

Lay Supplement No. 8

ALCOHOLIC BEVERAGES  
AS A FOOD  
AND THEIR RELATION  
TO NUTRITION

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## ALCOHOLIC BEVERAGES AS A FOOD AND THEIR RELATION TO NUTRITION

ALCOHOL is a food and therefore must be included in discussions of nutrition. A recent book, *Alcohol Explored*, states: "The fact that alcohol is oxidized with the liberation of energy which can be used by the body, brings it into the category of a food. The fact that it is a food carries no implication of its merits as a food." These statements may perhaps help to end the debate as to whether or not alcohol is a food. And the importance of recognizing it as a food is not merely to settle an argument, but because this recognition, as will be seen, is essential to an understanding of how excessive use of alcohol may lead to dietary deficiencies and so to certain diseases of chronic alcoholism. If alcohol were not a food, these particular diseases would not occur as the result of the excessive use of alcohol.

All those who have been unwilling to recognize alcohol as a food have admitted that it supplies energy, but have excluded it from the classification of foods because it is more expensive than other foods which supply the same amounts of energy, or because it becomes harmful in excessive amounts. It is economical to evaluate foods on the basis of cost, but even the higher cost does not disqualify a food. If it did, it could be said that strawberries are a food when in season and not a food when out of season. Likewise, it is not sound to dispute the food nature of a substance because undue amounts may cause harm. Sugar and fat are highly valued foods but if eaten in excess they may cause severe indigestion and, if the excess is great and long continued, disturbances of health quite as serious as those of chronic alcoholism.

Alcoholic beverages are foods which are used widely in moderation with no more danger of disturbing nutrition than would come from an amount of pure and nutritious cane sugar

having the same calorific value. There are, however, some individuals who use alcoholic beverages in excessive amounts. Among them, some eventually develop the diseases of chronic alcoholism. In the past 10 years it has been shown that these diseases are not due primarily to the action of the alcohol on bodily organs but are due to nutritional deficiencies, particularly of the vitamins. There is thus a special reason for discussing alcohol in relation to nutrition.

## NUTRITIONAL DEFICIENCY AND DISEASES

It has been shown that one of the well-known diseases of chronic alcoholism is identical with a disease, known as beriberi, which is widespread among inhabitants of the Far East whose diets contain large amounts of polished rice. It is due mainly to deficiency of the vitamin called thiamin ( $B_1$ ), and it can be prevented or cured by increasing the amount of this vitamin in the diet. It has been found also that a certain disease in which sores appear on the skin, and which develops in some chronic alcoholics, is identical with a disease, once common in the southern United States, known as pellagra. It is due mainly to a deficiency of the vitamin called niacin, which, like thiamin, is part of the vitamin B group.

Certain disturbances of the brain and eyes seen in some chronic alcoholics have likewise been found to be due to insufficiency of one or another of the vitamins. It is even surmised that cirrhosis of the liver may, in part at least, be due to lack of vitamins. And certainly much of the general ill health of chronic alcoholics is due to their nutritional deficiencies.

Discovery of these facts has greatly advanced the medical knowledge of chronic alcoholism and hence of its prevention and treatment. On the other hand, many false popular beliefs have originated in these new nutritional discoveries. Because the most common and most striking diseases of chronic alcoholism are not caused directly by alcohol, the false conclusion has sometimes been drawn that excessive drinking is, in itself, harmless. No excess is harmless. It has even been thought that if vitamins were taken with alcohol, people could drink as much as they wished without becoming drunk, and that they would have no hang-

over. Vitamins have nothing to do with drunkenness, and they do not prevent immediate aftereffects. The only advantage that could come from the use of vitamins with alcohol would be in the correction of the dietary deficiencies that may result from excessive drinking.

Moreover, the wide publicity given to the importance of vitamin deficiencies in the diseases of chronic alcoholism has tended to make the problem seem too narrow. Certainly the most striking, and perhaps the most important, dietary deficiencies of chronic alcoholism are those of the vitamins. But they are not the only ones which may occur and contribute to the poor nutrition of the chronic alcoholic. There may be important deficiencies in minerals and proteins as well as vitamins. How extensive these deficiencies may be, and the exact part they play in the diseases of chronic alcoholism, are not as well known as those of the vitamins. But they cannot be ignored and, for this reason, they are included here in the brief discussion of the principles which establish the general dietary requirements.

