THE SWEET-TOOTHED CARNIVORE: FORAGING IN AN AFFLUENT SOCIETY

By

By Lorette Picciano

May 1976 No. 76-23

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Foraging: To Affluence	1
III.	From Hunter-Gatherer to Agricultural Carnivore	3
IV.	The Sweet Tooth	5
V.	The Sweet-Toothed Carnivore: Product and Victim of Affluence	5
VI.	Toadstools in An Affluent Age	9
VII.	Foraging in Confusion	13
IX.	Why Man Eats	18
X.	Where Would We Be Without the Neolithic Revolution?	19
XI.	Three Squares Illuminated	21
XII.	Is Activity an Essential Nutrient?	21
XIII.	Buying Time	23
XIV.	Pleasure and Health	23
XV.	Adapting to Affluence	25

THE SWEET TOOTHED CARNIVORE: FORAGING IN AN AFFLUENT SOCIETY*

By Lorette Picciano

I. Introduction

Man has been rather successful in procuring a living from his environment. In a long progression from hunter-gatherer to agricultural vegetarian toward the modern agricultural carnivore, he has not succumbed to starvation or prolonged deficiency. He performs well the task of sustaining himself; so well in fact, that his numbers have increased dramatically, and are fed by a consistently declining proportion of workers, freeing many for other tasks.

Our affluent society holds benefits and dangers undreamed of by carnivores of yore. Foraging is no easy task when our fare is abundant and of limitless variety. In the wild, provisions are sufficient; man obviously thrived on what nature supplied. In the modern supermarket, he can also obtain all that is necessary for optimal nutrition--or conversely, a multitude of products inadequate or even dangerous to the health. Man long ago learned which berries and toadstools were lethal. The fare provided in the packages plucked from the grocery shelves hold similar, if less evident dangers. The sweet-toothed carnivore's ability to withstand the perils of modern culinary influences is not documented; current evidence points to an ineptness for foraging in an affluent society.

II. Foraging: To Affluence

Hunting and gathering was the major occupation of our ancestors 12 thousand years ago. We can only speculate on what life was like in those days; however, the "discovery" of the Australian Aborigine and others bypassed by 10,000 years of progress proves that the wilds can foster a rather comfortable life, although it must be admitted there is little evidence of newspapers, televisions, cars, or self-cleaning ovens.

---

* In slightly modified form this paper was first submitted as part of the requirements for Agricultural Economics 660: Food, Population and Employment, Fall Term 1975/76.

The Neolithic Revolution, the name given to the shift from hunting to farming, is an even greater mystery. Domesticating wild crops is a slow process (the precursor of modern corn shrinks in comparison to its descendant, its ear being a mere inch long) and it is quite unlikely our forefathers set out to discover agriculture, searching for the wild corn and wheat and rice which seemed to hold potential. It is also unlikely our primitive ancestor was unaware that seeds and cuttings produced new plants until a genius came and informed him of what any child can tell you today. Perhaps cultivation was first a pastime which made gathering easier. Gardening required more work and care for planting, harvesting and warding off predators, and farming could hardly have been a choice occupation. Whatever his motivation, once man had to turn to farming, agriculture came to occupy an important role in his development.

Cultivation changed man's way of life. The hunter had to settle in one place, giving up his centuries of freedom as a nomad. The cultivator instead spent time developing new and better ways to fill his breadbasket. With new tools and skills, one worker could produce food for two, then three or four. Those freed from planting turned to other tasks: growing specialty crops, fashioning clay pots, statues, and other artifacts. Trade became possible.

One region was often superior to another in producing a certain crop, or a certain article. Trade became profitable, and transportation grew up with it. With goods, ideas flowed. There were now people free to build on these ideas. Science, philosophy and math became disciplines. Buildings were constructed, governments were set up, and art and literature flourished.

Culture and society existed before the Neolithic Revolution. Only in agricultural societies, however, were means of recording ideas developed. Only there could the division of labor occur with one man cultivating while another made pots, and a third became a trader, and a fourth a man of learning.

Towns sprang up around the fields, and cities grew in trade centers where ideas were a major commodity. Scientific curiosity of old fostered the printing press, the paper mill, the mechanical clock; and invention, experimentation and innovation were accepted gradually. A new hunger for material goods grew. Entrepreneurs emerged to satiate and to generate this appetite. The lords of manors caught this disease; the tenant farmers were turned off the land which had long fed them as wool production moved in. The yeoman, a simple farmer, was exiled to the city.

The wheels began to turn. Inventions became machines which produced commodities and other machines. The landless peasants residing in the squalor of the city became a source of labor to run these machines. The industrial age got underway.

Agriculture reaped its share of improvements. The cotton gin, the steel plow and the combine allowed more people to be fed and clothed with less labor.

More recently, the assemblyline, and now automation, replaced many factory workers, and blue collars are exchanged for white ones. Even the factory worker has a reasonable standard of living where luxuries of old have become commonplace. Of this affluence was born our Sweet-toothed carnivore, along with his television, automatic golf cart and the tiger in his tank. Not to mention the thick, juicy steak being set before him this very minute.

III. From Hunter-Gatherer to Agricultural Carnivore

Life has changed over the past few thousand years, and with changes in life style have come changes in man's most basic activity--gathering food.

Hunter-gatherers selected from their often lush environments those foods which they could most easily gather and kill. Plant products, were, and still are, the staples of such economies. Meat is a highly valued, although less reliable source of nourishment, but many who rely mainly on plants choose to call themselves hunters.

Perhaps man is a carnivore at heart. Plant products are a nutritional necessity; few societies exist primarily on meat, and those that do are found in the marginal tundra areas where plants are unavailable much of the year. Vegetarianism, with the exceptions of religious cults and affluent rebels and faddists, is largely the result of economic necessity.

Meat is a luxury in subsistence agricultural communities. Animals have long been domesticated and used for milk, labor, fuel, food and hides. Few could afford to raise cattle solely for meat.

Pastoralists are found mainly in desert and mountain areas where other modes of existence are difficult. Animals are essential for transportation, and milk.[1/] Man's carnivorousness is held in check because animals are a symbol of wealth and prestige. It is considered wasteful to kill and consume meat before the animal has served man for its full life span. Only then is it slaughtered for meat and hides; it is essential for man's survival that it is not killed earlier.

Hindus are held in suspect for not eating their sacred cows: this religious taboo preserves the animal for other more important functions.

1/ Most people lack the enzyme lactase necessary to digest milk. Pastoralists and some western societies are among the few groups who are able to use milk as food beyond weaning (1a).

FROM HUNTER-GATHERER TO AGRICULTURAL CARNIVORE

	10,000 B.C.	1500 AD	1974
Population	10 million	350 million	4 billion
% hunters	100	1.0	0.001

* R. Lee and I. Devore, Man the Hunter (Chicago, 1968), cover page.

Animal dung is the major fuel source for India. Milk produces "ghi" (clarified butter), a principle food in India. Animals provide labor in Indian fields. They do not compete with men for food. When they die, their hides supply the world's largest leather industry. Their meat can be eaten by Moslems and untouchables, the poorest of Indians. In famine situations, the animals die first, and provide meat for these groups. This religious taboo fits a value system which has grown up in conjunction with India's economic system. The cow has many other roles besides furnishing meat.

In agricultural societies, cattle provide labor. Also, any surplus of grain is more easily stored and transported on the hoof. Extra money from crop sales is often invested in animals, which can be sold in hard times--a bank account.

It is only in the affluent nations that grain is grown or imported to feed cattle. When man can afford meat, he does. Today's meat eater is not a hunter, but an agricultural carnivore. His economy is abundant enough to allow him to consume his meat. The agricultural carnivore is the product of affluence.

IV. The Sweet Tooth

Only societies with an abundance of agricultural or industrial products can afford to convert grain to meat on a large scale. Only these societies foster affluence. One characteristic they share is that they have complex trade arrangements. It is this characteristic which allowed the sweet tooth to come to be.

There are few areas of the world suited to massive sugar production and these are primarily in the warmer latitudes. Sugar, with the exception of hard-to-produce beet and maple sugar, was unavailable in temperate zones before transportation and trade routes developed. Refined sugar was unavailable before modern technology could produce it.

All men may have a sweet tooth; witness the popularity of cola drinks in developing nations; but it is only in the last 100 years, through technological developments and increase in wealth that sugar usage has become widespread. Meat may have been available to many cultures before ours, but the sweet, and decaying tooth of a whole society is a modern product.

V. The Sweet-Toothed Carnivore: Product and Victim of Affluence

With the advent of agriculture, man changed his way of life and his dietary habits. Meats, nuts and berries gave way to grain crops. Protein came from plants, fat yielded and starchy staples became the way of life.

