A SURVEY OF THE EFFECTS OF ALCOHOL ON NUTRITION IN A FREE LIVING MALE POPULATION

by

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(ABSTRACT)

A dietary survey of male volunteers, both drinkers, and nondrinkers of alcohol, on free choice diets, was conducted in Blacksburg, Virginia in the spring and summer of 1981. The survey was conducted to assess the relationship between the consumption of alcohol and the intake of selected nutrients on both a mean daily basis and on a per kilogram body weight basis. One hundred seventy-one subjects ages 18 through 56 kept food and beverage intake records for five consecutive days, including Saturday and Sunday. The food and beverage records were hand coded and processed by computer for nutrient analysis. Subjects were grouped, according to the amount of alcohol consumed, into nondrinkers, low, moderate or high drinkers. Regression and correlation analysis revealed that there was little difference among the groups of subjects in the effects of alcohol intake on intake of the traditional energy supplying nutrients, protein, fat, and carbohydrate

expressed as mean daily intake and expressed on a per kilogram body weight basis. The expression of nutrient intake based on a per kilogram body weight basis made no difference in the significance of results when considering the relationship between the consumption of alcohol and calcium, iron, magnesium, phosphorus, vitamin A, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and vitamin C. The need for further investigation into the relationship between alcohol consumption and nutrient intake of social drinkers has been documented.

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Chapter I

Introduction

There is growing interest of persons in the United States in the contribution of alcohol to the diet and its effects on their health. In the past, most research in this area was centered around the alcohol dependent individual (alcoholic) with little regard to light or moderate drinkers (1). However, the current prevalence and increasing incidence of use of alcohol in the diets of nonalcohol dependent drinkers or social drinkers is sufficiently widespread that possible effects as part of the food supply warrant investigation.

In 1979 about 80 percent of American adolescents reported having had a drink, half this number drank at least once a month, and nearly 3 percent drank daily. These reported figures are double those reported in the mid-sixties. The prevalence of drinking is highest among men in the age group 21 through 39 years (2). Fourth Special Report to the U.S. Congress on Alcohol and Health (3) estimated that approximately two-thirds of the American adult population consumes alcoholic beverages. One-third of these adults drinks at least once a week; another third drinks primarily on special occasions; while the remaining

third is evenly divided into total abstainers and current abstainers.

Several population surveys have been completed to determine the prevalence of drinking, but few have presented information on dietary intake associated with alcohol consumption. Reliable information is available on the diet and drinking patterns of alcohol dependent drinkers, but little research has been conducted with social drinkers (4). In alcohol dependent persons calories from alcohol cause an imbalance of nutrients which leads to malnutrition and increased risk of disease (1).

One disease state ascribed to be related to heavy alcohol consumption is coronary heart disease (CHD). However, several surveys of large population groups have shown that there appears to be a negative correlation between moderate alcohol consumption and CHD (5-8). These results may be explained by the quantitative and qualitative differences in nutrient intakes resulting from the level of alcohol consumed (9).

Few studies have set out to measure nutrient intakes of social drinkers. Reports, with differing results, include the fact that the intake of basic energy yielding nutrients (protein, fat, and carbohydrate) may be affected by the amount of alcohol consumed. Based on the percentage of total calories, Bebb, Harold, Houser, Witchi, Littell,

and Fuller (4) and Jones, Barrett-Connor, Criqui, and Holdbrook (9), found a decrease in calories from fat and carbohydrate; Tofler, Saker, Rollo, Burvill and Stenhouse (10) found a decrease in carbohydrate only; and Hasunen, Pekkarinen, and Nuutinen (11) found an increase in fat and a decrease in carbohydrate.

The above researchers used varied methods to obtain dietary information. Methods used ranged from a diet history, a three day food diary record (one weekend day, two weekdays), a 24-hour dietary recall, and a series of three consecutive food diary records at approximately monthly intervals. Each method was reported to have advantages and disadvantages for obtaining accurate information.

This present study was based on records for a five consecutive day food diary kept for three week days and two weekend days to increase the accuracy of information on possible food and alcohol intake patterns. The objectives of the study were:

1. To measure the effects of alcohol consumption relative to body size on the consumption of the energy supplying nutrients, protein, fat, carbohydrate.

