Food Selection—II*

For Rational and Economical Living

By C. F. Langworthy†

Concluded from SCIENTIFIC AMERICAN SUPPLEMENT No. 2100, Page 211, April 1, 1916

In its studies of methods for imparting information through its extension and other activities, the Department of Agriculture has endeavored to classify common foods in a way corresponding to their distinctive functions in nutrition. The division must be more or less arbitrary, for some foods could go almost equally well in two or more groups. Thus milk, which is a general food, is included with the protein foods because it is a valuable source of this nutrient. Bread is a carbohydrate food, a protein food, and an ash-yielding food, but it is classed as a carbohydrate food because its most obvious constituent is starch, and because we use it in the same general way as we do starchy foods like potatoes. The classification as now arranged consists of five groups, and it is the understanding that each of these groups should be represented, if not at every meal, at least once a day, and that if an excessive number of food materials from any one group are used in the course of a day the result is likely to be unsatisfactory from the standpoint of rational dietetics or of taste.

The groups may be described in terms of the dietitian as follows: (1) Foods in which protein bears a higher proportion to fuel value than it does in the well-chosen diet as a whole; (2) those in which fuel value is high in proportion to protein, owing chiefly to the presence of much starch; (3) those in which fuel value is high, owing to the large percentage of fat; (4) those whose chief value is mineral constituents and vegetable acids (the latter important from the standpoint of flavor as well as of body needs); and (5) those which (like the foods in Groups 2 and 3) have a high fuel value, but in this case due to the presence of sugar. From the standpoint of fuel value only, it is obvious that Groups 2 and 5 could be combined. From the standpoint of the well-chosen and palatable meal, on the other hand, they should be kept distinct, since sugar is frequently as important as a flavor as it is as a food.

In housekeepers' terms the groups may be described as: (1) Flesh foods (except the very fattest), milk, cheese, eggs and such meat substitutes as dried beans, peas, and other legumes, and some of the nuts; (2) starchy foods; (3) fat foods; (4) watery fruits and vegetables (excluding dried legumes and fruits which have been dried or combined with much sugar); and (5) sweets.

The grouping is easy to remember and provides a guide for the housekeeper in the selection of food materials for a meal or for a day's ration and also a means of checking up and criticising the meals which have been served.

It is obvious that while some foods belong clearly to one group, sugar and honey to Group 5, for example, and liver and veal (which contain very little fat) clearly

The following sets of menus contain none but wholesome and desirable food materials. These food materials, however, have been poorly combined so far as the protein, fat, and carbohydrate which they provide are concerned. The first set is characterized by much protein, the second set by much fat, and the third set by much carbohydrate.

MENUS WITH PROTEIN PREDOMINATING.

Breakfast—Cereal cooked in milk, chicken hash with egg, popovers, butter and milk as a beverage.

Dinner—Dried-bean purée, halibut steak, potatoes scalloped in milk, tomatoes stuffed with chopped beef, bread and butter, and frozen custard with nut cookies.

Lunch or Supper—Baked beans, nut bread and butter, old-fashioned rice pudding, and a glass of milk.

The following shows a day's menus (not at all unusual or peculiar) in which fat foods predominate.

MENUS WITH FAT PREDOMINATING.

Breakfast—Oatmeal with cream, sausage, and corn bread and butter.

Dinner—Cream of tomato soup, mutton chop with creamed potatoes, greens cooked with bacon or pork, bread, and suet pudding with hard sauce.

Lunch or Supper—Creamed salmon, lettuce with oil dressing, tea biscuits and butter, pumpkin pie, and a cup of chocolate.

The following is an example of three meals of combinations common enough, but in which carbohydrate (starch and sugar) predominates.

MENUS WITH CARBOHYDRATE PREDOMINATING.

Breakfast—An orange followed by corn cakes with maple syrup, and bread or toast and butter.

Dinner—Meat pie and baked potato, green peas, bread and butter, and cottage pudding with chocolate sauce.

Lunch or Supper—Rice croquettes with jelly, rye bread and butter, baked apples, and sugar cookies.

The food and fuel values of the menus served are given below, the portions served being of the average and usual size for an adult.

Described in technical terms, for the benefit of the dietitian, the first day's menu supplies 4.2 grammes of protein per 100 calories of energy, or 2,356 calories of energy per 100 grammes of protein; the meals of the fatty menu, 2.4 grammes of protein per 100 calories of energy, or 4,120 calories of energy per 100 grammes of protein; and the meals of the starchy (carbohydrate) menu, 2.5 grammes of protein per 100 calories of energy, or 4,081 calories of energy per 100 grammes of protein.

