SOME GENERAL PRINCIPLES OF DIETETICS,
WITH SPECIAL REMARKS ON PROPRIETARY FOODS *DAVID L. EDSALL, M.D.
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Since the subject which I have been asked to discuss, the general principles of dietetics, is one that, if considered comprehensively, would necessitate an extremely extensive paper, I shall be obliged to confine myself to a few points which seem to me particularly important, especially to teachers, for I know that the latter comprise a large proportion of those present in this Section.

Contrary to the conditions that existed not long ago, when this would have been considered to be well-nigh heresy, it has come in recent years to be an evidence of open-mindedness to dwell on the frequency with which drugs are abused, and as a contrast to the common empiricism in drug therapy to point with gratification to the increasing extent to which the latter is being superseded by rational hygiene and dietetics. The strictures on the use of drugs are occasionally unfair and irritatingly sweeping, but I agree that the general trend of this movement is admirable and correct.

Before we adopt too optimistic an attitude in regard to the extent to which the poor use of drugs has been replaced by good methods in diet and hygiene, however, I think that we may do well to determine how largely and how well these latter are actually employed. As a matter of fact, while public hygiene has made great advances and while many valuable details have been added to our knowledge of individual case hygiene and of dietetics, there are many things still to be wished for in the practice of these subjects, some of which, in regard to hygiene, I indicated in a paper that I read before this Section last year. One important reason for the looseness with which they are employed is the fact that the information that we possess in regard to them exists, from a practical standpoint, in very large part in a form that makes it laborious to acquire, so that practitioners can get very little useful working acquaintance with it unless they come gradually to formulate a system for themselves through experience and prolonged study. This means that those who make frequent and confident use of these measures belong to that comparatively small number who have done sufficient study and work in reference to them to permit them to bring into somewhat orderly shape the scattered and fragmentary details learned from various sources and particularly from scattered literature, especially the current literature of the past few years. This is not so true of drugs. It certainly cannot be said that the frequent and confident use of the latter is confined to a few. I need not go into the question whether their less frequent use might not be an advantage, but I may seriously say that many practitioners do actually make skilful use of drugs and that among earnest and intelligent men the distinctions as to skill in this regard are chiefly dependent on differences in personal wisdom and breadth of knowledge rather than on differences in the principles that they apply in using drugs. Be the errors in the customary use of drugs what they may, I think that the intelligent man either possesses or knows how to obtain logical reasons for making his choice in drugs, and the errors that are made with them are dependent more frequently on a widespread habit of using empirical faith than on a

lack of means of reaching a rational decision. With hygiene and diet, however, there is very commonly an actual inability to reach a rational preliminary decision as to what general line should be followed.

I have had some interest in learning with what degree of freedom and ease a large number of practitioners, especially recent graduates who have modern training, make use of dietetic measures. I think I am right in saying that a large majority of them believe—and, I imagine, believe rightly—that so far as they are themselves concerned they can accomplish much more with drugs than with diet even in those cases in which they recognize the especial suitability of dietetics. The reason for this is, I think, apparent. They have the means of forming an intelligent judgment in a large proportion of instances regarding the use of any particular drug, while in dietetics, aside from a few conditions such as diabetes, in which specific things can be stated, their knowledge usually consists, on the one hand, of some physiologic facts which have not been presented to them in such a way as to adjust them very clearly to clinical procedures, and, on the other hand, of a more or less considerable mass of practical details which have usually been presented to them almost purely as arbitrary measures and their trend not very well adjusted to the physiologic facts. A decision regarding diet is, therefore, in actual practice usually made in a much more empirical manner than is one in regard to drugs, and it is correspondingly the more likely to be incorrect. Indeed, in dealing with advanced students or even with practitioners who have had no special training in dietetics, I find that they are likely to be unable to give any regulations that could not be equally well or better given by a wise housewife; and the reasons for the regulations that they do give are generally not at all clear, while on the other hand they do very frequently know why they order any particular drug.

