

WHAT WE KNOW ABOUT DIET

BY JAMES AND PETA FULLER

ALL the propaganda about balanced diets, vitamins, amino acids, "basic seven" foods and "hidden hunger" cannot disguise one plain truth — that we know appallingly little about human nutrition. Enough is understood about the food needs of laboratory animals to produce a race of super-rats any time we happen to want one. But with human beings it is otherwise. To the embarrassment of dieticians and food advertisers alike, a steady stream of fresh (and often conflicting) data has issued from nutrition laboratories to challenge many of the food and diet theories we once trustingly accepted.

Most nutritionists will reluctantly admit the rudimentary state of their science. "Few people," according to Charles G. King, scientific director of the Nutrition Foundation, "realize how limited our knowledge is, in regard to human nutrition. For example, we still do not know what chemical elements and compounds must be supplied to the human body to meet its basic requirements for health and growth."

The lower animals appear to have no such problems. At Johns Hopkins University School of Medicine, Dr. Curtis P. Richter allowed his laboratory rats to select food at will from a rat cafeteria. The results were remarkable. Unconfused by theories, conditioned tastes or by synthetic flavors and odors, these animals made (from a nutritionist's standpoint) an almost perfect choice of foods. They grew as fast as rats kept on a standard scientific diet, they were healthy and normal, they reproduced, they showed no signs of deficiency and they lived longer than could ordinarily have been expected.

When supplies are available, the food sense of the lower animals seems almost flawless. The gray squirrel, when food is abundant, eats the nutritious germ of corn and discards the rest. (We eat the rest and discard the germ.) The University of Missouri Department of Soils noted that, with many different hybrids of corn to choose from, hogs will select only corn grown on soil that has a high mineral content. In warehouses, rats

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tend to be choosy about what bags of feed they raid, going after only the best. And insects are said to ignore "enriched flour" rather pointedly.

Equally wise were the babies in the much-discussed series of experiments by Dr. Clara M. Davis in Cleveland and Chicago. Given a wide choice of foods, these infants were allowed to eat whatever and as much as they wanted. One baby ate seven eggs at one time, another dispatched four bananas, and a third gobbled down a pound of lamb at a sitting. But these excesses were soon balanced by switches to other foods. Although the combinations were often unorthodox, each child in the course of six months had balanced his diet among fats, carbohydrates and proteins. His calory count was very close to what science says it should be. One child with a severe case of rickets voluntarily took enough cod liver oil to heal the bone lesions completely. Digestive disturbances were fewer, and gains in weight and height greater, in the experimental group than in the control group fed in the conventional, tedious way.

Again and again, laboratory findings attest the validity of simple folk wisdom about food. Savages, foraging for essential foods (including calcium) in African jungles, eat a great variety of leaves from shrubs and trees. If these are too coarse or unpalatable, they burn them and eat the ashes. In China for centuries the traditional gift to a young mother just delivered of her baby is a pig'sfoot pickled in

vinegar. This delicacy is nutritionally perfect, since pig'sfeet supply much of the calcium lost by a mother to her baby before birth.

Enterprising nutritionists, who made a survey recently of the Otomi Indians in the Mezquital Valley in Mexico, found that food deficiency diseases were uncommon, although these people were eating few of the foods usually considered essential. Their home acres are arid and their soil is barren, so they eat almost no meat, dairy products, fruits or vegetables. Instead they live on tortillas, pulque (fermented juice of the century plant) and such edible plants as malva, maguey, yucca, purslane, pigweed, sorrel, wild mustard flowers and sow thistle. The nutrient value of this menu had never been measured, so the investigators froze a sample diet and sent it to the Massachusetts Institute of Technology for chemical analysis. There it was calculated that the daily intake of the Otomis was not only adequate but actually superior in nutrient content to that eaten by an average urban group in the United States (which was being studied at the same time). This was no surprise to the MIT scientists, since their studies have shown that there are more foods rich in essential nutrients in Latin America than in the United States.

II

The nutritionists have been less than overjoyed by these studies. Some of them have cast doubt on the validity

of the Richter and Davis experiments and concluded, without much supplementary evidence, that taste and appetite are not biologically valuable guides to good eating but, rather, annoying obstacles that distract people from eating what is good for them. The prejudice is understandable. What price dieticians if, at least in the presence of abundance and variety, we choose so wisely, unaided?