Speaking in terms of the housekeeper: Into the first day's menu there went sixteen food materials other than fresh fruits and vegetables, of which nine were

THE COMPOSITION OF THE NUTRIENTS AND THE ENERGY SUPPLIED BY THE MENUS USED FOR ILLUSTRATION.

	Weight of Edible Food Served, Grams.	Protein Grams.	Fat Grams.	Carbohydrates Grams.	Fuel Value, Calories.
Protein meals:					
Breakfast.....	471	36	50	54	810
Dinner.....	772	55	64	120	1,288
Lunch or supper.....	639	33	38	105	894
Total.....	1,882	127	152	279	2,992
Fatty meals:					
Breakfast.....	353	24	69	58	949
Dinner.....	617	33	88	108	1,356
Lunch or supper.....	621	29	83	98	1,259
Total.....	1,591	86	240	264	3,564
Carbohydrate meals:					
Breakfast.....	509	15	32	168	1,020
Dinner.....	529	40	33	133	989
Lunch or supper.....	376	14	27	127	807
Total.....	1,414	69	92	428	2,816

It is hardly necessary to say that different combinations of vegetables and fruits may be made in which the proportion of mild vegetable acids and ash to the other nutrients in the total diet may vary widely—a fact which could be shown by similar groupings of food materials into menus.

To benefit by well-selected menus, each member of the family should eat all of the kinds of food provided, for, if a person habitually eliminates some particular sort of food as fruits and green vegetables, he has failed to take advantage of the housekeeper's selection, no matter how good it may be. One must, speaking broadly, relish all kinds of food, which is a matter of good habits and good manners as well as of physiological importance.

The housekeeper who will learn the simple classification of foods mentioned above can easily see the relation of the different groups of foods to the character of the meals she provides. She need only go a step further to realize that it is wiser to provide dishes varied in character for a given meal, and also meals varying from those of the same day and varying from day to day. She can do this easily by taking care to see that the different food groups are represented in at least two of the three meals she serves each day. The more extended her information as to market facilities, the wider her knowledge of standards of quality, the wiser her selection of foods, and the greater her skill in preparing and cooking them, the easier it will be for her to plan meals by this or any other method, which will be reasonable, economical and satisfactory, as well as adequate.

She can understand also that it is more important to apply the principle outlined to a considerable period of time than to a single day. A departure from the ideal for a day or so means little, for it can be made up the next day or the next week, while an irrational diet, if followed for a long period, may lead to marked disturbance or even serious illness.

The housekeeper need not go into the reasons for all these things which she has to attend to, but she will be quick to see in a general way the point of it all in so far as it concerns her problem of preparing suitable meals for her family. She need not know the theories of electricity to use and appreciate an electric light, nor need she be burdened with the theories of dietetics, if she is willing to trust the conclusions others have reached and apply them to her particular problems.

She naturally wishes for some tangible proof that her efforts to provide a rational diet as part of her good housekeeping are meeting with success. The general condition of her family should offer her fairly good evidence. Thus, it seems fair to say that the child who continues to approximate the average for his years with respect to weight and height, who is apparently normal in respect to work and play, and who exhibits none of the obvious symptoms of ill health cannot be very faultily fed, any more than can be the adult who remains in fairly constant weight for long periods of time, making due allowance for the seasonal variations (such as the small loss in weight in summer and the small gain in

SOME COMMON FOODS GROUPED ACCORDING TO THEIR CHARACTERISTICS.
(All five groups should be represented in the diet every day.)

Group 1.	Group 2.	Group 3.	Group 4.	Group 5.
Foods Characterized by Protein.	Foods Characterized by Starch and Similar Carbohydrates.	Foods Characterized by Fat.	Foods Characterized by Mineral Substances and Organic Acids.	Foods Characterized by Sugars.
Lean meats Poultry Fish Oysters, etc. Milk Cheese Eggs Dried legumes Nuts And other protein-rich foods	Bread Crackers Macaroni Rice Cereal breakfast foods, meals and flours And other cereal foods	Butter Cream Lard and other culinary fats Salt pork Bacon Chocolate And other fatty foods	Spinach Peas Lettuce Potatoes Turnips Apples Oranges Berries And other vegetables and fruits, raw or cooked	Syrup Honey Jellies Dried fruits Candy And other sweets

to Group 1, other foods are difficult to classify. Mutton, for example, is a protein food which might also be classed as a fat food, and dried navy beans might be classed as a protein and also as a starchy food. To cite another example, potatoes, which are an important source of mineral substance, with some organic acid, are included in Group 4 rather than in Group 2, which at first thought might seem the more logical place for them when we recall that they are so generally used as a source of carbohydrate (starch). In general, however, the system of groupings will be found helpful.