## THE BASIS OF NUTRITION

It has been recognized from time immemorial that the amount and quality of the food eaten affect health. If a man did not get enough food, he lost weight and eventually starved to death. If he ate indigestible food or food containing poisonous substances, he became ill. These were only the crudest observations on nutrition; they not only often led to wrong conclusions, but, what was more important, they gave no understanding of food in relation to the basic needs of the body. The great contribution of modern science to nutrition is that it has been able to state what chemical substances in the foods, and approximately what quantities of them, are required by the body, and in what kinds of foods these substances are most readily available.

Food can enter the body and be used only as it is absorbed from the digestive tract after it is eaten. Nearly all foods require digestion before they can be absorbed. In this digestion, the foods are broken down into their component chemical substances and it is these components only which contribute to the nutrition of

the body. The enjoyable taste of foods, the personal likes and dislikes regarding them, have nothing to do with their nutritional qualities.

A dozen different foods, with as many different appearances and tastes, may have exactly the same nutritional qualities—or lack of them. To the mother, milk and spinach seem essential foods for her children; but the nutritionist views them only in terms of the proteins, carbohydrates, fats, vitamins, and minerals which they contain. The nutritionist does not insist on milk or spinach, but only on foods which will supply the same chemical substances which these two foods supply; and there are many others which will supply them. And, if for some reason the natural foods containing these chemical substances are not available or cannot be eaten in sufficient amounts, as by someone who is ill, the nutritionist can help to maintain normal nutrition by supplying the same necessary chemical substances which have been extracted from their original sources or even produced by chemical synthesis.

By applying this knowledge of modern nutrition, human feeding ceases to be a matter of chance and habit and becomes a science. The science, still so new as to be far from universally applied, contributes not only to the avoidance of the clearly evident diseases of nutritional deficiency, but also to the difference between having, on the one hand, no disease, and, on the other, being in the best health.

## FOOD REQUIREMENTS

THE chemical substances needed in adequate amounts for the nutrition of the body are the fuel foods, proteins, minerals and vitamins.

The fuel foods supply energy for the warmth and movement of the body and consist primarily of carbohydrates (sugars and starches) and fats. To a less extent, proteins of meat and vegetables are also used as fuel foods. The amount of energy in a food is expressed in terms of "calories" and this term is used also to express the energy that the body expends both as heat and in movement. A calorie is actually a measure of heat; it is the amount

of heat required to raise the temperature of 1 liter (about 1 qt.) of water 1° Centigrade (about 2° Fahrenheit).\*

A man or woman of sedentary habits may expend 2,000 to 2,500 calories a day; one of moderate activity, 2,500 to 3,500 calories; and one doing hard muscular work, from 3,500 to 6,000 calories.

If more calories are expended than are supplied by the diet, the body loses weight, for the deficit of energy is made up by using the fat of the body. A pound of fat yields about 4,300 calories, which will supply all the energy for a day of hard work. Losses of weight, amounting sometimes to several pounds a day, are not due to loss of fat, but to loss of water, as perspiration; such losses are soon made up when water is drunk.

Some foods have a high calorific value and some a low; thus at one extreme, a pound of butter yields 3,500 calories and, at the other extreme, a pound of celery yields only 80. Fat is the most concentrated food that can be eaten. Of the highly purified foods, a pound of sugar or starch yields about 2,000 calories and a pound of pure alcohol about 3,300.

Hunger is largely determined by the need for "calories" and the fact that the weight of most adults remains fairly constant over long periods of time expresses the nice adjustment between energy expended, hunger, and food eaten. This relation is especially striking in view of the wide differences in energy content, the calories, of the different foods. Most of the minerals and vitamins, when taken in excess of the body's needs, are eliminated†—and wasted—but an excess of any fuel foods is not eliminated. It is either converted into fat or spares some other food which can be converted into fat. This fat adds to the weight of the body until such time as the food eaten provides less energy than is expended; the body's fat is then used and the weight decreases.

It is an unfortunate fact that while hunger regulates the amount

\*This is known as the large or kilocalorie; and its abbreviation is C. The small calorie is one-thousandth of a large calorie; and its abbreviation is c. In nutrition the term Calorie always signifies the large Calorie.

†Vitamins A, C and D can to some extent be stored for future use, but the vitamins of the B group can be stored only in very small amounts, if at all.

of fuel foods eaten, it makes no specific demands for the other foods necessary for the body—proteins, minerals and vitamins. A man can satisfy his hunger on a diet rich in fuel foods, but deficient in the other foods, and have no warning that his diet is deficient until general physical inefficiency and finally definite disease develops. It is because of this fact that dietary deficiencies may arise from the excessive use of alcohol.