2. To determine the relationship between the consumption of alcohol and of selected nutrients (calcium, iron, magnesium, phosphorus, thiamin, riboflavin, niacin, vitamin A, B6, B12, and C).

Chapter II

Review of Literature

PREVALENCE OF ALCOHOL CONSUMPTION

The apparent consumption* of alcohol has increased continually since 1934; annual apparent consumption in the U.S. in 1978 reached an average of 2.7 gallons absolute ethanol per person 14 years old and older. This approximated a daily per capita consumption of 1 ounce absolute alcohol when averaged over the drinking age population of 14 years and older (2). The Fourth Special Report to the U.S. Congress on Alcohol and Health (3) included an estimate that one-third of the United States (U.S.) adult population abstains from consumption of alcoholic beverages. Thus, approximately two-thirds of the U.S. population consumes some form of alcoholic beverage whether frequently or infrequently.

Estimates of the prevalence of drinking have traditionally been based on data from surveys of representative samples of the U.S. population. Mulford (12) in 1963

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*one of two major estimates of alcoholic beverage consumption derived from official reports of states, tax-paid withdrawal records, and, in some cases, reports of sales by the beverage industry. The second major estimate is self-reported consumption and is derived from personal responses to a survey instrument (3).

sampled 1515 men and women chosen by modified random sampling procedures to represent the total noninstutionalized population of the U.S. aged 21 years and over. Subjects were asked, by a trained interviewer, if they ever had an occasion to use alcoholic beverages or were an abstainer. Overall, 71 percent of the sample reported themselves as drinkers. Based on this report, an estimated 80 million American adults drank in 1963. These results showed an increase in estimated consumption from an earlier study in the 1940's by Riley and Marden (13) who found that 65 percent of 2677 respondents were drinkers.

Cahalan and Cisin (14) conducted a national survey of drinking practices throughout the continental U.S. between 1964 and 1965. A random sample of 2,746 people responded to questions about their drinking practices. Drinking was found to be typical rather than atypical for both men and women; 68 percent of the sample classified themselves as drinkers. The report indicated that, on the basis of an estimated 112.4 million adult population in the U.S. in 1964, there were 76.4 million drinkers age 21 and over. This finding was close to that reported by Mulford and implies that more than two-thirds of the U.S. adult population were drinkers.

National surveys such as that reported in the Second Special Report to the U.S. Congress on Alcohol and Health

(15) have found significant regional differences in drinking patterns in the United States.

Barnes and Russell (16) surveyed 1041 adults in Western New York State in 1975 to compare the drinking practices there to those of the nation as a whole. General findings were that the proportion of the rates of drinking and of heavy drinking were higher for both men and women than was the national average. These researchers also compared their results with those from the Mid Atlantic Regions of the country. They found again that differences with the rate of drinking and proportion of heavy drinking indicated that Western New York State persons consumed more alcoholic beverages.

Age and Sex

Harford and Mills (17) reported on 794 adults in metropolitan Boston, Massachusetts and 5617 junior and senior high school students who participated in a national survey. The adults were interviewed while the adolescents used self-administered questionnaires. These researchers reported that the frequency of drinking increased with age while the average quantity consumed on each drinking occasion decreased with age. Furthermore, they held that adults tend to underreport actual consumption and stated that it may be just as common for adolescents, who associate drinking with adult status, to overreport the number of

drinks consumed. The increasing frequency of alcohol use among adults may have been due to more widespread accessability and exposure to alcohol with increasing age of the person.

While population surveys confirm the general finding that men are more likely to drink and drink more heavily than women, the absolute proportions vary between surveys and regional areas. Barnes and Russell (16) found the highest proportion of heavy drinkers among men aged 8-20 and 21-29. While reports of the general tendency are that heavy drinking decreases as age increases, there appeared to be a slight increase in heavy drinking among Western New York men between the ages of 40 and 59.

Findings reported in the Second Special Report to the U.S. Congress on Alcohol and Health (15) indicate that the differences between men and women in the prevalence of drinking have been decreasing over time, the rate of drinking reported by women has been increasing, and the overall prevalence of drinking among men remaining rather stable. Barnes and Russell (16) concluded that despite any narrowing of the gap in the prevalence of drinking between men and women, gender still remains one of the most important factors in alcohol use patterns, particularly with respect to heavy use, and that age is the other most significant factor with regard to heavy drinking.