The first point to get fixed in our minds, it appears to me, is that, except in rare instances, of which a conspicuous example is diabetes, we do not diet any particular disease by specific means, but we diet disturbances of function which are common to many diseases; that is we employ diet just as we do most drugs. We may often, for example, wisely use precisely the same diet in gastritis, in some stages of gastric ulcer, in some nervous disturbances of the stomach and in various other disorders, since our principle of action here is simply to choose foods that are mechanically, chemically and physiologically unirritating and that do not stimulate the functional activity of the stomach. A common method of writing text-books is simply to describe a special list of articles as especially suitable in each of these conditions. This is, to my mind, quite as irrational a method of teaching as to recommend a particular set of drugs in a particular disease as if they had some especial specific effect in that disease. The rational way of prescribing a diet in these conditions, it appears to me, is to decide through common sense and common knowledge of the physical characters of foods which would be mechanically irritating and which would probably be unirritating in the case at hand and what manner of preparation, if any, would help to avoid this; and to determine which are chemically and physiologically suitable through direct application of the very valuable investigations, such as those done by the Pawlow school particularly, and by Cannon in this country, which have so largely aided rational dietetics; those investigations, that is, that have taught us the influence of protein, fat and carbohydrate

* Read in the Section on Pharmacology and Therapeutics of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.

and of some special members of these classes of nutritive substances on gastric secretion and motility.

In our dietetic regulations in most diseases we start with precisely the same point of view as that just indicated. For instance, we do not diet nephritis as nephritis; we diet simply irritation of the kidney and inadequacy in its excretory function, and we do this by cutting down as far as we can, without damaging general nutrition, those foods that are most irritating to the kidneys through their excretory products, and that demand the greatest amount of functional activity on the part of the kidney; and these, again, we can adjust partly through common sense and partly through physiologic knowledge and without depending on any set list that may be right or may be simply the product of an author's personal idiosyncrasy.

In the second place, we need to look on a very large proportion of patients as needing less a special diet for some particular disorder than instructions as to what a normal diet is. Many persons, of course, damage their health by overindulging themselves at table, in quantity or quality, without producing, for a long time at least, any particular form of disease, and many persons also damage themselves by little or big peculiarities, rather than indulgences, in the use of food or drink, and generally without any comprehension of the harm resident in their peculiarities.

Many undernourished and consequently sickly persons need simply to eat more of the highly nutritious forms of food and less of the innutritious kinds; but they do not know how to choose these themselves successfully, nor does the physician unless he has accurate knowledge of the value of foods. Again, large numbers, particularly of young women of the working classes, but also those of higher station, need, for instance, to eat more breakfast, instead of working the first half of the day during practically an eighteen hours' fast; and there are any number of other peculiarities of eating of all sorts. The only way to discover and correct them is to inquire exactly and in detail into the dietetic habits of the individual, and preferably to get a written statement from him covering several days to a week, and including just what he has eaten and drunk, and how much and at what period of the day.

The third point I would touch on is that we should hold in mind in most instances as the key-note of our success with patients kept on a special diet for any considerable length of time the influence that the diet is having, not simply on the most conspicuous local disorder that the patient exhibits, but on his general nutrition. Many persons improve rapidly as to their local trouble, only to discover soon that the most seriously disordered organ has been relieved at the expense of the general organism, unless this point is carefully watched and guarded against. Indeed, a very large proportion of persons need no special attention paid to particular organs, even though they superficially may seem to, but rather need to be dieted simply for their general undernutrition or overnutrition. This point always demands attention in deciding on the line of diet to be pursued in the beginning and also at each subsequent visit, and it must be determined first by learning whether the individual's weight and general vigor seem normal for him, aside from any disease that may be uncontrollably affecting these, and then subsequently by watching carefully the effect of the diet on weight and vigor. This, simple and patent as it seems, is often not done, and I believe more readily avoidable dietetic errors are made in regard to this point than in any other, many persons complain-

ing that they were made thin and weak and half ill by a diet, while others, though in smaller numbers, are made uncomfortably fat and occasionally seriously obese.