Pure alcohol and many alcoholic beverages contain no proteins, minerals and vitamins. Alcohol, like pure sugar, starch or fat, supplies only food energy; and this food energy satisfies hunger. If all men lived in semi-tropical regions the year round and ate, and with good appetite, only the fresh foods that were found there, fish, game, raw vegetables and fruits, they would, by satisfying their hunger for the energy foods, obtain at the same time all the proteins, vitamins and minerals they would need for the best nutrition. Under the conditions which we call "civilized," foods are often cooked, preserved and purified. The cooking, preserving and purifying may not lessen the energy content of the foods, and hence their hunger-satisfying qualities, but minerals and vitamins may be lost. Unenriched white bread, sugar and starch are examples of such purified foods. And most alcoholic beverages belong nutritionally to the same category. Good nutrition does not prohibit the use of such foods in the diet; it demands only that they shall not be used in such large amounts that they replace, to a dangerous extent, the foods which contain proteins, minerals and vitamins.

Unlike the need for energy foods, that for proteins does not vary greatly with exertion; the need is, however, particularly great during the period of growth and during pregnancy and lactation. For an average adult, the needs for protein will be adequately satisfied by 70 g. or about  $2\frac{1}{3}$  oz. of protein a day. This is the amount in 7 or 8 oz. of beef or lamb, and in 9 or 10 eggs, and in  $2\frac{1}{2}$  qt. of milk.

Likewise the mineral requirements, except for table salt which is lost in sweat, are not greatly influenced by exertion. Consequently, fairly definite amounts can be set for the daily needs of the average adult. The two most likely to be deficient in the diet are calcium and iron. About 0.8 g. of calcium is needed daily



(more for children and women who are pregnant or lactating) and 12 mg. of iron.

The requirements for vitamins A, C and D are virtually independent of the bodily activity but those for the vitamins of the B group, thiamin, riboflavin, and niacin and others, vary with the rate of energy expenditure. Table 1 gives the estimated desirable daily amounts of minerals, vitamins and proteins for a man weighing 154 pounds in different states of activity. The fact that the need for the vitamins of the B group—and there are others than the better known ones listed here—varies with the rate of energy expenditure has, as will be seen, an important bearing on the type of dietary deficiency which may develop from the excessive use of alcoholic beverages.

Table 2 gives the nutrient composition of some common foods and beverages. One of the features shown by the tables is that no single food fulfills all the requirements of the diet. Even milk, which forms nearly the entire diet of the baby, is deficient in iron—and usually in vitamins. It is generally necessary to give babies vitamins D and C and, after the sixth month, foods containing iron. Some foods, such as the fruits and vegetables, are rich in vitamins and minerals but contain little protein, and especially do they contain few calories, so that it would be impossible to eat or digest the enormous amounts necessary to supply the calorific needs of the body. Meats and eggs are rich in protein and many contain B vitamins, but they contain no vitamin C. The cereal grains are rich in the B vitamins but these may be lost in the milling process by which white flour is made. In Table 2 the nutrient content of foods is expressed in terms of the amounts of special nutrients per 1,000 calories of energy supplied by the food, because the point to be emphasized here is that of “nutrient-free” and “nutrient-rich” calories.

It might be expected that the alcoholic beverages would contain vitamins, especially the B group, since the materials from which they are made are rich in vitamins. Distilled spirits contain none (unless they are added, as has often been suggested) for the distilling process would prevent any vitamins from reaching the finished products. Brewed beverages, such as beer, and also wine, contain the B vitamins but ordinarily only negligible amounts of

TABLE I  
*Estimated Optimum Daily Amounts of Protein, Minerals and Vitamins for a Man of Average Size (154 lb.)*  
*Vitamins*

Activity	Calories expended and eaten	Protein, g.*	Calcium, g.	Iron, mg.†	A, mg.	C, mg.	B GROUP		
							Thiamin, mg.	Riboflavin, mg.	Niacin, mg.
Hard work	4,500	70	0.8	12	1.5	75	2.3	3.3	23
Moderate work	3,500	"	"	"	"	"	1.8	2.7	18
Sedentary	2,000	"	"	"	"	"	1.2	1.8	12

\*g. is the abbreviation for gram; a gram is approximately 1/30 of an ounce.

†mg. is the abbreviation for milligram, which is 1/1000 of a gram.