* The Scientific Monthly.
† Chief, Office of Home Economics, State Regulations Service, U. S. Department of Agriculture.

winter), and has other attributes of good health. As one reaches middle life it is wise to be more abstemious in matters of diet, as in other things, for the body is "slowing down" and becoming less active and so needs less food. If, in any case, things do not seem to be as they should be, advice should be sought from a physician or other expert, as he alone can judge whether there is an actual departure from normal and whether it is due to diet or to some other cause.

Experience shows clearly that the experimental and the professional worker can be more helpful to the housekeeper than heretofore. The Department of Agriculture is doing what it can to accomplish this important end. The method for translating technical matters of diet into housekeepers' terms, which is outlined above, is an attempt to do this. The method can be modified as experience indicates is desirable, and the subject-matter can be amended to keep pace with the results of investigation and experiment.

What we can now do to help the housekeeper solve her problems falls short of the ideal, but, at any rate, what has been accomplished would seem sufficient to show her that her problems are recognized as worthy of study, and that an extended and consistent effort is being made to give them the attention they merit. In this movement the United States Department of Agriculture is taking part to the full extent of its opportunities.

Ancient Principles of Physiognomy*

THE parent view that mental traits are conditioned by bodily composition affiliated with views of similar ancestry holding that the traits were revealed in bodily signs, such is the principle of physiognomy, a doctrine as old as Aristotle, and older. There is the traditional story that the physiognomist Zopyrus, in reading the character of Socrates, pronounced him full of passionate tendencies, thus showing in the opinion of the disciples of Socrates, the vanity of his art. But Socrates came to his defense and confessed the reality of the impulses, which, however, he was able to resist. Aristotle's advocacy of physiognomy was not very pronounced; it may have been little more than an inclination to recognize the reflection of emotion in feature, or the co-ordinate growth of body and mind. But the tractate on "Physiognomy" ascribed to him served as the text to the renaissance adepts in occult lore. Thus restated, even more than in its original setting, it presents the characteristic dependence upon weak analogy in connecting specific bodily features with specific mental traits. Coarse hair, an erect body, a strong sturdy frame, broad shoulders, a robust neck, blue eyes and dark complexion, a sharp but not large brow, were together regarded as marks of the courageous man, while the timid man showed opposite characteristics. The doctrine was re-inforced by such analogies as that timid animals, like the rabbit and the deer, had soft fine hair; while the courageous ones, like the lion and the wild bear, were coarse-haired.

There is no more instructive instance to illustrate how the old learning was reinstated with slight alteration in precept and practice than the career of Jerome Cardan (1501-1576). Esteemed by his contemporaries, shrewd and able, he was urged in one direction by his taste for science and in another by his credulity. His autobiography reveals his analytic bent as well as his strong personality. It has been said of him that for all for which his contemporaries thought him wise, we should think him mad; and for what we think him wise, they would have thought him mad. So great was his reputation that he was invited and then inveigled to travel from Naples to Scotland to treat the bishop of St. Andrews. The prelate's ailment had been described as a periodic asthma due to a distillation of the brain into the lungs, which left a "temperature and a condition too moist and too cold, and the flow of the humors coinciding with the conjunctions and oppositions of the moon." With the characteristic prestige that results from finding others in the wrong, Cardan promptly found that the Archbishop's brain was too hot and too dry. He put his distinguished patient on a cold and humid diet to resist the attraction of the brain, yet had him sleep on a pillow of dry straw or sea-weed, and had water dropped upon his shaven crown; in addition, however, he prescribed a regimen of simple food, much sleep and cold showers. The improvement that resulted—naturally ascribed to the "humoral" procedures, added much to the glory of Cardan's reputation and the profit of his purse. This physician, learned and wise for his day, was yet the very embodiment of all things superstitious. Every trivial occurrence was an omen or potent. He cast horoscopes, wrote on all manners of cosmic influences, and espoused the rôle of a physiognomist. His distinctive contribution was an astrological physiognomy, based upon the underlying notion that the furrows or lines of the forehead correspond to the seven dominant celestial bodies; and that the qualities which they denoted were those connected

with the powers and virtues conferred by Venus, or Jupiter, or Saturn, or Mercury, etc., in the current astrological system. Across the forehead he drew seven parallel lines, the spaces in succession dedicated to the moon and the six planets, and by the proportions and prominences of these lines he read the fortune of the subject, not hesitating in one case to predict from the grouping of these wrinkles that the owner thereof was doomed to die by hanging or drowning.