This brings up the next point that I would speak of, namely, that we must have more accurate knowledge than is common in regard to the value of foods and hence in regard to the value of any diet that we are using. Many doctors, if you mention calories to them, indulge in sad lamentation and complaint, or vigorously deny that calories can help any sick person to get well. This is quite as irrational as to deny that there can be any good in knowing and using a suitable dose of strychnin or atropin instead of employing them haphazard in infinitesimal amounts or by the handful, as fancy might happen to dictate. Many and gross errors are committed through not knowing what amount of food is being given; not such serious errors as would result from a wholly unlicensed dosage of poisonous drugs, for foods are not usually directly poisonous, but very serious and very common errors nevertheless, and errors that are very often overlooked because the human organism will stand, and frequently for a long time, very marked degrees of starvation or overfeeding without exhibiting superficially any results that are evidently due to this. I think that most persons who are especially interested in dietetics will say that they have very frequently seen persons starved to a dangerous degree or greatly overfed, especially the former, without its having been recognized that this was being done; and I feel sure that I have several times seen persons unknowingly starved to death under such circumstances, chiefly while under treatment for serious acute disease. Some effort is necessary in order to acquire knowledge of food-values and facility in using them in practice, but most important things in medicine are acquired only through effort. In certain groups of cases it is, to my mind, wholly inexcusable to proceed without precise knowledge of what we are doing, for in these cases at times the patient's life, or at least his health depend more on what we do in diet than on anything else; and we need in such instances not a mere general knowledge that this food is nutritious, that one less so.

If we are to accomplish safe and successful results, we need to know just what we are doing with the same accuracy that we would demand to know whether we were using $1/12$ or $1/6$ of a grain of morphin with a desperately sick patient. These cases are chiefly those chronic cases in which we must use a diet that differs very largely from the normal cases—that is, of such diseases as diabetes and obesity, and some nephritic and gastrointestinal cases, and various others; also all cases such as those of any severe acute infectious disease, in which the diet is necessarily extremely limited in character and usually fluid and in which unless we choose wisely we may readily order what is essentially starvation.

In most walking cases in which the diet is only moderately regulated, we can trust to the patient's appetite and to observations of his general weight and vigor to see that he gets what he needs, and not much more. In the other types of cases we need to order with clear knowledge and appreciation of food-values if we are to avoid starving him through too great restriction or overfeeding him through too great generosity. A very large proportion of diabetics, for example, are greatly damaged by being told what they must not eat, while no attempt is made to see that their nutritional demands are met by ordering accurately sufficient amounts of the foods that they may take; and the common feeling that obesity is a

very discouraging condition to treat is dependent chiefly on the fact that the diet for the obese is commonly ordered with so little knowledge of its actual value that the result is a mere question of luck, with the odds against success, and the patient is usually given enough to keep him obese or so little that he is made more or less seriously weak or ill and has to relinquish the diet.

The commonest bad results are in the severe acute diseases, and it is in these that I have most frequently seen serious underfeeding, on the one hand, or serious disturbances of digestion and general nutrition, on the other hand, produced by the use of an irrationally large or small amount of total food or of one type of food. Too much fat especially is very frequently given in such cases, though protein and carbohydrate are not uncommonly ordered in too large or too small amounts.

Such errors can be very readily avoided after acquiring a little facility through practice, and with the tables of food-values that are now available in text-books and government publications there is no justification for the old excuse that food-values can be determined only with great difficulty.

It is in cases of the type last under discussion in which great care in diet is needed that proprietary foods have come most largely into use and in which, therefore, their value and limitations in value need most careful consideration. I have no hesitation in saying that proprietary goods have in most particulars depended for whatever success they have had on the fact that so little attention is given to acquiring skill in the use of natural and home-prepared foods. I have even less hesitation in saying that proprietary foods have done much more harm than good, all told; and this is not because they are wholly devoid of value, but is due to the fact that almost all of them have been exploited in such a manner as to exaggerate greatly the worth that they may have, so that instead of their being used rationally and in suitable ways and suitable cases they are ordinarily employed with a grossly hypertrophied idea of their total nutritive qualities, without any clear idea as to what amounts of the different classes of nutritive materials they contain, and, furthermore, often without the slightest notion that nearly all of them have some more or less decided disadvantages, such as a high alcohol content, associated with their use. In many cases these disadvantages are sufficient to make their use wholly undesirable. Personally, while I gladly employ anything as food that I think most suitable, I practically never find it necessary to depend on any proprietary foods and rarely find it desirable to use them at all—and for these reasons:

First, not one of them can be used in amounts sufficient to supply all the nutritive demands of the organism even of a person absolutely at rest. With the liquid foods this is impossible, first, because the alcohol content is, as was shown in an admirable report in *THE JOURNAL*,¹ so high that if an amount sufficient to meet the nutritive demands were given, almost any patient would be made continuously drunk. Furthermore, it would be only very rarely that a patient could take such an amount of these prepared foods without their becoming quickly repulsive and disturbing to the digestion. In the amounts usually given and in the quantities ordinarily recommended by their exploiters, they provide only a small fraction of the quantity necessary to preserve nutrition. This statement of their limited usefulness and value in nutrition has been vigorously denied

by the manufacturers of some of them since the above-mentioned report was published, and beguiling counter-statements regarding their value, that superficially seem somewhat convincing, have been published in advertisements. Any one who has some knowledge of such questions can very quickly see, through a little analysis of these replies, that the counter-arguments are wholly specious and inaccurate.

My second reason for not using them is that, even when they are employed in feasible amounts, they are most unduly expensive and I do not consider it proper to make a patient pay what is in some instances even as much as twenty or more times the amount that he needs to pay in order to get a given quantity of food, unless there is some very good reason for it.

Finally, my third and most important reason is that I do not find patients who cannot take ordinary foods quite as well or better if they are properly prepared and properly chosen. It has been my fortune to treat in the past few years in hospitals an exceptional number of patients with acute infectious disease and I have been especially interested in their diet. I have tried a variety of proprietary foods, and I have never seen that I could not do better with some much cheaper and more natural food, which has usually been milk—sometimes whole milk, sometimes skimmed or diluted or otherwise modified milk, but always, when I employ milk, a milk free from harmful kinds and numbers of bacteria. With an experience of well over a thousand cases of typhoid fever in that time, I am wholly unable to comprehend what physicians mean when they say that typhoid patients cannot take milk without its causing distention or other abdominal disturbance. This usually is undoubtedly due to the fact that those who have had difficulty in employing milk have used an infected milk. If this is avoided it is practically always possible to use milk freely except for very transitory periods during sharp acute digestive disturbances, and in the latter instances digestion needs rest from any except very dilute foods.

The dry proprietary foods I use very little indeed, because I find these also unnecessary, because they likewise are often relatively very expensive; because in amounts that are of much value they tend to disturb digestion; and, finally, because many of them, especially many of the foods for diabetics and dyspeptics, are not by any means what they are advertised to be and are frequently, as may be seen from Winton's analyses, simply frauds. The gross exaggeration in some advertisements of such foods may be seen in the fact that I simply weighed a specimen of a food substitute that is, in advertisements, most energetically lauded for its nutritive value, and found that if all its weight were considered nutritive material (and this, of course, is very generous) it was so light that it would cost \$1.25 to \$1.50 to buy an amount equal in food value to a five-cent loaf of bread. I frequently find gluten and other similar foods being used under the impression that they are nearly or quite carbohydrate-free. It should become generally known that all but two or three of these are shameful frauds in this particular and most important point. The greater credit, therefore, is due to the few that are honest preparations.

Many of these foods, both the liquid and the solid, have some value. They can be used in certain cases in small amounts to increase somewhat the quantity of food that a patient is getting, thus adding a small proportion more than the patient would otherwise take. In difficult cases it is sometimes valuable and helpful to secure such small increments and especially to increase

1. Medicinal Foods: Report of the Council on Pharmacy and Chemistry of the American Medical Association, *THE JOURNAL A. M. A.*, May 11, 1907, xlviii, 1612.

variety, but even this is in most cases unnecessary—and more than this these foods do not accomplish.

So-called beef extracts and the like I need not touch on further than to point out that, as was shown in a recent bulletin of the Department of Agriculture, most of them have scarcely any food-value. Many of them are essentially devoid of all food-value and practically all are not "beef extracts" or "meat juice" at all. These, more than the other proprietary foods even, have been used with an enormously exaggerated idea of their value, and have done a corresponding amount of harm.