Education

The prevalence of heavy drinking in relationship to education was reported by Barnes and Russell (16). These researchers found that heavy drinking occurred in 17% of those with a grammar school education or less, 28% of those with some high school, 27% of high-school graduates, 23% of those with some college, and 17% of college graduates or more. Cahalan, Cisin, and Crossley (18) reported slightly different percentages of heavy drinkers for the nation as a whole. Their findings for the same level groups were 11 percent, 10 percent, 14 percent, 15 percent, and 12 percent respectively.

Alcohol, hashish, marijuana, and tobacco were listed as most frequently abused substances (19) on college campuses. Kopplin, Greenfield, and Wong (19) reported on a study of substance use by a random sample of university students on a large midwestern campus. Results from two surveys were compared, the first with 598 students in 1969 and the second with 474 students in 1973. Alcohol use increased from 86.1 percent in 1969 to 93.0 percent ($p < 0.001$) in 1973. The almost universal and fairly frequent use of alcohol by all subgroups was in accord with national findings, as was the trend of increasing percentages of drinkers as reported by Johnston (15) in the Second Special Report to the U.S. Congress on Alcohol and Health, 1974.

Although there were increases in the percentages of drinkers in the study by Kopplin et al. (19) there was no associated increase in the reported frequency of use among the drinkers. Although these data did not have any direct bearing upon the issue of problem drinking, a national study conducted in 1973 indicated that the greatest proportions of persons who had experienced some problem in connection with drinking were in the age group from 18 to 24 years. Of the single male graduate student respondents, 95.6 percent reported use of alcohol. Single male undergraduate students reported an increase from 79.9 percent in 1969 to 94.0 percent ($p < 0.001$) in this study.

PATTERNS OF ENERGY CONSUMPTION

Individual alcohol consumption has been reported to vary from no consumption to heavy consumption in which alcohol becomes a major portion of the energy value in the diet. The Fourth Special Report to the U.S. Congress on Alcohol and Health (3) indicated that in the two-thirds of the U.S. population who drink, mean daily absolute alcohol consumption of 1.3 oz./day, 215 kilocalories are provided by alcohol. Although alcohol is generally considered to be a high calorie, low nutrient beverage, additional kilocalories and some nutrients may be provided by components other than alcohol in each drink. Some nutrients would be found in the various mixers and condiments added

to mixed drinks. Beer and wine have traces of minerals as well as vitamins as inherent components.

Barnes and Russell (16) stated that male drinkers between the ages of 15 and 18 years consumed the lowest percentage, 10.1 percent, of total mean kilocalories as alcohol while the next lowest percentage of kilocalories from alcohol was found in male drinkers ages 65 and over, 13.1 percent. From ages 15-18 through ages 51-64 the percentage of kilocalories from alcohol was increased steadily, and peaked at 19.5 percent. For all male drinkers, 17 percent of mean daily kilocalories were from alcohol. In the 1977-78 Nationwide Food Consumption Survey (20) alcoholic beverages, for those consuming alcohol, were found to contribute from 10.1 to 19.5 percent of total mean daily kilocalories.

Bebb, Houser, Witschi, Kittell, and Fuller (4) reported that, as of 1971, several studies of representative samples of the U.S. population had estimated the prevalence of drinking and the amounts and frequency of alcohol consumed. However, few of these studies presented dietary intakes along with alcohol consumption in the data. Bebb, et al. summarized some nutrition surveys that included data for drinkers and nondrinkers combined. These surveys only reported mean daily kilocalories from alcohol and the proportion of mean daily kilocalories resulting from alcohol consumed.

Bebb et al. (4) then studied three groups of non-alcoholic adults to determine the contribution of kilocalories from alcohol to the diet. Group I consisted of 73 male and female multiple sclerosis patients, group II was made up of 54 healthy male corporation executives, and group III consisted of 28 healthy male professionals or businessmen who participated in the same physical fitness program.

Mean alcohol intake by 53 percent of all these subjects on the days they drank was the equivalent of 2 oz. or less of 80-proof whiskey (200 or less kilocalories). Twenty-six percent of the subjects, most of whom were in group II, consumed a mean of 300 or more kilocalories from alcohol on drinking days.