TABLE 2

## Approximate Nutritive Composition of Some Foods

Food	Calories from 1 lb. or pt.	Approximate amounts giving 1,000 C.	SPECIAL NUTRIENTS SUPPLIED PER 1,000 CALORIES OF ENERGY FROM THE FOODS						
			Pro- tein, g.	Cal- cium, g.	Iron, mg.	Vit. A, mg.	Vit. C, mg.	Thia- min, mg.	Ribo- flavin, mg.
Fruit* (Average)	250	4 lb.	14	0.3	8.0	0.8	500	1.0	0.8
Vegetables, leafy† (Av.)	150	6 ½ lb.	73	3.5	52.5	19.4	1,400	2.8	98.0
Vegetables, fleshy‡ (Av.)	155	6 ½ lb.	59	0.7	26.0	6.8	850	2.6	2.0
Vegetables, roots§ (Av.)	225	4 ½ lb.	25	0.9	13.0	2.6	132	1.8	1.3
Eggs	720	9	91	0.4	21.0	5.0	—	0.6	1.4
Meat   (Av.)	1,200	5/6 lb.	68	0.05	9.0	—	—	0.6	1.4
Butter	3,500	1/3 lb.	1.5	0.02	0.3	2.0	—	—	—
Whole wheat bread	1,200	16 slices	36	1.5	7.0	—	—	1.2	0.4
White bread	1,200	18 slices	32	0.12	2.4	—	—	0.3	0.25
White bread enriched	1,200	18 slices	32	0.12	4.8	—	—	2.0	1.00
Molasses	1,250	5/6 lb.	8	0.8	26.4	—	—	—	—
Corn sirup	1,600	5/8 lb.	—	0.03	0.8	—	—	—	—
Cane sugar	1,600	5/8 lb.	—	—	—	—	—	—	—
Milk	335	3 pt.	48	1.8	3.0	1.0	30	1.0	3.0
Beer	260	5 bottles	7	—	—	—	—	0.16	0.4
Ginger ale and other soft drinks	140 to 300	12 to 6 bottles¶	—	—	—	—	—	—	—
Distilled spirits	1,350	4/5 pt.	—	—	—	—	—	—	—

\*Apples, bananas, grapefruit, oranges, strawberries.

†Broccoli, cabbage, kale, lettuce, spinach.

‡String beans, peas, peppers, squash, tomatoes.

§Beets, carrots, parsnips, potatoes, turnips.

||Lean beef, lamb, frankfurters.

¶Averaged as 9-oz. bottles.

B<sub>1</sub>. This vitamin is present in the grains from which the beer is made, but apparently during fermentation the yeast plant absorbs and retains it. Most soft drinks contain no vitamins. Likewise coffee and tea contain none, but there is one important difference in respect to these two beverages—they supply no energy except from the cream and sugar added and hence, since they supply no calories, they do not supply nutrient-free calories any more than does water.

## DIETARY DEFICIENCY

What mothers mean when they warn their children against “spoiling their appetites” by eating candy is—although the mothers may not express it this way—that they may supply calories from sugar to such an extent that they will be unable to eat enough of the foods which supply both calories and special nutrients. By satisfying their hunger on nutrient-free calories, their diets may become deficient in the necessary vitamins, minerals and proteins. Of course, a small amount of candy will not have this effect. Its use becomes serious only when the calories from the candy represent a considerable percentage of the total calories for the day.

Alcohol does, in this respect, what candy does—it “spoils the appetite” by supplying nutrient-free calories. How alcoholic beverages act in this respect, and why certain deficiencies, especially those of the B vitamins, are more prone to develop than others, can be illustrated by examples in which the data from Tables 1 and 2 are used.

*Example 1.* A certain sedentary man expends 2,000 calories during a day and replaces them with an equal number derived from the collection of foods shown in Table 3. The foods were selected from those of Table 2 only for illustration, as yielding not only the desired number of calories but the recommended amounts of protein, calcium, iron, vitamins A, C and thiamin. A great many other combinations of foods could have been chosen. The particular foods used here do not supply the optimum recommended amount of riboflavin but we shall limit our illustration to thiamin only.

Two hundred and thirty-four out of the total of 2,000 calories

in this meal are "nutrient-free calories," from sugar and jam. In their place an equal calorific value of alcohol (about 2 highballs) could have been substituted without in any way disturbing the nutritional benefits of this collection of foods.