In such manner the humoral doctrine served to determine the diagnosis of disposition and ailment, while from astrology and physiognomy were drawn further indications of personal character and probably fortune. Hardly less significant for the logical temper of these pre-Harveian days were the contributions of Giovanni Battista della Porta (1538-1615). He was impressed by the comparative physiognomy sketched in the Aristotelian writings—a field in turn indicating the strong impression that the traits of animals make upon the thought-habits of primitive people; it appears in totemic practises, as well as in animal fables from Æsop to Br'er Rabbit. The notion that stubborn persons will carry the outward sign of their obstinacy by having features in common with the face of a mule, or that foolish ones will show a like resemblance to a sheep, impresses the modern reader as a strange joke. The analogy will barely support a pleasantry or a metaphor. We are fully conscious of the metaphor of our epithets, when we call an obstinate person mulish, or a shy one sheepish, or a man of sly ways an old fox, or speak of a social lion or a wise owl or a gay butterfly; it is significant that what was once serious logic is now playful figure of speech. It is also in accord with the principle of survivals in culture that the notions made current by generations of credulous "physiognomists" continue to be circulated in the popular manuals sold to simple folk to teach them the art of reading faces and futures.¹

All this would be as irrelevant retrospectively as it is to our central purpose, were it not that it indicates the presence throughout the ages of a considerable body of popular lore and systematized doctrine—both saturated with flimsy analogy and engaging prepossessions—which was available for the ambitious renaissance of the interest in character and its signs in the face, through its best known apostle, Johann Caspar Lavater (1741-1801). The contrast between Lavater and such men as Cardan and Porta is as marked as that of the spirit and scope of the scientific study of their respective times. The vagaries of the sixteenth century may have stood measurably aloof from the real, if slow and uncertain, advances in the knowledge of mind and nature then maturing; but they were not wholly remote, not wholly tangential to its orbit. This was no longer true of the eighteenth century. Lavater, despite his reputation and associations and the imposing effect of his ambitious publications, failed to affect seriously or to divert the increasing stream of scientific discovery to which the early eighteenth century gave momentum. The scientific contemporaries of Lavater judged his views as critically, appreciated their wholly subjective basis in a personal predilection and their lack of objective warrant quite as justly as we of to-day. The contrast of attitude appears equally in the all but complete desuetude of the old persistent pseudo-sciences, astrological and others.

Lavater has nothing new to offer in principle or data or method. He was an impressionistic enthusiast setting forth conclusions with a minimum of argument, and convictions with a minimum of proof. His system was based upon subjective interpretation. His delineation of character has a direct reading of detailed mental traits by an interpretation of their equivalents or representatives in features and expression. Lavater's activities were manifold. Preacher, orator, philanthropist, political reformer, dramatist, writer of ballads, he was a conspicuous man of his times, highly regarded by his eminent contemporaries—among them Goethe, whose contribution of the *Fragments of Physiognomy* have been identified. He was quite without scientific bent or training. Yet his name was so commanding in the annals of physiognomy as to distract attention from the slightness of the foundations upon which his elaborate superstructure was raised. Indeed, the impressiveness of elaborate plates and luxurious editions, and the support of distinguished but uncritical patrons, were responsible for much of his fame. The reader who desires first-hand acquaintance with Lavater must be prepared

¹ Nothing less than a glance at the illustrations which the earlier physiognomists employed will convey an adequate impression of the vagaries of Porta and his kind. They show that what was once pictorial proof has become the artist's pastime. The material presented for amusement in Lear's "Nonsense Botany" or Wood's "Animal Analogues" is hardly more remote than that which served Porta as a serious instrument of research. Thus a portrait of Plato is printed side by side with that of a dog, and one of Vitellus Caesar is paralleled by that of a stag; and in each case some of the most deserving qualities of the animal are regarded as typical of the human embodiment. Similarly distorted illustrations show human resemblances to a lion, or a bull, or a donkey, or a deer; while the picture of a girl is ungallantly made to approach the features of a pig. These and yet more capricious ventures in animal physiognomy were incorporated into later systems, often in complete ignorance of their source.