The trouble is that we know comparatively nothing about the function of appetite and food preference in the human being. Are, for instance, heredity, race or climate the factors that explain the tolerance of highly-seasoned dishes by the Dutch in Indonesia and by the Mexicans? Does our digestive mechanism extract more nourishment from food when we enjoy it? How unnatural can our food prejudices get? Dr. Conrad A. Elvehjem of the University of Wisconsin, who is scientific advisor to the Nutrition Foundation, put it this way:

It is also important to know more about the compounds that give food their taste appeal, their flavor and aroma. Why do some people hate liver and other people like it? Why do some like Limburger cheese while others are nauseated by it? Sooner or later chemists and physiologists must get together on this subject. I am also afraid that most biochemists interested in isolating compounds from biologic material have tried to use raw or unprocessed foods. We need to know what compounds may be formed during processing. What happens during cooking?

Habituated to denatured and processed foods, artificially colored and

flavored, our taste mechanisms may lose their powers of discrimination. And there are other penalties for "civilization." Dr. Samuel Brody of the University of Missouri points out that:

Dietary selection in modern man is not always motivated by biologic wisdom. Instead, biologically irrelevant traditions, fashions, prejudices, prestige symbolism and advertising often govern the choice of food. Some of the most nutritious foods have the lowest prestige value. The most nutritious parts of animal carcasses are often visceral, most of which are discarded as offal. Yellow corn is superior to white corn but Southern whites prefer white because the yellow is "nigger food." Sharecroppers avoid river fish because "fish is eaten by them river rats" (social inferiors). . . . On the other hand, canned and packaged foods are highly esteemed by the rural poor because of their high prestige value. They are "city foods."

And how, Dr. Brody asks, can we distinguish between natural tastes and acquired prejudices? Can man follow his personal preferences or must he lean on the nutritionists? With scientists from left to right contradicting one another and yesterday's "indispensable" food element proved suspect today (and likely as not restored to prestige tomorrow), how do we recognize a good meal when we see one? Especially when such experts as Dr. Anton J. Carlson of the University of Chicago admit, "We have no accurate quantitative measure either of health or of physical or mental efficiency."

To confuse matters further, much

of what nutrition scientists do know runs directly counter to popular beliefs. A Western trucking company several years ago reasoned, logically enough, that "Vitamin A cures night-blindness. Carrots contain large quantities of Vitamin A. Eating carrots will cure night blindness." Forthwith, all drivers were provided with bags of raw carrots and it was soon proclaimed that the number of night-time accidents had decreased. Only two things were wrong with this picture. No clear-cut evidence exists that taking Vitamin A improves vision, day or night. And carrots, while unquestionably high in carotene, have been shown by University of California experimenters to yield only one sixth as much Vitamin A in the human body as scientists formerly assumed. Quite possibly it was the crunching and not the carotene that kept the drivers wakeful and so improved their scores.

Remember the vogue for eating compressed yeast cakes? Fresh bakers' yeast, nutrition researchers had found, was alive with B vitamins, notably thiamin and riboflavin. So millions downed their yeast, grimacing but happy in the belief that they were being nutrified. Yeast had the vitamins, all right, and still has. The trouble is, it retains them. And even worse, as University of Wisconsin scientists recently reported, the yeast cells, except when cooked, probably steal some of the thiamin released by other foods. (Raw clams, carp and a number of other sea foods do the same

thing. They contain an enzyme that destroys thiamin. Clam chowder is still safe, however; cooking destroys the enzyme that destroys the vitamin.)

Spinach is rich in iron and calcium, and iron and calcium are needed by the body. The inference would appear to be obvious. And so all good children have eaten unwelcome acres of the stuff and survived to discover, too late for reprisals, that these valuable minerals are not present in spinach in forms the body can easily use. Spinach, like carrots, has a lot of potential Vitamin A but it is doubtful that we absorb much of this either. And spinach also contains oxalic acid, a substance no one would knowingly proffer a trusting infant.

Probably the most persistent single food fallacy of our times, one that no amount of debunking has completely wiped out, is that fish is a brain food. The belief is harmless of course, since fish is apparently a good enough food in any case. This myth was popularized by one of the most eminent scientists of the nineteenth century, Louis Agassiz, professor of natural history at Harvard. Knowing that fish are rich in phosphorous and that phosphorous is an essential item in the human brain, he made a deduction which might better have been postponed until more data was available. If there is a specific food for the brain, nutritionists have yet to ascertain it.

The double orange juice of the Club Breakfast has also become an American morning must. We must get our Vitamin C (ascorbic acid). Dr.