The sweet-toothed carnivore represents a modern-day reversal of this trend, a phenomenon illustrated in Chart I. This chart shows a relationship between increasing income and change in diet pattern. In general, carbohydrates--the starchy staples--decrease as a percentage of the total calories eaten. In addition, simple sugar replaces many of the grain products found in the diet of less affluent men. Protein intake increases only slightly as income does; however, meat becomes a much more important source while vegetable protein intake declines. A more affluent man has a greater choice in the foods he selects--meat and simple sugar are consistently chosen over traditional grain and bean products. Separated edible fats also increase--the affluent man can now afford fried foods and the sweet concoctions prepared with sugar and oils. Unseparated fat intake also increases--this is not the result of conscious choice. Both plant and animal products have fats attached to them. Animals, like man, can store energy only in the form of fat, while plants can store theirs in the form of carbohydrates. Although unseparated vegetable fats decrease as plant foods are less utilized, this decrease is more than counterbalanced by the increase in unseparated animal fats stored in the energy-rich meat products wealth is able to procure.

The American diet is an excellent example of dietary change occurring as income rises. Chart II indicates the major changes since 1880, the most significant of which is the decline of starchy foods and the rise in nonstarchy foods characteristic of income increase shown in Chart I. In the last 65 years, our diet has changed to include nine percent more fat, slightly more protein, 15 percent less starch, and 6 percent more sugar. Animal sources of protein have usurped vegetable sources. Over half our carbohydrate calories are derived from the inferior relative of the starch family, sugar, which provides none of the vitamins and minerals found in grain crops.

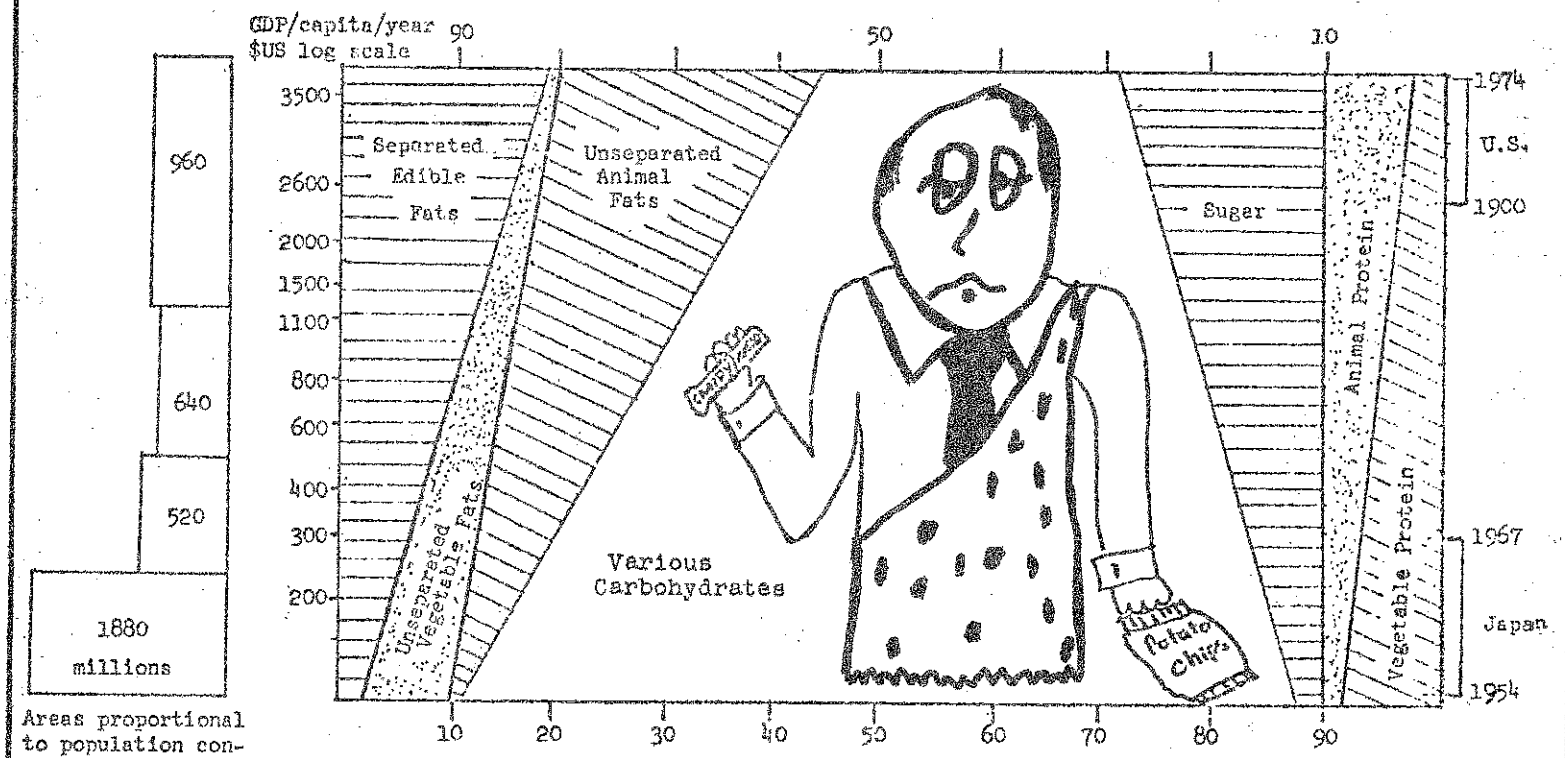
Fresh fruit, consumed in large quantities in the late 40s is no longer so popular. The orange in our lunch bag has been replaced by an ice cream sandwich. And while Bessie the cow smiled on us, we emptied our milk glasses. Since 1960, however, her influence has decayed as milk consumption per capita declined. Only ice cream grew in popularity.

Vitamin C and calcium are the two nutrients Americans are likeliest to consume in quantities less than those recommended (1, p. 178, p. 250). They are found, of course, in citrus fruit and milk.

The caloric consumption and the caloric requirement of the average U.S. citizen have also decreased, presumably because we are much more sedentary than our wood-splitting ancestors. Requirements cannot fall much lower and still provide adequate nutrients when a large portion of those calories are low in nutrient value (e.g., potato chips, soft drinks, alcohol, sweets). Fats and sweets fill stomachs and leave no room for the fruits, vegetables and starches which carry nutrients man needs.

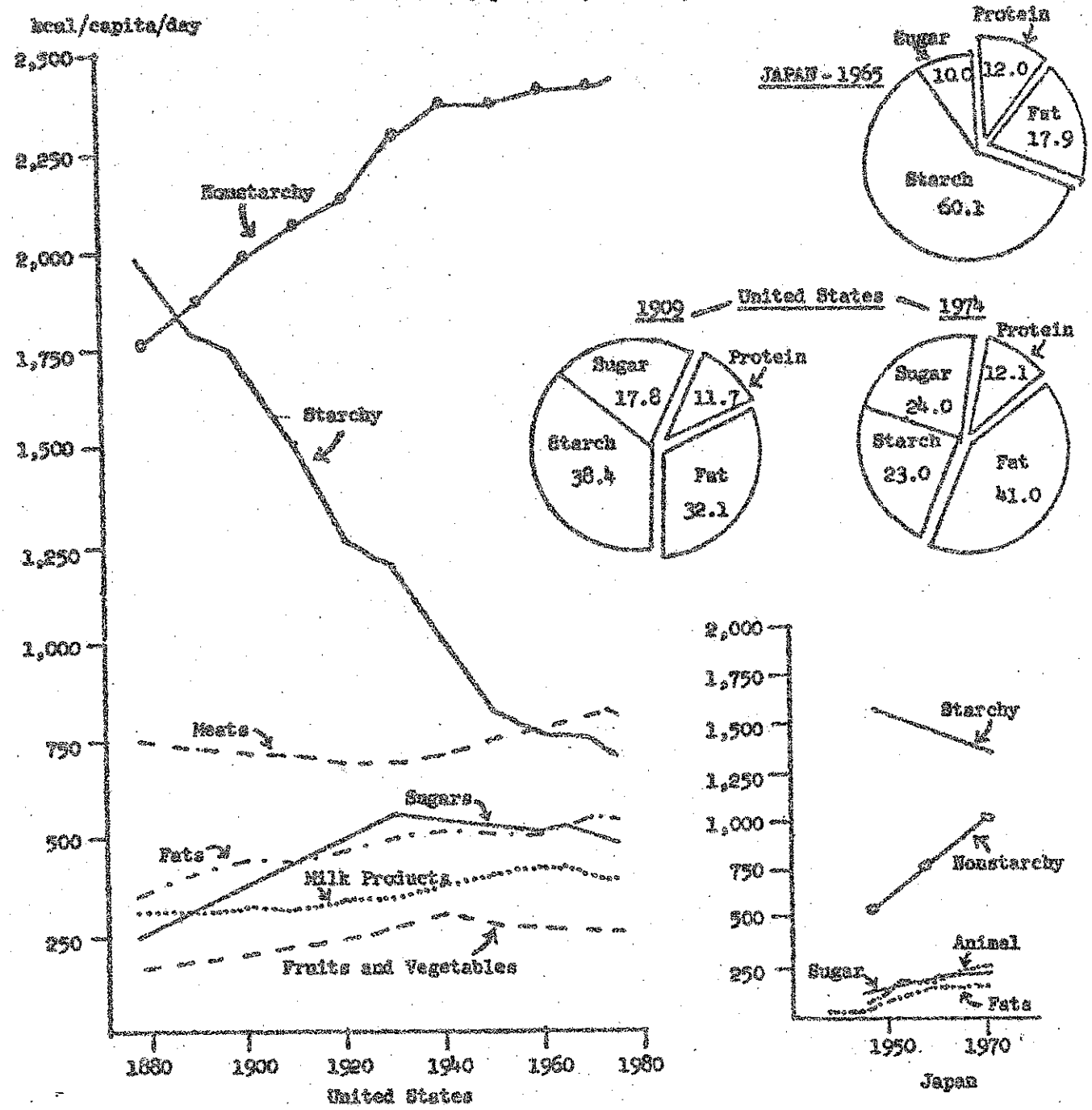
CHART I.