for tedious assertion, for generalities that do not even glitter, for persistent avoidance of real issues, for the futile contention and misunderstanding of a propagandist. Of method he had little, and for the most part translated directly and by use of a dictionary of fanciful etymologies, from the language of a superficial anatomy into that of a wholly arbitrary psychology. He presented a popular, empirical grouping of feature-interpretation by virtue of a certain common-sense shrewdness, which he elevated to the dignity of a universal physiognomical sense—"those feelings which are produced at beholding certain countenances, and the conjectures concerning the qualities of the mind," which the features suggest. The extensive collection of portraits alone offset the tedium of the text. Lavater was an expert draftsman, and a diligent collector of engravings, outline drawings, and the silhouettes then in vogue. To each picture he attached a character-reading, which reflected little more than his personal impression or knowledge of the subject, to which occasionally were added special correlations of such traits as prudence, cunning, industry, caution, determination or what not, with the forehead, the eye, the nose, the mouth, the chin.

It was inevitable that the practical interest, lacking the compensations of Lavater's serious purpose, rapidly turned physiognomy into vulgar quackery. The followers of Lavater developed a craving for handy recipes by which to interpret the meaning in terms of character, of chin, forehead, eyebrows, and of the several distinctive combinations of feature, by an arbitrary or plausible system of signs. Physiognomy degenerated into a baseless and senseless empiricism. Oblique wrinkles in the forehead were held to indicate an oblique or suspicious mind; small eyebrows with long concave eyelashes were made the sign of phlegmatic melancholia; long high foreheads were advised not to contract friendships or marriages with spherical heads; such was the detailed but arbitrary correlations oracularly set forth with no more analysis or understanding of facial traits than of mental ones.

Lavater's work supplies a convincing and not too ancient example, if such be needed, of the limitations of impressionism as a basis for the study of character and of its utter futility for the purposes of a sound psychology; and that apart from the like disqualifications resulting from an ignorance of the significance of such sematic features as those which formed the basis of the system. It shows how readily an enthusiastic but unintelligent industry may build a monumental construction upon a hollow foundation. It illustrates as well a specific psychological fallacy: that of exaggerating the significance of traits in which we have an interest. It is the general human appeal of the face and its expression and its place in human intercourse that supplies the interest so readily abused by popular writers or commercial charlatans. It is just this realm of loose analogy and unchecked ambitious conclusions that attracts feeble minds with a taste for speculation and an inclination for the occult, the bizarre, the esoteric; such a taste, as if to appease a neglected, logical conscience, usually finds refuge in a practical semblance of verification. It is this combination of interests that supports physiognomy or phrenology, palmistry or fortune-telling, and (with an altered complexion), Christian Science or Theosophy—in which latter examples cures or miracles instead of readings supply the realistic support.²

A possible redeeming feature of Lavater's work is his recognition of facial expression as worthy of study; in this he followed the leadership of the artist LeBrun. Expression is much more generic and more readily interpreted than are peculiarities of feature. In such biblical maxims as "though a wicked man constrain his countenance, the wise can distinctly discern his purpose," Lavater found a text for his exposition. Of the true meaning of expression, so far as it was possible before Darwin, he had slight understanding. His physiognomical sense conferred no physiological comprehension. Indeed, so far as he ventured into the biological territory, he reverted to the older notions, and made fish and fowl and even insects reveal their character by their effects upon the human impression. In an engraving of the heads of snakes he pointed out the reprobate qualities distinguishable in their form, the deceit of their colors, and the naturalness with which we shrink from such a countenance. The logic of physiognomy, ancient or modern, learned or ignorant, is of one kinship; it is the family associations that in time and circumstance come to be less and less respectable.

An Interesting Fact Relating to Cement

SAND mixed with cement is usually considered as an adulteration, or a diluent, but experiments made at the Arrowrock Dam have shown that a mixture of equal parts Portland cement and sand, when ground together to a very fine state, forms a cement that is practically as strong as clear cement.

² For the general subject I may refer to my volume: "Fact and Fable in Psychology," 1900.

*Prof. Joseph Jastrow, of the University of Wisconsin, in *The Scientific Monthly*.