These researchers reported that alcohol contributed less than 4 percent of total mean daily kilocalories in the multiple sclerosis patients and the men in the physical fitness program and 10 percent of total mean daily kilocalories for the others. Twelve subjects reported drinking every day. In these subjects, alcohol contributed approximately 17 percent of their mean daily kilocalorie intake. Bebb, et al. (4) reported that the mean total kilocalorie consumption of male drinkers on non drinking days was similar to that of non drinkers, 2,165 kilocalories and 2,145 kilocalories respectively.

RECOMMENDED DIETARY ALLOWANCES

Recommended Dietary Allowances (RDA) were established in 1943 by the Food and Nutrition Board (NRC) as a guideline for average energy intake based on activity level and gender for all age groups in a population. Since that time these allowances have been updated at intervals to reflect research findings. The three traditional energy nutrients, protein, fat, and carbohydrate, generally contribute 11-12 percent, 42 percent, and 46 percent of dietary energy intake respectively (21). Page and Friend (22) stated that in the past carbohydrate foods made by far the largest contribution to energy content of the diet, but now fat consumption has increased to nearly equal levels with carbohydrate. Protein intake has remained about constant over the years.

Alcohol contributes to the energy intake of people who drink and for these persons averages 5-10 percent of their total energy intake (23). Hartroft reported that some people consume 1800 kilocalories/day from alcohol regularly.

Recommendations for kilocalorie consumption proposed by NRC (21) are as follows: total fat intake should not exceed 35 percent of dietary energy particularly in diets below 2000 kilocalories/day. By reducing the intakes of refined sugar and alcohol, the nutrient concentration of

the diet will be increased and the possibility that all allowances for nutrients are met will be increased for those whose energy needs are less than 2000 kilocalories/ day.

Protein needs are based on 0.45 g of protein per kgBW (kilogram body weight) per day to meet the needs of almost all members of a population (21). However, an additional 30 percent was added to the allownace as a safety factor for population variation making the recommended allowance 0.6 g/kg/day. There is no specific recommendation for fat intake but 15-25 g dietary fat meets the needs of an adult body as a carrier of fat soluble vitamins and essential fatty acids. The recommended intakes for these energy nutrients represent a considered judgment regarding an intake that will maintain normal function and health (21).

ALCOHOL AS A SOURCE OF ENERGY

Because alcohol contributes 7 kilocalories/g to the energy intake of a drinker, it is an important source of energy among drinkers. Hartroft (23) reported that alcohol may provide from 5-10 percent of total calories in people who drink. Because 10 percent is fairly close to the proportion of kilocalories provided by protein, 12-15 percent, investigators set out to determine whether the alcohol kilocalories are purely additive to the kilocalories from the three traditional energy nutrients or

whether one or more of these energy nutrients is displaced by the alcohol.

Hartroft (23) described an "executive" drinker as a social drinker who consumed 1,800 kilocalories per day from alcohol and presented two ways in which the executive drinker could deal with these kilocalories from alcohol. By adding the alcoholic kilocalories on to a basic diet (2400 kilocalories for a 70 kg man; 48 percent carbohydrate, 40 percent fat, and 12 percent protein) the total kilocalorie level is raised to 4200 kilocalories/day. The proportion of kilocalories from the traditional energy nutrients is reduced (27 percent carbohydrate, 23 percent fat, and 7 percent protein). Obviously a drinker could gain weight on this increased number of kilocalories.

The second way a drinker could deal with the alcoholic kilocalories would be to reduce the intake of solid food to keep the kilocalorie level at 2400 kilocalories/day. In this case carbohydrate consumption would decrease to 12 percent, fat to 10 percent, and protein to only 3 percent of the total dietary kilocalories. Hartroft, however, speculated that the actual intake for a typical drinker would fall somewhere between these two examples.

Bebb, et al. (4) studied executives and multiple sclerosis patients, and concluded that alcohol users added kilocalories to a basic diet. These researchers found a progressive increase in total mean daily kilo-

calorie intake as the percentage of total kilocalories from alcohol was increased. In the two groups studied proportional intake of fat and carbohydrate were decreased with increasing alcohol consumption. However, the percentages were based on total mean daily kilocalorie consumption including the kilocalories contributed by alcohol. When alcohol-derived kilocalories were additive rather than displacement kilocalories, this method of analysis automatically resulted in a reduction in the percentage kilocalories derived from nonalcoholic sources. Bebb et al. also found that actual intake of grams of protein, fat, and carbohydrate were increased slightly on drinking days.