CHANGE IN ORIGIN OF CALORIES ACCORDING TO INCOME*



* Adapted from J. Perisse, F. Sizaret, and P. Francois "The Effect of Income on the Structure of the Diet," FAO Nutrition Newsletter, Vol. 7, No. 3, July-Sept. 1969.

CHART II.
DIET COMPOSITION, U.S. AND JAPAN: PERCENT CARBOHYDRATES, FATS, PROTEIN AND CONSUMPTION PER CAPITA PER DAY FROM SELECTED FOOD GROUPS, U.S. 1879-present[a/], JAPAN 1954-1968[b/]



Sources: a/ adapted from M. K. Bennett, The World's Food, (New York, Harper and Brothers), 1954; and USDA, Yearbook of Agriculture, 1955-74.

b/ adapted from the Food Balance Sheets of the Japan Ministry of Agriculture and Forestry, Abstract of the Statistics on Agriculture, Forestry, and Fisheries, published annually, 1954-1968.

Americans of today are among the first of the Sweet-Toothed Carnivores. They devour a diet technologically and economically unavailable in all former and many present societies. This diet, which is rich in simple sugars and meat, is a symbol of the prestige of affluence. It is also the precursor of health problems unknown in the past.

What are the effects of increased incomes and dietary change? Affluent nations tend to show a reduction in deaths from communicable diseases and those generated by malnourishment. Infant mortality declines. These changes reflect better medical technology, and are not unrelated to the improved nutritional status of the individual.

There are, however, diseases of affluence: cardiovascular disease, hypertension, obesity, and cancer. These are related to changes in diet and lifestyle linked to affluence.

VI. Toadstools in an Affluent Age

Cholesterol. The word strikes fear into the heart of any middle-aged American male. It is an essential cell nutrient the body can make. In the diet it is concentrated in animal products, particularly eggs. Heart disease has been linked to high cholesterol, and Americans listened: egg consumption has decreased dramatically since the 1950s.

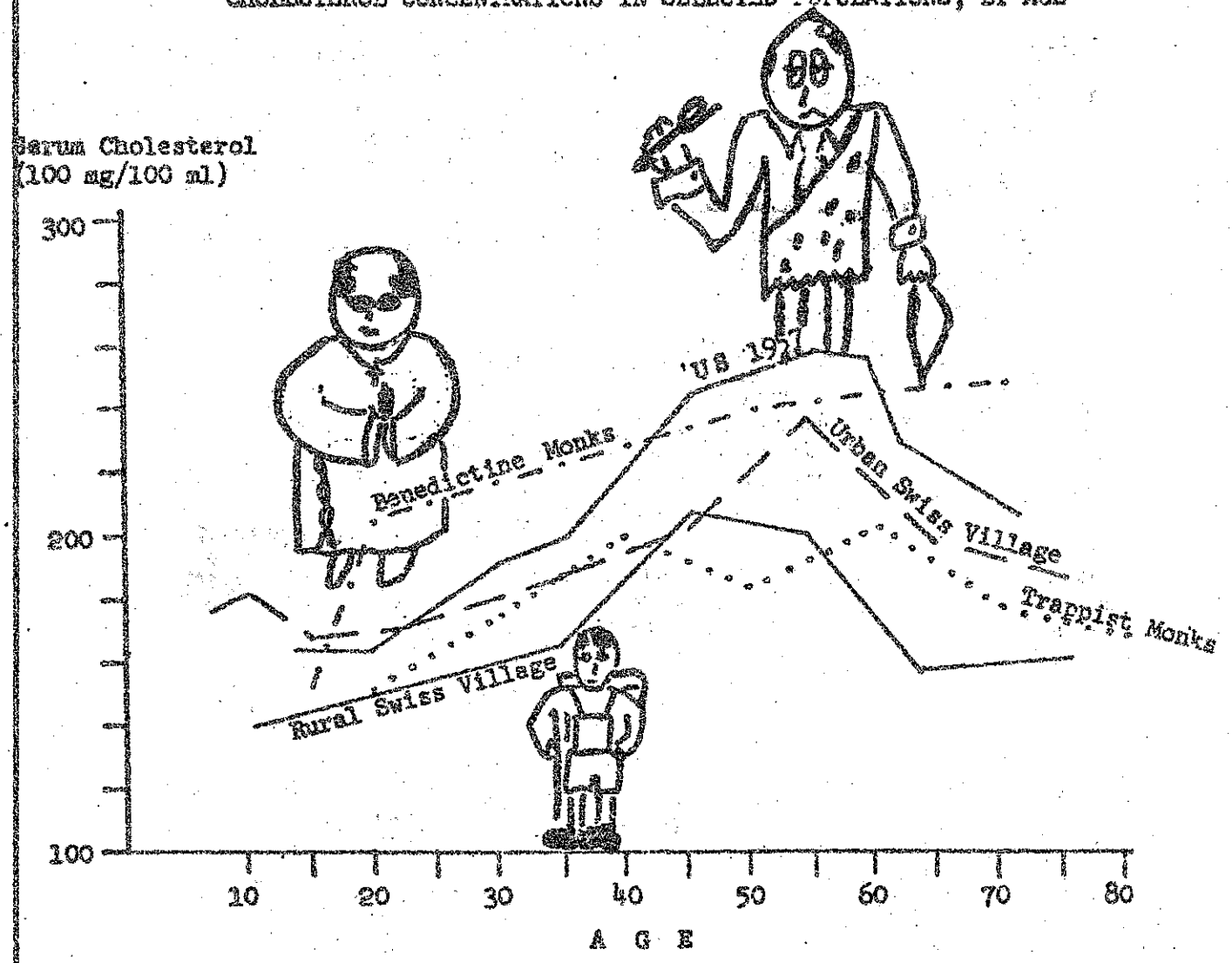
When overweight and normal weight men were placed on reducing and prudent diets, cholesterol levels decreased after ten weeks in the heavier men, and after six months for the others. Each diet was half carbohydrate; the reducing diet was 35 percent protein and 20 percent fat, and the prudent diet, 20 percent protein and 35 percent fat (2, p. 206).

A Trappist Monk community fed a traditional diet, high in starch, with little meat, and a Benedictine community subsisting on a Western diet, high in fat, were compared (Chart III). The first group had consistently lower levels of cholesterol, although neither group had incidences of heart disease found in the population at large, a factor attributed to the reduced stress of the monastic life (3, p. 462). Blood levels of cholesterol are related to diet, but there seem to be other characteristics of modern life which determine if heart disease follows.

Elevated cholesterol levels are not the only factor contributing to heart disease, nor is diet the only influence on cholesterol levels. A study comparing a Swiss mountain village consuming a high proportion of fat, and a Swiss town with a smaller fat intake indicated cholesterol levels were lower in the village, despite the higher fat intake (Chart III). The variable appeared to be the very high activity level of the mountain people who carried heavy loads uphill in their daily work. Town people were only moderately active (4, p. 472).

CHART III.

CHOLESTEROL CONCENTRATIONS IN SELECTED POPULATIONS, BY AGE*



* Adapted from: Gsell and Mayer, "Blood Cholesterol and High Calorie, High Saturated Fat Intakes," and Gruen, et al., "Effects of Diet and Stress in Trappist and Benedictine Monks," both in American Journal of Clinical Nutrition, June 1962.