Some manufacturers of these and of the other preparations mentioned evidently believe the statements that they put forth in advertisements. Others quite as clearly know better, but make the statements purely to acquire money. It is a sad commentary on the knowledge of dietetics possessed by many members of our profession that they have so freely accepted these statements and then, with their minds fixed in favor of some of these substances, believe that they have seen clinical results that are absolutely impossible. When one attempts to point out to them facts that are as simple as that two and two make four and not forty, one often meets with the reply, quoted from the exploiters, that because of the peculiar manner of preparation or some peculiar composition or what not of the foods, they are especially nutritious and not to be judged by ordinary standards. This is a mere play on either ignorance or unscientific fancy. There is no basis at all for such statements in many instances; and while at most the manner of preparation and the like may give them a very small fraction of superiority over an equal amount of unprepared food, it is only a small fraction. On the basis of this very slight advantage, it is claimed usually that they have anywhere from two to a thousand times their nutritive value; sometimes even more than a thousand—an infinite number, indeed, for some of them are, so far as we know, devoid of any nutritive value. And yet some of the latter have been used quite as freely as some that have value, simply because they have been well advertised.

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PROPRIETARY AND PREDIGESTED FOODS FROM THE STANDPOINT OF THE PEDIATRIST *

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The name of the proprietary infants' foods is legion. They are like the rats in Bishop Hatto's tower; "by thousands they come and by myriads and more." No one can remember the names of more than a fraction of them. Many are widely used throughout the civilized world; others have merely a local vogue. We may well seek an answer to the question, What has brought about the general employment of these substances?

Undoubtedly many factors have been operative. One of the chief of these has been the ignorance of the great bulk of the medical profession in regard to the artificial feeding of infants. It was for years and by many considered as a subject little deserving of the serious attention of a trained physician, and the amount of exact knowledge, until comparatively recent years, was pitifully small.

* Read in the Section on Pharmacology and Therapeutics of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.

With time came enlightenment but bewildering complexity. With the development of the percentage method of infant-feeding appeared a great number of complicated algebraic formulas by means of which the required amount of the various ingredients, cream, milk and sugar, were to be calculated, a separate formula for each ingredient. Well might the busy general practitioner shrink from the task of puzzling over them. He stood before them as Boussard stood before the trilingual Rosetta stone, realizing that it was the key to much knowledge, but appalled at the task of deciphering it. Especially would a physician in a community where most of the children are breast-fed be apt to turn to a printed direction which relieved him of future responsibility. And, indeed, it might seem not only the easiest but the wisest thing to do, for the extravagant claims attractively presented by the agent who personally seeks him out may be backed up, be it regretfully acknowledged, by the quasi-scientific articles of eminent men, who have sullied their professional reputation that gain might follow.

Another potent cause has been the difficulty in obtaining clean milk fit for an infant's use. Until recent years this has, in the majority of places, been nearly impossible, and a permanent sterile food "guaranteed to contain all the necessary elements of milk" is attractive. The ease of preparation and the fact that ice could be dispensed with have appealed to many as arguments for the employment of proprietary foods. It must not be denied that for use where ice and fresh milk are not obtainable, food unalterable in dried form is a necessity.

The very low fat content of these foods, that which renders them totally unfit for permanent use, has undoubtedly made them of temporary value. The most frequent mistake in artificial feeding with cow's milk is probably overfeeding with fat, and the change to a fat-free prepared food brings about a prompt improvement and also a firm conviction that cow's milk cannot be digested and that this particular food is henceforth necessary.

The laxative maltose which many of the foods contain and which aids in overcoming the constipation troublesome with artificial feeding commends them to many.

These are the factors that have chiefly contributed to the demand for proprietary foods.

Before considering arguments against their use, let us look for a moment at their composition.

They may be roughly divided into those with and those without dried milk; in each of these classes there are some with much unchanged starch, some with the starch partially converted by malt into dextrins and maltose, and some with the starch almost completely converted. In addition, certain other variations have been brought about by adding lactose or cane-sugar or white of egg. One and all, they are very deficient in fat, low in proteins and salts, and they contain large amounts of insoluble and soluble carbohydrates, starch, dextrins, maltose, lactose and saccharose.

There are two chief arguments against their permanent employment: used without milk they fail absolutely; used with milk they are unnecessary. Their composition shows plainly why they are impossible without milk; they are hopelessly deficient in fat and many are so low in proteins as probably to furnish less than the minimum amount of nitrogen required. The mineral content also is unduly low. Rickets is to be expected with them. Absolutely lacking in that very essential but vague quality of freshness, their use is followed in a