Jones, Barrett-Connor, Criqui, and Holdbrook (9) reported that kilocalories from alcohol intake were additive to the diet. These researchers stated that the total kilocalorie intake was significantly greater among the alcohol consumers studied ($p < 0.001$). In all cases alcohol drinkers consumed a greater number of total calories than did nondrinkers. The same findings held true when considering only nonalcohol derived kilocalories, except for moderate drinkers (25-49 g alcohol) whose kilocalorie intake was below that of the nondrinkers. Amounts of the three traditional energy nutrients consumed were greater for the alcohol consumers than for the nondrinkers except for the moderate drinkers whose intake

showed significant differences for protein and carbohydrate ($p < 0.01$) and for fat ($p < 0.05$) consumption.

Tofler, Saker, Rollo, Burvill, and Stenhouse (10) surveyed 359 healthy employed men characterized as non-alcoholics who consumed from 0-400 oz. beer per day (or an equivalent from other alcoholic beverages based on 4 percent alcohol by volume for beer). The researchers found that there was no significant difference among the subjects for protein and fat intake. However, mean daily carbohydrate (g/day) was decreased steadily with an increased alcohol consumption from 315 g/day in nondrinkers to 170 g/day in very high alcohol consumers (> 150 oz. beer or equivalent/day). Mean daily kilocalorie consumption was given as a percentage of the subject's recommended daily allowance. Nondrinkers consumed 95 percent of the total kilocalories recommended, while the low and moderate drinkers (1-80 oz. beer or equivalent/day) consumed only 92 percent of total kilocalories recommended. The subjects classified as high (81-150 oz. beer or equivalent/day) and very high drinkers consumed 102 and 118 percent of their total recommended energy allowance respectively.

Hasunen, Pekkarinen, and Nuutinen (24) surveyed 1,206 men to determine if alcohol consumption had an effect on food and nutrient intake between those classified as low drinkers (7.2 g/day mean alcohol intake) and high drinkers

(47.8 g/day mean alcohol intake). These researchers reported that mean daily energy intake was greater for the high drinkers than for the low drinkers, 3,750 kilocalories vs. 3,310 kilocalories. Protein contributed 14 percent of total mean daily kilocalories in both groups, however fat intake was increased with an increase in alcohol consumption from 38 percent to total energy intake for the low drinkers to 42 percent for the high drinkers. Carbohydrate contributed approximately 43 percent of total kilocalories for the high drinkers and 48 percent for low drinkers.

To examine the effect of regular alcohol intake on nutrient ingestion, Barboriak, Rooney, Leitschuh, and Anderson (25) studied 51 elderly males who were residents of a Veterans Administration Domiciliary. The average daily energy intake for the nondrinkers was 2,415 kilocalories while that of drinkers was 2,140 kilocalories, alcoholic kilocalories excluded. The drinkers consumed less mean daily amounts of protein, fat, and carbohydrate than the nondrinkers, 87 vs. 97 g, 90 vs 100 g, and 246 vs. 284 g respectively. Intake of kilocalories from alcohol was averaged to be 473 kilocalories per drinking subject per day.

MICRONUTRIENT CONSUMPTION

Up to this point, emphasis has been placed on the contribution of kilocalories from alcohol to the diet and whether or not those kilocalories displace the kilocalories derived from protein, fat, and carbohydrate. However, kilocalories are not the only nutrients supplied by some alcoholic beverages (1).

Bebb, et al. (4) reported that except for kilocalories, alcoholic beverages contributed little to the diets of subjects who consumed less than 5 percent of their daily kilocalories from alcohol. Because beer has a higher vitamin and mineral content than other alcoholic beverages, the researchers grouped alcohol consuming subjects according to their beer consumption. Subjects who drank more than 2 12-oz. bottles of beer per day consumed significantly more phosphorus, riboflavin, and niacin from alcoholic beverages than did nondrinkers. Six percent of total calcium intake was from the alcoholic beverage consumption.