Nor are fats and cholesterol the only toadstools. Simple sugar leads to the tooth decay prevalent almost exclusively where food products of affluent societies are available. Obesity, a contributing factor to heart disease and diabetes, results from the consumption of delicious and seemingly harmless sugars and fats.

The diseases of affluence are complex. There is no one causal factor, but rather a system of interrelated influences. Lifestyle and eating habits, as well as these dietary toadstools are involved and difficult to isolate or modify. The most serious result in our society is cardiovascular disease.

In 1972, over half of the almost two million deaths in the U.S. were caused by cardiovascular diseases (Chart IV). Affluence itself may not be the only answer. Japan, the first rice-based culture to reach affluence, has a remarkably low rate of heart disease (Chart IV). Although the Japanese per capita income approaches that of the U.S., the diet lags far behind in the normal progression of affluence, still consisting of a high proportion of starches (Charts I and II). Hawaii, a state with a population of one-third Japanese origin, falls far below the national average in cardiovascular deaths. Decreased stress may contribute to this difference, but the adherence to rice, the basic element of oriental cuisine may also be significant.

DEATHS FROM CARDIOVASCULAR DISEASE IN SELECTED AREAS, 1972

(deaths per 100,000 population)

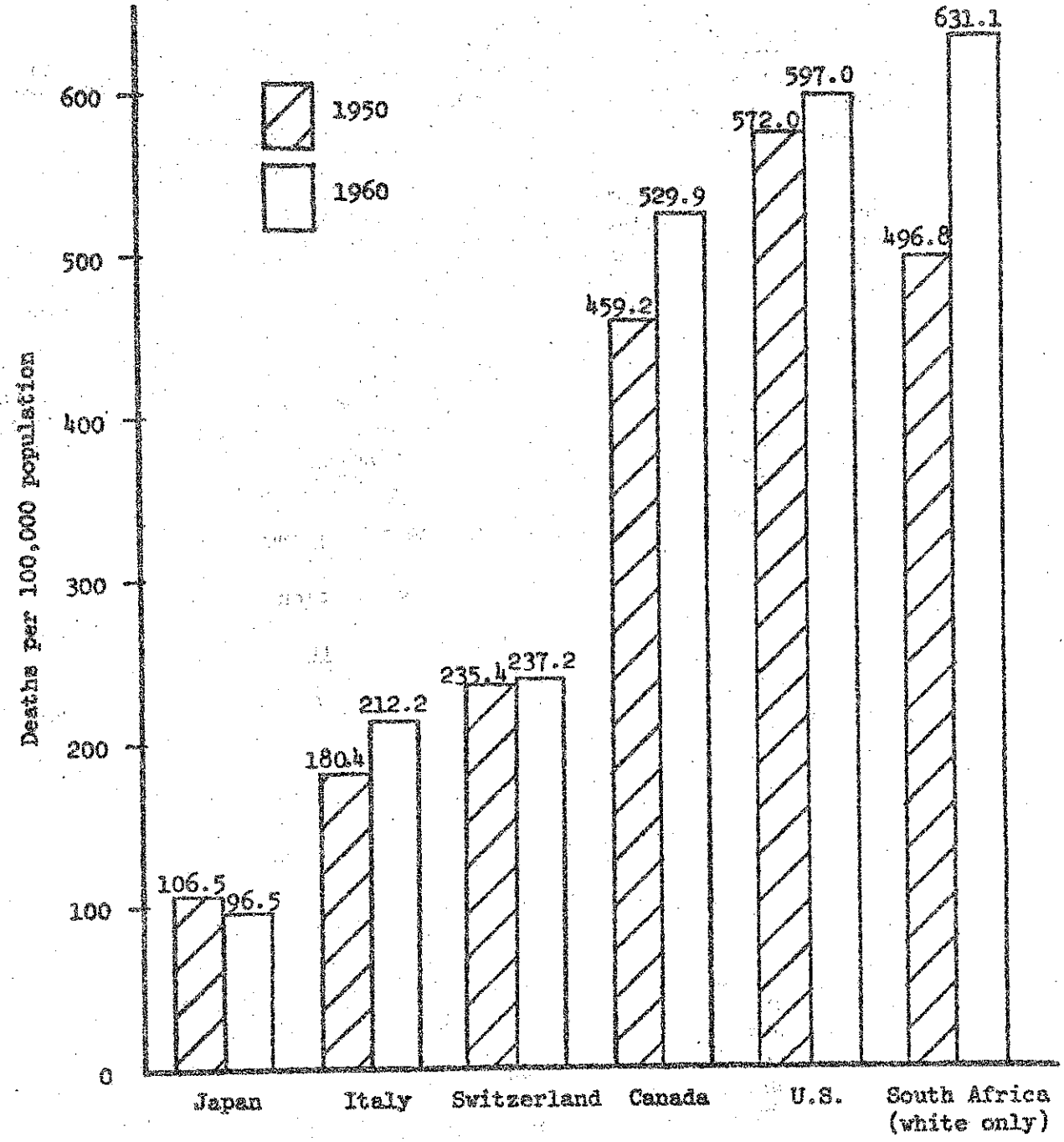
	Japan[a/]	Hawaii[b/]	Switz.[a/]	U.S.[b/]	N.Y.[a/]
Heart disease	81.3	166.4	240.8	361.3	425.7
Hypertension	16.5	-	20.9	13.7	-
Cerebrovascular	166.7	49.9	106.5	101.1	90.7

a/ U.S. National Center for Health Statistics, Vital Statistics of the United States, 1973.

b/ United Nations Demographic Yearbook, 1973.

The maladies of affluence are only beginning to be deciphered by modern medicine and nutrition. Meanwhile, interest in nutrition has increased. What fills the market for nutritional literature is very often, however, not based on sound biological evidence. In addition to quackery and diets based on half-truths, the problem of what to tell people when the answer to so many questions is "we don't know the effects of . . . " looms before us.

CHART IV. DEATHS FROM HEART DISEASE IN MEN AGED 45-64, 1950 AND 1960*



* Hundley, James, "Heart Disease: Recent Trends in Morbidity and Mortality," Journal of the American Dietetic Association, Vol. 52.

VII. Foraging in Confusion

In recent years, nutrition has become a science while diet literature has become a popular plague. Good nutrition sense such as the hallowed basic four hadn't met the challenge of teaching people to forage in an affluence of quick and easy, sweet, sticky and greasy fodder popularized by millions of advertising dollars. Obesity, dental caries and degenerative diseases increased markedly, and doctors pointed fingers at the traditional nutrition good guys: meat, milk and eggs. So our Sweet-Toothed Carnivore ate less eggs and dairy products, but clings tenuously to his meat, and ever prevalent sweets.

Nutrition began with the study of hidden factors which produced remarkable cures for scurvy, rickets, beri-beri, etc. The magic of vitamins set the stage for modern nutrition (1, pp. 17-18). And Americans are still searching for magic. Vitamin sales have increased from 8 million pounds in 1960 to 23 million in 1972 (5, p. 89), and are reputed to do everything from curing the common cold to increasing virility--unfounded claims at best.

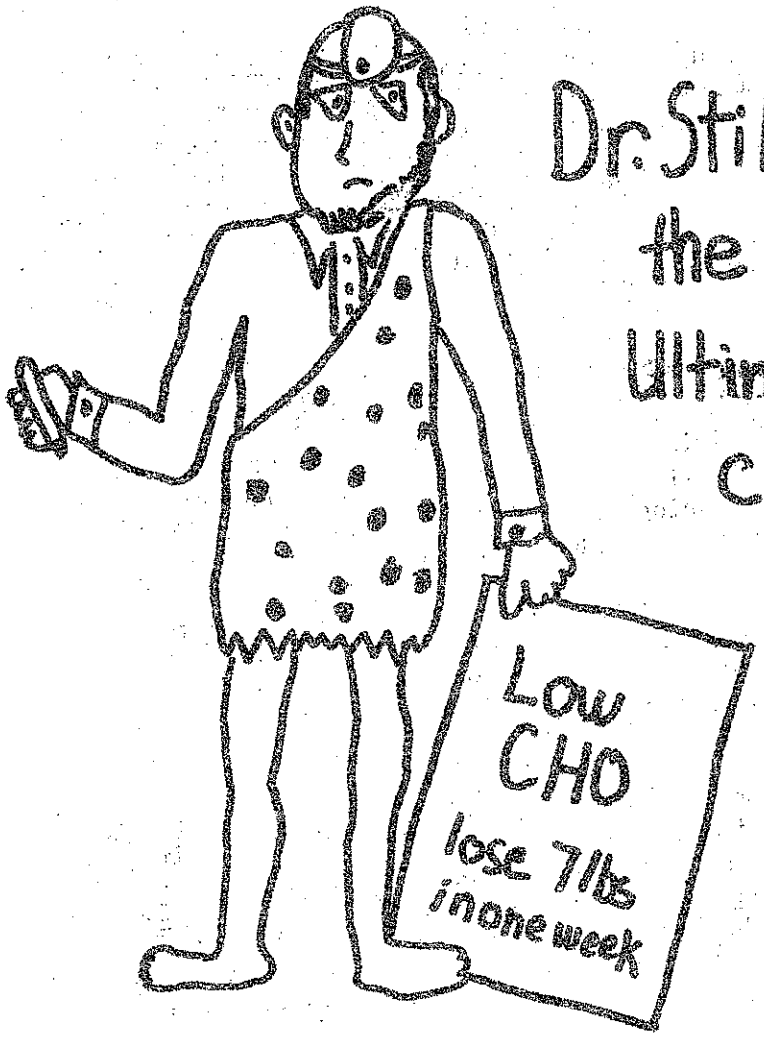
In addition, magic diets foster the hope that fat can be effortlessly melted away. However, the law of Conservation of Energy stands, and energy intake (calories) must be below energy expenditure for weight loss. Other diet prescriptions range from ineffective to dangerous.