*Example 2.* A certain man of moderate exertion expends 3,000 calories a day and supplies 1,000 of these calories from alcohol (about 12 oz. of whisky) and the remaining 2,000 from the collection of foods shown in Table 3. In spite of the large number of nutrient-free calories the man will obtain sufficient protein, calcium, iron and vitamins A and C since, as shown in Table 1, the requirements for these nutrients do not increase with exertion and the basic diet used here, giving 2,000 calories, gives also the recommended amounts of these substances. The need for thiamin, however, increases with exertion. At 3,000 calories it is 1.8 mg. and the collection of foods eaten gives only 1.2 mg. The man is therefore deficient in vitamin B<sub>1</sub>.

*Example 3.* A certain sedentary man, expending 2,000 calories, supplies 1,000 from alcohol. He will then supply only 1,000 calories, instead of 2,000 as in Example 1, from the collection of foods shown in Table 3. In consequence, he will obtain only half of the nutrients given: 36.0 g. of protein instead of 73.0; 0.40 g. of calcium instead of 0.80; 6.2 mg. of iron instead of 12.4; 0.8 mg. of vitamin A instead of 1.5; 37.0 mg. of vitamin C instead of 75.0; and 0.6 mg. of thiamin instead of 1.2. This man will be deficient in thiamin as was the man in Example 2; but he will, in addition, be deficient in all other nutrients.

The tables and discussion given here are only illustrative; they are intended to show why certain dietary deficiencies are most prone to develop from excessive use of alcohol. Most individuals do not eat as well-balanced a diet as that shown in Table 3. In fact, without using excessive amounts of alcohol, or even any alcohol, the diets of a great many people are deficient, especially in the B vitamins.

Often a very heavy drinker who is a manual laborer with a high expenditure of energy, and correspondingly large intake of food, may only gradually show the effects of dietary deficiency. He may then lose his job and become sedentary in his habits but without decreasing the amount of alcohol he is using. Since the

TABLE 3  
 Illustrative Daily Intake of Food Yielding 2,000 Calories

Food	Calories	Pro- tein, g.	Cal- cium, g.	Iron, mg.	Vitamins		
					A, mg.	C, mg.	Thiamin, mg.
Eggs, 1	80	7.0	0.03	1.70	0.24	—	0.08
Milk, 12 oz.	252	12.0	0.50	0.75	0.22	7	0.22
Fruit, 2 oz.	32	0.5	0.01	0.25	0.03	15	0.03
Vegetables, leafy, 2 oz.	18	1.8	0.08	1.00	0.35	26	0.05
Vegetables, fleshy, 2 oz.	50	1.0	0.02	0.50	0.13	17	0.05
Vegetables, root, 4 oz.	65	1.6	0.05	0.80	0.15	9	0.10
Meat, 6 oz.	450	32.0	0.02	4.50	—	—	0.25
Butter, 1 oz.	218	1.0	0.01	0.06	0.38	—	0.02
Whole wheat or enriched bread, 6 slices	500	15.0	0.08	0.80	—	—	0.40
Sugar, 1 oz. } nutrient-free	100	—	—	—	—	—	—
Jam, 1½ oz. } calories	135	—	—	—	—	—	—
Molasses, 1 oz.	100	0.6	0.06	2.00	—	—	—
	2,000	72.5	0.86	12.4	1.5	74	1.2
		70.0	0.80	12.0	1.5	75	1.2

Recommended at 2,000 calories:

nutrient-free calories then become a much greater proportion of his total calories, his diet becomes seriously deficient, as in Example 3 given above, and he rapidly develops nutritional diseases.

There is an additional feature in the dietary deficiency from excessive use of alcohol besides that of nutrient-free calories. Long continued very heavy drinking of strong alcoholic beverages in time may affect the stomach directly so that it becomes irritated and inflamed. The appetite of the chronic alcoholic then becomes fickle; he can eat less and he loses weight. The lesser amount of food and the peculiar selection of food due to his fickle appetite further increases his dietary deficiency.

### THE DEFICIENCY DISEASES OF CHRONIC ALCOHOLISM

VIRTUALLY all chronic alcoholics have some dietary deficiency. Many are anemic from lack of iron; the bad teeth of some show deficiency of calcium; and the greater fatigability and loss of alertness that are common to all chronic alcoholics are, in great part, a consequence of protein, and particularly vitamin, shortage. In about one-half of all chronic alcoholics\* the dietary deficiencies become sufficiently severe to pass from vague ill health to definite and recognizable diseases. For the reasons that have been given, these diseases are mainly those resulting from deficiency of the B vitamins. Generally there are deficiencies in several of these vitamins but one or another is the more marked, depending upon the peculiarities of the individual diet. The particular deficiency gives its character to the disease which develops.