Robert C. Hockett, scientific director of the Sugar Research Foundation, reports, however, that one average-size orange contains all the Vitamin C a normal human being can absorb in a day. The body does not store this vitamin. The ascorbic acid in the second orange, not to mention the acid in most other fruits and vegetables eaten during the day, is eliminated by the body as superfluous. All that is got from any oranges after the first, therefore, is a certain amount of sugar, water and flavor.

III

The dieticians are less a prey to popular superstitions than the public, but the area of their admitted ignorance is vast. It has been relatively easy for them to assay each of our common foods and determine the exact content of known nutrients. From there on in, though, there is mystery. We don't know how much of each nutrient the body assimilates or synthesizes, or how. We know very little about the interaction of food elements (there are 30 known anti-vitamins as well as 30 known vitamins), and we don't know exactly how much of them we need. And the value of vitamin supplements — except in cases of known deficiency, and even there opinion is divided — is decidedly open to question. The *American Journal of Public Health* reported last year: "No indication was found that sporadic or regular use of vitamin pills among United States troops exercised any effect whatever." *Fecce*, it is inter-

esting to note, are often rich in vitamins. And cancerous tissue has been shown to be richer in many vitamins than normal tissue.

What about the widespread popularity of "starting the day right" with a substantial high-protein breakfast? The meat industry made capital out of this idea. But Dr. John Haldi, professor of physiology at Emory University, cast considerable doubt on the value of the practice after testing among some industrial workers. Efficiency, level of work output and incidence of mid-morning letdown were the gauges he used. It turned out that the toast-cereal (high carbohydrate) eaters and the bacon and egg eaters were equally efficient. Then, to everybody's consternation, Dr. Haldi discovered that just as good work was done by those who ate no breakfast at all. And to confuse matters still further, other researchers found diets high in fats and carbohydrates to be superior to high protein diets.

The legend of widespread malnutrition in the United States apparently got its start in 1940, shortly after the National Research Council published its highly-controversial table of Recommended Dietary Allowances, setting minimum daily requirements for various nutrients. That this was a faulty and generally unreliable yardstick, raised deliberately high "to be safe," is now conceded by most nutritionists.

At the time of publication, the Council admitted that "it is amazing how few standards can be laid down

with any degree of uniformity of opinion." But the damage was done: the table became the dieticians' bible. Programs were built on it, balanced diets were dreamed up to meet its standards, and surveyors, using it as a guide, produced horrendous, headline-making claims that 100 million Americans were undernourished. The data was based mostly on the memory of whoever happened to answer the questionnaire for the family. Few physical tests were made. In any case, the Medical Nutrition subcommittee of the Council admitted recently that "no symptoms or physical signs can be accepted as diagnostic of early nutritional failure."

Somewhat sounder studies are now being made by Dr. Haldi on groups and individuals in many sections of the country and at all income levels. So far, no alarming number of outright nutritional diseases has been revealed. As to sub-clinical deficiencies, Dr. Haldi believes that all current tests of measuring them are extremely unreliable, especially since the body seems to adapt itself to low-level intakes of various "essential nutrients" without apparent damage.

Wartime nutrition research, based on extensive examination of human subjects, is beginning to yield data that may modify, if it does not entirely reverse, old concepts and create new ones. At least it is making dieticians think twice before drawing conclusions from the food needs of white rats. Dr. David B. Dill, scientific director of the Army Chemical Cen-

ter's medical division, recently warned the Quartermaster Corps that good rations for soldiers and civilians cannot be based on feeding experiments with rats who are neither at war nor at work.

The carbohydrate-fat-protein argument may go on forever, but men in a tough spot seem to know instinctively what they want most from these foods. The Quartermaster Corps found that troops going into combat discarded all their rations except those containing sugar and starch. Under stress, they unconsciously selected foods that would furnish quick energy. This behavior was so widespread that a special "invasion ration" of quick-energy foods was eventually devised. The crews of combat planes similarly demanded candy, cigarettes, chocolate and gum for flight rations, whatever the dissenting nutritionists might think. And they wanted fried eggs for pre-mission breakfasts, even though scientific studies showed that cereals and toast ought to raise their ceiling by an extra 2000 feet. Commenting on the nutrition findings of the Army during the war, Dr. W. B. Bean of the Cincinnati General Hospital, wrote in *Nutrition Reviews*:

There was a clear demonstration that the acceptability of foods, a factor neglected until surprisingly late in the war, was a factor of great importance in nutrition. Skill in the preparation of food was as important as the food itself in promoting acceptability.