The ultimate diet would be one where man could eat all he wanted, or at least all he wanted of his favorite foods. Meat is a favorite, and the good doctor's Stillman and Atkins, in their bestsellers, The Doctor's Quick Weight Loss Diet (6) and Dr. Atkins' Diet Revolution: The High Calorie Way to Stay Thin (7) have given us the opportunity to study this ultimate carnivore--a lucky break for nutritionists who rarely find so many eager human subjects. Some dangers of the diets they advocate (8, pp. F46-50):

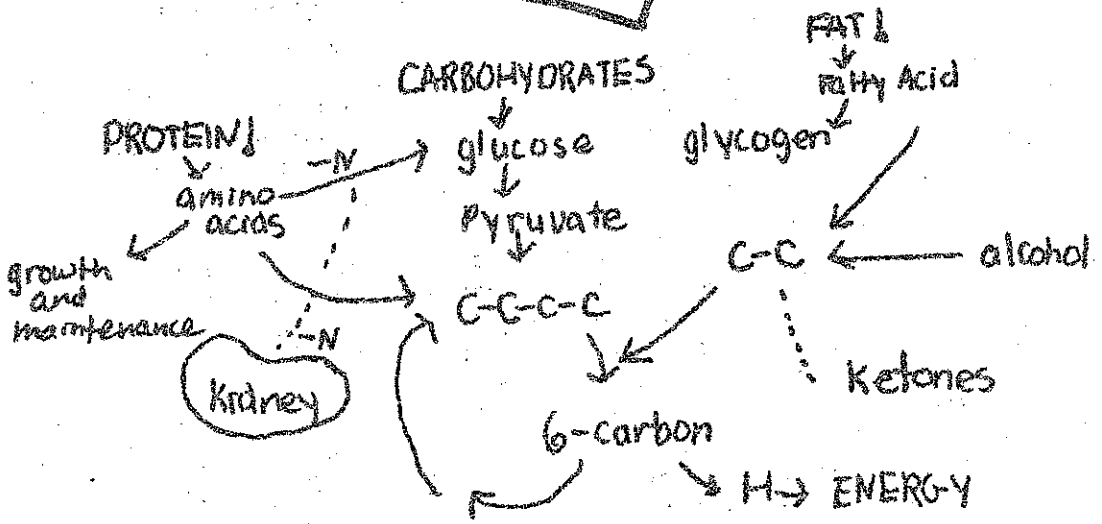
Carbohydrates are eliminated on this diet. This reduces the body's capacity to retain salt, and therefore water: seven pounds can easily be dripped off in a week, and as easily regained when carbohydrates are added again.

Carbohydrates are the preferred source of a four-carbon compound the body needs to produce energy (Chart V). Protein, the compound used to build and maintain cells, can also provide this compound, but nitrogen must first be removed; this process is less efficient and may result in a lack of energy, or fatigue. The four-carbon compound must be combined with a two-carbon compound produced when fat is broken down. While the body is busy removing nitrogen from protein (putting an added strain on the kidney to excrete it), the two-carbon compound is building up, unused, in the form of ketones. We don't know the effects of long-term exposure to this substance.

CHART V.



- strain on kidney
- no fiber
- lose water, not fat
- trace minerals?
- excess ketones
- Cholesterol increase?
- fatigue
- ..... ?



Limiting carbohydrates means limiting plant products: carbohydrates are only stored in plants, and milk is the only animal product from which they are available. Without vitamin supplements, the ultimate carnivore is likely to lack Vitamin C and calcium, and other vitamins depending on what meats are chosen. Trace minerals, of which plants are a rich source, may be lacking. We don't know the kinds and amounts of these the body needs, and cannot add supplements.

Fiber, the indigestible cellulose found only in plant products and not on low-carbohydrate diets, plays some role in absorbing wastes in the large intestine (9, p. 34), protecting intestinal walls from irritants (including carcinogens and nitrogen wastes), and preventing the reabsorption of compounds such as cholesterol into the body. With an increase in cholesterol-containing meat, and a decrease in fiber, it is not surprising that serum cholesterol levels increase on this diet.

In planning diets, cholesterol is not the only evil to be avoided. A rival, triglycerides, merit our attention, particularly because high levels of these lipids are found in young people. Triglyceride excesses seem to be related to high levels of carbohydrates, particularly sugar, combined fat-and-alcohol ingestion, and obesity. We know very little else, except that the danger of cardiovascular disease is amplified.

Cholesterol and triglyceride levels are affected by the substitution of unsaturated for saturated fats. Calcium, hard water, and trace minerals are hypothesized to have some effect on reducing the risks of cardivascular disease; there is no definitive evidence. Cigarettes, heredity, and numerous other factors may also be involved. Diet is only one, and since risks vary with individuals, so must diets vary. The only sound advice seems to be to reduce caloric intake to fit your energy needs, to substitute grains and other starches for simple sugars, to eat less saturated fat relative to polyunsaturates, eat fewer eggs if your family is prone to heart disease, and to brush after each meal and snack.

VIII. "All the People Who Ate Tomatoes Between 1830 and 1865 Are Dead"

When man discovered he could feed the grain he never seemed to crave to animals to make meat, his hunting days were over. Meat costs a bit more, but it is easier to obtain than in the days when he had to chase it around the jungle. It is a perishable foodstuff, but with refrigeration, and clean feeding and slaughtering facilities, safe meat is widely available.

Most of our perishable foods can now be preserved, in fact, making them available year round without threat of bacterial infection. Our food supply is one of the cleanest on earth. The number of dead roaches allowed in flour is small indeed, although no one has proved roaches are inedible. Dirt is abhorred, and all but eliminated. Ironically, minerals once supplied by dirt are washed down the sink.

After eliminating dirt and bacteria, we discovered carcinogens. They are now banned in any quantity from the food supply, selenium (an essential nutrient) included. This action may be warranted, but there is another parameter to the problem.

Moderation. No more perplexing dilemma exists in the age of synthetic vitamins and processed foods. Vitamins cure scurvy and rickets (actually, they prevent them) . . . vitamins are magic, and the affluent mind applies the principle that if some is good, more is better (the corollary: if any is bad, none shall be tolerated). Unfortunately, a poison is a substance ingested above the tolerance level for that substance. One serving of Polar bear liver, for example, causes hair loss, calcium loss, fatigue, vomiting, and dry lips. There is no other so highly concentrated source of Vitamin A, but continued ingestion of the synthetic form of this vitamin will have the same effect. Vitamins A, D, E and K are stored in body fat, rather than being eliminated as are the water-soluable Vitamins C and the B complex. Overdoses of the fat-soluable vitamins are more likely; Vitamins A and D are sold by prescription only above certain dosages. There is no proof of any benefit from ingesting vitamins in dosages above the recommended amounts. Excesses are excreted, or built up to potentially dangerous levels in body fat (1, pp. 187-223).

More recently, the importance of trace minerals in the body has been documented. These substances are required in minute amounts, and toxicity problems are magnified. Chromium, for instance, is required in the amount of one part per billion and is toxic at eight parts per billion, a rather narrow range.