#### *Beriberi.*

Some 20 per cent of the chronic alcoholics entering general hospitals suffer from an abnormality of the nerves controlling the legs and arms. This condition begins with burning sensations in the soles of the feet. Later, pain develops in the legs and this pain slowly spreads upward. Walking becomes more and more difficult and ultimately the person afflicted with this disease is

\*See Lay Supplement No. 1 for definition of chronic alcoholic.

neither able to walk nor to stand. It has been discovered in the last 10 years that this disease, which is called "polyneuritis" (meaning inflammation of the nerves\*) is exactly the same disease which occurs frequently in the Far East among people living entirely on polished rice and is known as dry beriberi. Polished rice, it has been ascertained, lacks thiamin. When thiamin is given to beriberi patients, they make a good recovery. Likewise the polyneuropathy of chronic alcoholics yields to thiamin treatment. Suitable addition of thiamin to the diet prevents the disease.

There is a wet form of beriberi in the Orient and this, too, occurs in about 10 per cent of chronic alcoholics. In this form of the disease, the muscle of the heart is weakened and the organ itself is dilated. Sometimes there is swelling of the legs from a collection of fluid—dropsy. The main deficiency in wet beriberi is the same as in dry beriberi, namely a deficiency of thiamin. In the wet form of beriberi the vitamin deficiency is probably more severe than in the dry form. There is also some indication that very active individuals are more liable to wet beriberi.

Both of these diseases in the past, especially wet beriberi, had a high rate of mortality. The rate has greatly decreased since the introduction of thiamin treatment. Other vitamins are also administered to such patients, since they are deficient in all vitamins; and their diets are altered to supply the deficiencies in protein and minerals which also generally exist.

### *Pellagra.*

Of the chronic alcoholics entering general hospitals, about 10 per cent show a spotty reddening of the skin and a scarlet coloring of the tongue, lips, gums and palate. Frequently ulcers develop, and there are serious disturbances of digestion. The minds of these individuals also usually become affected.

This disease was found to be exactly the same in its aspects and origin as the disease known as pellagra, which occurs in the southern part of the United States among people whose diet is mainly cornmeal. An American physician, Dr. Joseph Gold-

\*More recently it has been found that the nerves in this condition are not inflamed but degenerated, and physicians now refer to this disease as polyneuropathy meaning abnormality of many nerves.



berger, showed that this disease was not caused by some poisonous substance present in the diet but rather by the deficiency of some essential element of nutrition. Later, it was found that what was deficient was a vitamin of the B group, now known as niacin. With the administration of this vitamin the ordinary pellagra, as well as the "alcoholic" pellagra, can be cured—and prevented.

Possibly some chronic alcoholics develop pellagra instead of beriberi because they have different dietary habits. Perhaps, however, some special nutritional disturbances result in some individuals which make it more difficult to utilize one vitamin than another.

### *A Disease of Complete Deficiency*

In pellagra, niacin is deficient but not entirely absent. Some excessive drinkers neglect to eat solid foods for many days in succession and subsist only on alcohol. In these individuals, niacin may suddenly become entirely depleted. Such sudden depletion brings about severe changes in the brain. Niacin in large doses may restore the patient, who is otherwise in mortal danger.

## NUTRITIONAL MODERATION

It is seen here that all these diseases of chronic alcoholics may occur in individuals who do not use alcohol at all. The fact remains, however, that they occur much more frequently among excessive drinkers than among abstainers and moderate drinkers. Thus, while these diseases are not caused by alcohol itself, they must be debited to the habits of using excessive amounts of alcohol which interfere with proper nutrition.

The idea has been advanced that the dangers of excessive drinking might be overcome by supplementary vitamin tablets. If an individual cannot be broken of his habit of excessive use of alcohol, it is certainly wise to give him supplementary vitamins and to avoid disease complications. But the vitamin tablet is not the solution of the alcohol problem; it is only a partial solution in the prevention of the more striking diseases of dietary deficiency which may develop in the chronic alcoholic. The solution lies in a moderation which does not interfere with normal nutrition, that

is, the restriction of alcohol to amounts which do not represent a considerable portion of the individual's caloric budget. Such restriction has other implications quite as important as those of nutrition. The consequences of continuous drunken behavior to the individual himself and to society are serious even when diseases of deficient nutrition are avoided.

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