But it is the vitamin theory, in its over-emphasized form, that seems to

have been the most spectacular diet casualty of the war. In a well-controlled study of human starvation and its consequences, Dr. Ancel Keys at the University of Minnesota found that 32 conscientious objectors who volunteered to go on a six-months starvation diet (1760 calories plus 49 grams of protein) suffered severe weakness, depression, fatigue, anemia and loss of weight. But the diet produced few, if any, unequivocal signs of vitamin deficiency. Later, in building the men back to health, a high-calory diet speeded the return to normal but vitamin supplements had little apparent effect on recovery. In confirmation of these findings, it has been reported that Europeans, starved to emaciation (as in concentration camps), showed few if any indications of vitamin deficiency.

A year-long study of the effects of a daily vitamin supplement on the health and development of children was undertaken in England in 1943-44. As reported in the *British Medical Journal*, 1620 school children (5 to 14) were divided into two groups. One group received, daily, a capsule containing Vitamins A and D, thiamin, riboflavin, nicotinamide and ascorbic acid; the other a placebo (harmless pill). The vitamin children did not come off any better than the others as to growth, strength, endurance, fatigue potential, or the incidence or severity of clinical conditions.

One of the most valuable surveys of the relationship between diet and efficiency has just been reported by

the U. S. Army Nutrition Laboratory under the title, *Analysis of U. S. and Canadian Army Ration Trials and Surveys, 1941-1946*. After exhaustive feeding experiments with large numbers of Army men from New Brunswick to Georgia, the nutritionists decided that simple caloric deficiency is the greatest single menace to health and efficiency; that true vitamin deficiencies, even of the sub-clinical variety, are so rare as to be inconsequential.

Then, in conclusion, they stated that "high carbohydrate and high-fat foods are better than high-protein foods," and that "emphasis on nutrient value should stress calories all the time. If sufficient calories are eaten in the form of a variety of foods of good biological value, then all other nutrients will automatically be taken care of."

This is a very recent report and it sounds conclusive. But so have a lot of other pronouncements on nutrition sounded conclusive in their day. There appears to be nothing for laymen to do but put up a determined skepticism and examine each new statement critically. That, at least, is what Professor E. P. Cathcart of the University of Glasgow's physiology department is doing. Professor Cathcart is the authority who wrote the nutrition section for the *Encyclopaedia Britannica*. Two years ago at a meeting of the Nutrition Society of Great Britain, he made a few remarks that might well be pasted in every dietician's hat. He said:

Far too much of the so-called research work on nutrition has been carried out by individuals with little or no biological training. . . . We have got to deal not with a series of robots but with living human beings, with their likes and dislikes, their hopes and fears, their griefs and joys. As Durig wrote in 1938 regarding the pathetic desire to lay down dietary standards, "People who are free to choose their diet will not bother with such standards, those whose diet is prescribed for them, or who cannot afford a proper diet, cannot bother about them; and even specialists and professors of dietetics cannot, and in any case will not, construct their own daily diet according to standards." . . . Any diet, it is obvious, can be regarded as defective if you put your so-called standards high enough. . . .

We are repeatedly told that some people or other are getting 1500 or 2000 calories a day. The statement obviously means nothing unless the composition of the food from which the calories are derived is known. Calories are merely convenient heat units for drawing up the physiological balance sheet. Calories have no nutritive value. . . .

Protein certainly can, when given within certain limits, stimulate the rate of growth in the lower animals. . . . Will speeding up the growth of children increase constitutional well-being? Does maximum growth make for health and longevity? There is certainly some evidence that it does not. There is no evidence that muscular work is carried out more effectively on a high-protein diet.

Fortunately, eating is a pleasure as well as a refueling operation. No one is going to give it up for lack of definitive evidence from the laboratories. Man is an ingenious and adaptable creature who has survived countless millennia of theory and superstition. He might even learn to adapt himself to processed foods and dietetic fashions.

And in the absence of reliable guidance, he might as well eat, drink and be merry and tomorrow die of it — or of something selse — with or without the help of science.

PHRASE ORIGINS—36

TO PETER OUT: *This is a term borrowed from the gold-mining profession. The process of extracting gold from deep beneath the surface of the ground generally requires blasting. In the old days, the explosives used contained saltpetre, called by the old mining hands "peter." When constant blasting had finally exhausted a particular vein, it was customary to say that it was "petered out." After a while, the expression flowed into America's linguistic mainstream.*

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