A little bit of rhubarb leaf or a whole lot of spinach can cause adverse reaction, but in general nature did a fairly adequate job of distributing nutrients: The Sweet-Toothed nutritionists and food processors have yet to master the technique. Processing causes major losses of vitamins. This difficulty was overcome when it was discovered that synthetic vitamins could be added to replace what was lost, and more. Minerals such as calcium, iron, and phosphorus which the body uses in realtively large amounts can also be added. Trace minerals, where the range between toxicity and deficiency is very narrow, present the major drawback to fortification. In addition, it is important to determine which foods should be fortified, and to what standards. Iron deficiency anemia is a disease prevalent in woman, but if we fortify according to their needs, men will be in danger of mineral overnutrition.

There is much to be said for eating a balanced and varied diet of "natural" foods such as fresh fruits and vegetables, meat, milk, and bread--the old basic four. Such hackneyed advice would ring on deaf ears, for fruit and vegetables no longer seem stylish in a world of hamburgers and fried chips. Nutrition hasn't designed a new basic creed for subsisting in the supermarket age. Recommended daily amounts prescribed on cereal boxes and bread wrappers are an attempt, but are difficult to calculate, and measure only what is known about the food we need.

FORAGING IN CONFUSION

The homo sapien affluens is a curious creature. Cranberries have yet to kill him, and mercury is a natural pollutant. Carcinogen is a noxious word, yet several essential nutrients have, in large amounts caused cancer in mice. There is an inherent contradiction there: that we must have some carcinogens. In fact, our experimental methods should be improved. We may overestimate the specific dangers of certain chemicals, while never studying the cumulative effects of combinations of these substances in humans in low doses over many years. Vitamins-uumh carcinogen-uugh, preservative-uugh, . . . salmonella-uugh.

Coronary Thrombosis is perhaps preferred to cancer as an exit from life, but while nutrients are discovered and poisons banned, the waistline continues to extend and the most serious toxins--calories, sugar and fat--are served in continually more appealing forms, with no warning at all appearing in food ads. All the people who ate tomatoes a century ago are dead, and probably, all those eating tunafish and saccharin now will be dead a century hence. This is no reason to divert our attention from people ingesting prime beef, ice cream, corn doodles, and soda pop who will be dead in 1980. Foraging is a difficult task in our society, but one we cannot dispense with.

IX. Why Man Eats

Why does man eat? He must. The body requires fuel to perform the multitude of tasks we set it to. It also needs energy to run itself--the liver, the heart, the brain, and in fact, every living cell require fuel to function, to the tune of 1000 to 1500 kilocalories per day. Protein, vitamins and minerals regulate reactions, provide material for growth and maintenance, and protection from disease. Physical activity increases the energy need, but the Sweet-Toothed Carnivore still requires a set amount of nutrients and energy at regular intervals to offset fatigue and hunger.

Eating is, in addition, the most basic communal activity; food and social functions are an inseperable couple. Hunting of large game was a group effort, and polishing off the catch before it spoiled may have been the basis of our modern day feasts.

In our affluent society, we have business lunches, coffee breaks, dinner meetings, covered dish suppers, banquets, barbecues, wedding receptions, ice cream socials, and T. V. dinners. Few gatherings are devoid of food.

While the nightly family meal may be a victim of our lifestyle, celebration without hearty fare is simply unheard of. Can you imagine Thanksgiving without turkey, Christmas without puddings, breads and cookies, or birthdays without cake? Even the busiest of people can open the instant stuffing and prepare a feast.

In primitive societies, people rarely eat alone. The Sweet-Toothed Carnivore saves the special recipes and finest cuisine for group gatherings--diet books only begin to rival cookbooks in diversity and number. Yet man will eat what he likes, even if alone. Hunger is not necessarily the motivation for sneaking to the refrigerator and relishing that last piece of apple pie.

Man has acquired a taste for food beyond his biological needs. Fats and sugar, the two magic ingredients which increase palatability are those which have become most widely available in the last one hundred years. There is a craving for such delicacies even when the stomach is full--try passing a box of chocolates after a large meal.

In a country where children can identify Ronald McDonald as often as they can Santa Claus, it is difficult to get away from reminders of food. The bell rings constantly, and the mouth waters. Fried chips, prebaked cookies, and french fries are shoveled into American mouths as effortlessly as they are obtained. Sweets, fats and meat are shoveled in fastest of all.

Man eats because he is hungry, whether his body, his mind, or his watering mouth be at the source of the desire. The need for food has remained constant, but man's means of obtaining food have changed, and his lifestyle with them.

X. Where Would We Be Without the Neolithic Revolution?

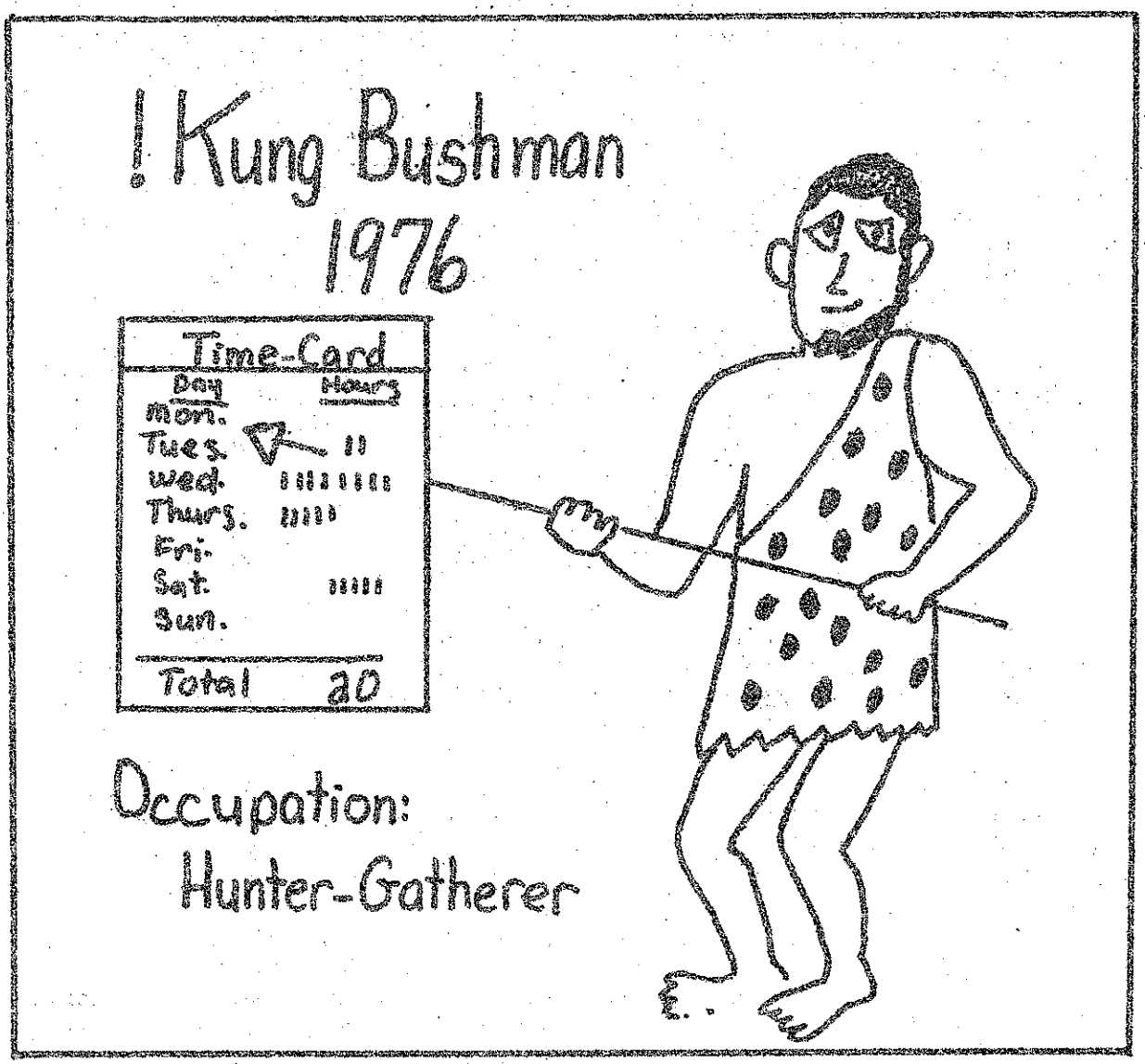
The majority of our food comes from agricultural production. Our cattle are as domesticated as our plants, and the closest we come to hunting is a trip to the meat market. There are still a few traditional societies which haven't felt the effects of the Neolithic Revolution. What would life be like without it?

The !Kung Bushmen in Southwest Africa live on a diet one-third meat, one-third gathered vegetables, and one-third mongongo nuts (10, pp. 3-12). The basic activity for men is hunting, and women trek several miles every few days to gather mongongo nuts.

The people are small (men average 5-foot, 2 inches), and live moderately long lives. They have no modern medicine, and very little technology, all of which is primitive. However, their diet and caloric intake is adequate. The diseases related to affluence are not prevalent. The average work week is under twenty hours. The rest of the time is free for rest and recreation (11).

