that of the Recommendations of the Commission on Enzymes of the International Union of Biochemistry, 1964 (*Comprehensive Biochemistry*, Vol. 13, *Enzyme Nomenclature*, 2nd ed., 1965 [M. Florkin and E. H. Stotz, editors]: London: Elsevier Publishing Co. Ltd).

**Tables.** Tables should carry headings describing their content and should be comprehensible without reference to the text. The dimensions of the values, e.g. g/100 ml, should be given at the top of each column and not repeated on each line of the table. Tables should not normally be included in the body of the text, but should be typed on separate sheets. Their approximate position in the text should be indicated.

**Nomenclature of Micro-organisms.** *Bacteria.* Scientific names of bacteria should be binominals, the generic name only with a capital, and should be underlined once (for *italic*) in the typescript. Names for new species or genera, or new combinations of generic and specific names, should be formed in accordance with the International Bacteriological Code published in *J. Bact.* 1948, **55**, 287, and (in 1949) in *Congr. int. Microbiol.* iv (1948), *Copenhagen*, p. 587. Wherever possible the names of recognized species should be those used in Topley & Wilson's *Principles of Bacteriology and Immunology* (1955: 4th ed. London: Edward Arnold and Co.). However, where authors wish for good reasons to use some other name (e.g. one used in Bergey's *Manual of Determinative Bacteriology*, 1957: 7th ed. London: Baillière, Tindall and Cox), the Topley & Wilson name should be inserted in parentheses at the first citation thus: *Serratia marcescens* (*Chromobacterium prodigiosum*).

A name must be given in full at the first mention in a paper; in subsequent mention the generic name may be abbreviated, but the abbreviation must be unambiguous.



Single letter abbreviations should, in general, be avoided (thus: *Staph. aureus*, *Strep. pyogenes*, not *S. aureus*, *S. pyogenes*). When the generic name is used to define a group it should have a capital but should not be italicized; trivial names, or generic names used as adjectives, should not have capitals or be italicized. Examples of 'trivial names' are: staphylococci, streptococci, and meningococci or meningococcus (generic name is *Neisseria*). *Staphylococcus* and *Streptococcus* are generic names and the following passage illustrates the correct usage. 'This investigation is concerned with *Salmonella enteritidis*, because this *Salmonella* is important as a cause of disease in man and, because of experimental salmonella infections in the mouse, it is the most easily controlled. Tests with staphylococci, including *Staph. aureus*, have not contributed to the understanding of susceptibility to staphylococcal infection.'

*Microfungi* should be designated as in Ainsworth & Bisby's *A Dictionary of the Fungi* (1954: 4th ed. Kew: Commonwealth Mycological Institute.)

#### Other Nomenclature, Symbols and Abbreviations.

Authors should follow current numbers of the *British Journal of Nutrition* in this connexion. The chemical nomenclature adopted is that of the Chemical Society (see *Handbook for Chemical Society Authors* (Special Publication no. 14, 1961, 2nd ed. London: The Chemical Society)). For nomenclature of amino acids, this Handbook (p. 186) and *Br. J. Nutr.* 1953, 7, 1 should be consulted. The symbols and abbreviations are

essentially those listed in *British Standard* 1991; Part 1, *General: Letter Symbols, Signs and Abbreviations* (B.S. 1991: Part 1: 1954, incorporating amendments issued July 1955 (PD 2241), February 1957 (PD 2707) and October 1960 (PD 3902), 7s.). BMR may be used for basal metabolic rate or basal metabolism.

Spectrophotometric terms and symbols are those proposed by the Society of Public Analysts and other Analytical Chemists (see *Analyst*, 1942, 67, 164). For mathematical notation and numerals the rules laid down in *Proc. R. Soc. A*, 1909, 82, 14, should be followed. The attention of authors is particularly drawn to the following symbols:  $m$  (=milli) =  $10^{-3}$ ,  $\mu$  (=micro) =  $10^{-6}$ ,  $n$  or  $m\mu$  (=nano or millimicro) =  $10^{-9}$  and  $p$  or  $\mu\mu$  (=pico or micromicro) =  $10^{-12}$ . Note also that ml (millilitres) should be used instead of c.c.,  $\mu m$  (micrometre) instead of  $\mu$  (micron), and  $\mu g$  (micrograms) instead of  $\gamma$ .

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