These people reap none of the benefits of modern society. They also lack our modern stresses . . . and who could complain of a work week of twenty hours? There is a certain opportunity cost in development, but would our primitive ancestors have begun planting if they knew the result would be the harried life we lead where forty hours is a gross underestimate of the time we invest in living?

CHART VI.


!Kung Bushman
1976
Time-Card
Day
Hours
Mon.
Tues.
Wed.
Thurs.
Fri.
Sat.
Sun.
Total
30
Occupation:
Hunter-Gatherer

XI. Three Squares Illuminated

The most significant change which has come about with affluence is in the lifestyle of the Sweet-Toothed Carnivore. The lightbulb lengthened his day, but nature left him with the same old body, geared to eat morning, noon and night. Without the incentive of a morning of physical labor, the classic battle of mothers and nutritionists to eat breakfast has been lost.

Food is least appealing in the morning. The potato chips eaten the night before by the light of the television are still a fatty blob in the stomach. Our Carnivore rolls out of bed, feeling bloated and full, with a slight headache which he attempts to offset with coffee.

When the body moves into action without fuel the body must compensate by setting aside other tasks to work to bring the blood glucose level (the major energy source of all cells) up to fasting level. When this level is attained, the body returns to other chores. But with no food, the level will fall once more, and the body will work to raise it, making the morning a cycle of energy and fatigue. Growth and maintenance must be set aside until protein is made available. Our bodies need food, yet we do not feel hungry, only fatigued. We down a sweet roll for energy. The glucose level rises very fast, only to fall lower in two hours than if we had not eaten at all.

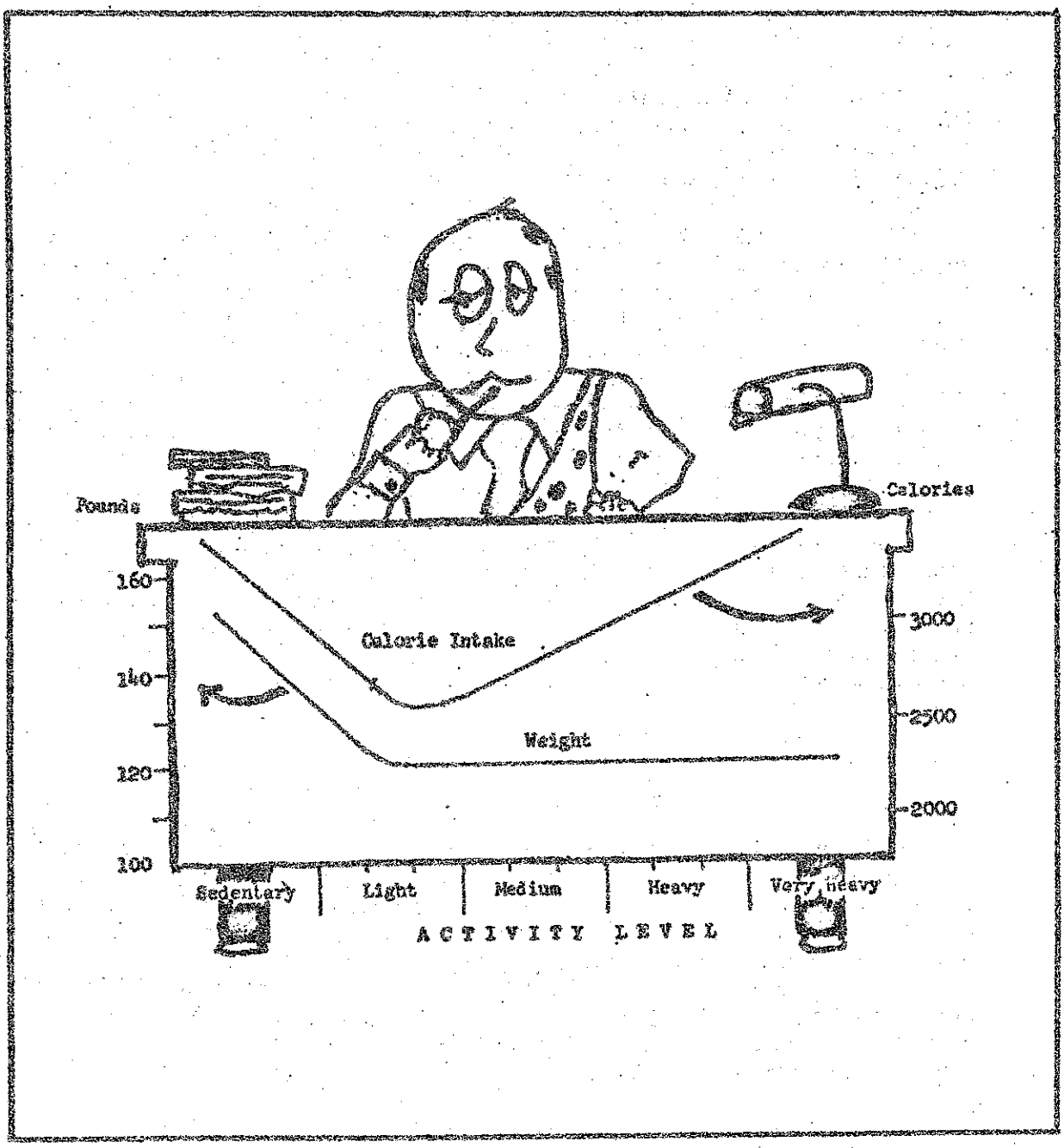
One large meal isn't the snswer. All protein is broken down within four hours of a meal--protein once a day gives the body only those four hours to perform maintenance tasks. Carbohydrate levels fall within a few hours of eating, leaving only fat to sustain us. The body is still geared to three squares. It performs excellently in light of the treatment we give it. It is no wonder the whole world seems lethargic at times.

XII. Is Activity an Essential Nutrient?

Our appetite has changed with our lifestyle. Meals on the run allow much food to be eaten quickly. Consequently, large meals may be one of our few relaxing activities, and we linger at the table through many courses, until we are overstuffed. Only rarely do we find ourselves responding to true hunger, and often this does not coincide with meals. The television, and all the machines which make our life easier, have limited the amount of energy we need. Yet food is more appealing than ever before. There are three choices: we must eat less, move more, or grow rounder.

There is some evidence that the body works better at moderate levels of activity, and weight is more easily maintained (Chart VII). Below certain activity rates, appetite mechanisms do not work well. An inactive person may never experience real hunger, but rather responds to external cues such as the sight of food, or a clock which says

CHART VII. RELATIONSHIP BETWEEN CALORIC INTAKE AND WEIGHT OF INDIANS WORKING AT DIFFERENT ACTIVITY LEVELS *



* Source: Jean Bogert, et al., Nutrition and Physical Fitness (Philadelphia: W. B. Saunders Co.) 1973, p. 514. Reprinted from Mayer and Bullen, Physiological Reviews.

"suppertime." A very active person is likely to eat at the calorie level his body requires. Activity may indeed be an essential nutrient.

XIII. Buying Time

While the affluent man has not adapted to low levels of activity, he has developed a food supply tailored to his lifestyle. Part of the increase in foods costs in recent years goes to pay someone to save us time by peeling vegetables, dicing fruit, canning tomatoes, and even preparing veal parmesan. Modern tools include the can opener and self-timing oven. Squeezing fresh oranges is practically passé. Convenience foods are here to stay. T.V. dinners are practical for a family passing through the home for a meal between activities beginning and ending at various times. The time put into preparing a meal is not so satisfying if no one is home to enjoy it.

Convenience foods can be nutritious and appetizing. They even include vegetables. The food processing industry is working to meet the needs of our sorry soul, but it is not clear if they have conformed to or promulgated our lifestyle.

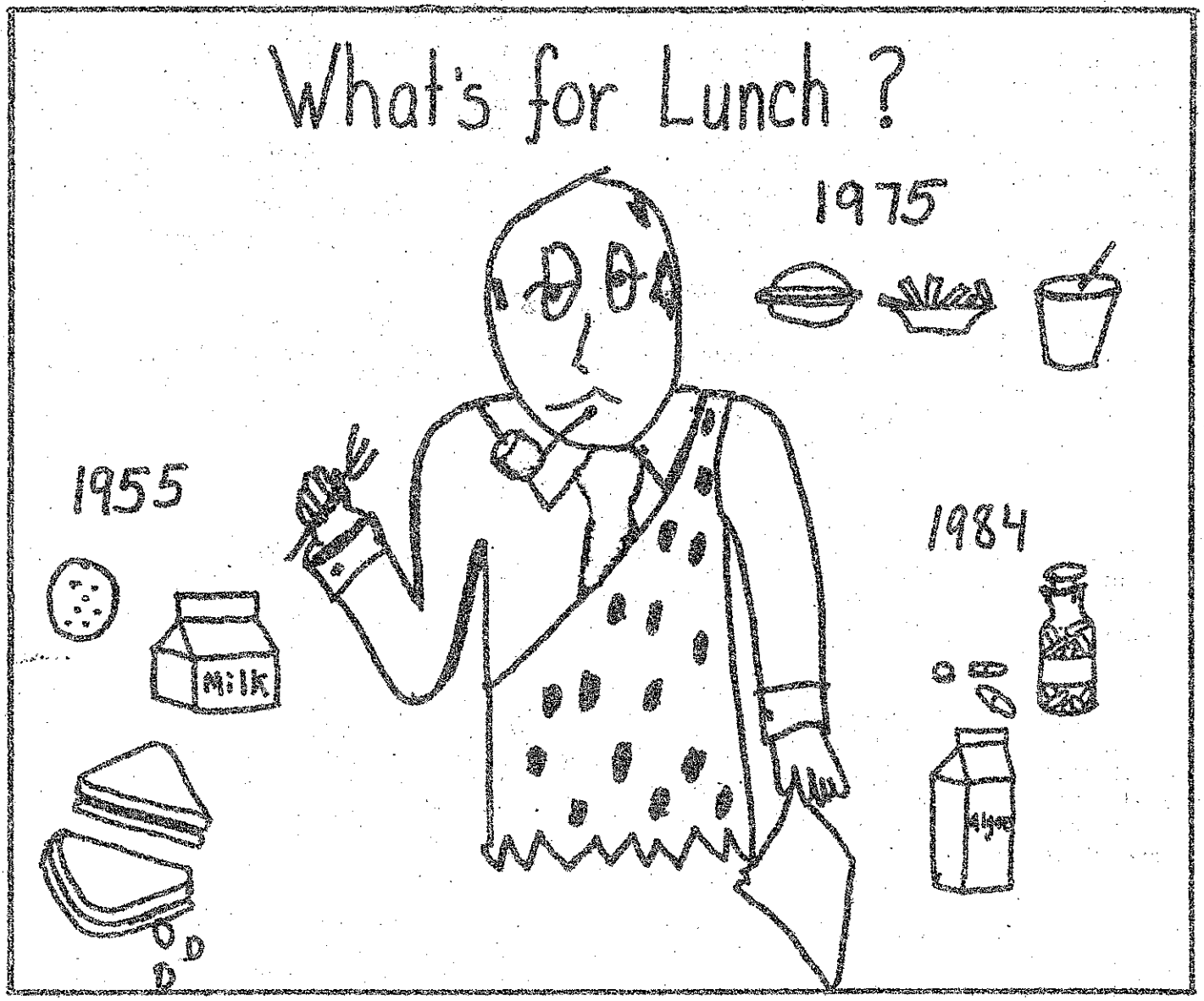
XIV. Pleasure and Health

While convenience foods are practical and delectable, we still often hear, wistfully, of "mom's home cooking." Some ingredient she adds makes her menu irreproducible by the finest of chefs. However, returning progeny and heads of state alike are honored with our highest tribute--a feast.

If calories, vitamins, minerals and protein were the only objectives in eating, affluent man could by now be distributing sterile, but nutritious algae and pills. Instead, we have more elaborate and varied fare, more cookbooks, more diet books, artificial colors and flavors--all indicating man has opted not to cut himself off from the strongest tantalizer of his olfactory, taste and tactile senses, his food.

Algae dispensary centers would be a dismal substitute for all the markets, restaurants, kitchens, and street vendors in New York, or in any other place where humanity congregates. Man's nutritional requirements could be more simply met, but at present there are no other means of fulfilling the psychological needs nourished by the partaking and sharing of food. The homo sapien affluens derives pleasure from his food and the company he shares it with. In this rapidly changing society, man will cling as tenuously to the institution of eating as he has recently to his meat and sweets. His current task is therefore not to find substitutes, but to reconcile eating pleasure and health.

CHART VIII.



XV. Adapting to Affluence

Man's whole life, and indeed his whole history, is permeated by his efforts to fulfill his most basic need. For centuries, foraging was his primary task. Affluence has freed him from all but cursory participation--a trip to the grocery is all the hunting and gathering necessary to sustain himself. He hires others to grow, process, prepare and even to serve his food. The choice of food is no longer limited by what is available in his immediate environment. This poses a problem; nature provided well for the homo sapien; now he must master the task. The two basic dilemmas of the Sweet-Toothed Carnivore foraging in his affluent society are 1) his inability to choose nutritious and enjoyable combinations from the vast array of foods available, and 2) his tense and passive lifestyle.

Modern medicine may develop cures for the maladies of affluence; it is more likely the days of magic are over and we are entering the age of prevention. Nutrition, while looking for the answers to the questions "we don't know the effects or interrelationships of . . .," has two immediate tasks: 1) to propose an interim creed to guide us through the dangers of toadstools, food ads, supermarket shelves, miracle vitamins and diet books and to educate us in this creed, and 2) to recognize the changes in lifestyle affluence has brought about, and to fit its prescriptions to these changes. Appealing and convenient food must be made nutritious, but more importantly, nutritious food must be made appealing and convenient to the Sweet-Toothed Carnivore at the times of day he requires them and will eat them.

Good nutrition is only a partial answer. The constant motion and tensions of our lives are ones we take sitting down. Relaxation is our passive antidote for our passive tensions. Leisure is an underdeveloped concept in a society where weekends and evenings provide little more than a succession of meetings and when possible, a period of rest from the nervous exhaustion that life in an affluent society creates.

Active physical endeavors are at the bottom of our priorities--yet activity is an essential ingredient in our adaptation to affluence. In the future, we must cultivate more golf courses, more ice rinks, trails and bicycle tours, and abandon our no-longer-so-convenient conveniences such as the motor car.

Disease indicates a faulty adaptation to an environment. In centuries of progress towards an easier life, the homo sapien has constantly made adjustments in his style of life. The Sweet-Toothed Carnivore, to survive the rigors of foraging in an affluent society, must recognize the benefits of not making things too easy. Only then can he recognize and treat his modern maladies and adapt to the slow revolution of affluence.

CITATIONS

1a N. Kretchmer, "Lactose and Lactase," Scientific American, Oct. 1972.

1 Jean Bogert, et al., Nutrition and Physical Fitness (Philadelphia, 1973).

2 Norman Joliffe, et al., "Effects of a Prudent Reducing Diet on the Serum Cholesterol Levels of Overweight Middle-Aged Men," American Journal of Clinical Nutrition, March 1962.

3 J. J. Groen, et al., "The Influence of Nutrition and Ways of Life on Level of Cholesterol and the Prevalence of Hypertension and Coronary Heart Disease Among Trappist and Benedictine Monks," American Journal of Clinical Nutrition, June 1962.

4 Daniela Gsell and Jean Mayer, "Low Blood Cholesterol Associated With High Calorie, High Saturated Fat Intakes in a Swiss Alpine Village Population," American Journal of Clinical Nutrition, June 1962.

5 U. S. Tariff Commission, Synthetic Organic Chemicals, U.S. Production and Sales, 1972.

6 I. M. Stillman and S. S. Baker, The Doctor's Quick Weight Loss Diet (New York, 1967).

7 Robert C. Atkins, Dr. Atkins' Diet Revolution: The High Calorie Way to Stay Thin (New York, 1973).

8 Jerry Rivers and Marjorie Devine, "Facts About Low Cholesterol Diets," Practical Forecast, October 1965.

9 J. Scala, "Fiber, The Forgotten Nutrient," Food Technology, Jan. 1974.

10 Richard Lee, "What Hunters Do For a Living, or How to Make Out on Scarce Resources," in R. R. Lee and I. Devore, eds., Man the Hunter (Chicago, 1968).

11 Richard Lee, "!Kung Bushmen Subsistence, An Input-Output Analysis," in A. P. Vayda, ed., Environmental and Cultural Behavior, (Garden City, 1969).

12 Robert Heilbroner, The Worldly Philosophers (New York, 1953).

13 M. K. Bennett, The World's Food (New York, 1954).

14 S. V. Boyden, The Impact of Civilization on the Biology of Man (Canberra, 1970).

15 Rene Dubos, Man Adapting (New Haven, Connecticut, 1967).

16 Berta Friend, "Nutrients in the United States Food Supply," American Journal of Clinical Nutrition, August 1967.

17 L. M. Henderson, "Nutritional Problems Growing Out of New Patterns of Food Consumption," American Journal of Public Health, Vol. 62, 1972.