Tofler et al. (10) reported that there was no significant difference among an alcohol consuming group and nondrinkers for intake of thimaine, iron, and riboflavin. The nondrinkers consumed more vitamin A than did drinkers, however vitamin A intakes were above the level recommended for all subjects. Niacin intake was also above the recommended level for all subjects, but highest levels were found among

the heavy drinkers. The thiamine intake of each group was similar but below recommended levels (approximately 0.25 mg/1000 kilocalories vs. 0.4 mg/1000 kilocalories. However, the mean thiamine intake, expressed as a percentage of the recommended allowance was decreased steadily with increased alcohol consumption. These researchers concluded that although thiamine levels were below those recommended, the dietary intake data alone did not provide sufficient evidence for the existence of a deficiency state.

In summary, previous research has shown inconsistent results for intakes of certain micronutrients when comparing persons classified as drinkers with those classified as non drinkers. Of the few studies reporting vitamin and mineral intake with alcohol consumption, niacin and vitamin C appeared to be consumed in greater quantities by the drinkers, while thiamin intake was greater for non drinkers.

DIETARY INTAKE ASSESSSMENT

Pernanen (26) stated that the method used for survey research may yield a different estimate of alcohol consumption than a method that is concerned with apparent consumption, since self-reported consumption by survey accounts for only 40 to 60 percent of beverage sales data. Therefore surveys may underreport true consumption.

In 1979, self-reported consumption data for adults did not show large shifts from recent years (27). Approximately one-third of the adult population in the United States reported abstaining from alcohol, one-third reported light drinking (0.01 to 0.21 oz. alcohol/day), 24 percent reported moderate drinking (0.22 to 0.99 oz. alcohol/day), and 9 percent reported heavy drinking (1.0 or more oz. alcohol/day) (3).

Blair, Sudman, Bradburn, and Stocking (28) reported on a nationwide survey to assess the response effects for measuring consumer behavior. They concluded that because because alcohol consumption is regarded by some people as socially unacceptable, some respondents, when questioned concerning their alcohol consumption, may understate their actual intake.

Studies of diet and alcohol are complicated by the problems of measuring dietary and alcohol intake. Jones et al. (9) stated that a 24-hour dietary recall is the most efficient method for determining nutrient intake in population samples. In the population they surveyed, over 90 percent of the respondents reported that their 24 hour recall was typical of a usual daily intake. However, the researchers stated that because measuring alcohol consumption was not a major focus of their study, validity as to the amounts actually consumed by these subjects is unknown.

Validity of the 24 hour dietary recall has been questioned as to whether it is an accurate measure for assessing an individual's usual consumption (29-32) as well as its reliability for describing the distribution of usual intakes of a population. In general a 24 hour recall indicates that individuals tend to overestimate low intakes and underestimate high intakes. However, it has been found to be sufficiently accurate for determining mean nutrient intake of population groups (9).

Garn (33) stated that 1-day diet records should not be used to rank individuals. However, Adelson (34) reported that a dietary diary kept for one week proved as satisfactory as for two consecutive weeks and that the recall method compared favorably with the diary method.

Young, Chalmers, Church, Clayton, Murphy, and Tucker (35) compared actual consumption of food measured by direct observation and by weighing portions to self reported intakes of subjects. They found that two-thirds of the subjects studied estimated their food intake to within 20 percent of that of the measured intake.

Gersovitz, Madden, and Wright (31) reported that dietary records, during the first few days of a total of seven days, were less prone to over- and under-estimating actual intakes. However, these researchers found that the validity of the dietary record declined by the fifth, sixth and seventh days of the study.

Leverton and Marsh (36) compared food intakes for weekdays and for Saturday and Sunday. They concluded that in order to obtain representative food intake data Saturday and Sunday must be used.

Chapter III

Procedure

SUBJECT RECRUITMENT

This study is a part of a larger study funded by an American Cancer Society Institutional Research Grant, and titled, "Environmental Factors Associated with High D-glucaric Acid Excretion in Men." A survey was conducted with over 200 members of the Blacksburg community. The primary focus was men, but approximately 20 women were included in the sample. However, only male subjects were considered for this study. Subject recruitment was limited to those volunteers between the ages of 18 and 56. No other restrictions or limitations were placed on the subjects. All volunteers were accepted for participation.

The recruitment period began in February, 1981 and continued through September, 1981. Recruitment was advertised by flyers distributed and posted on the Virginia Tech campus, in the Blacksburg community, and in surrounding Montgomery County. Announcements of the study were broadcast on area radio stations and reported in local newspapers. Active recruitment was carried out primarily in campus organizations, however some community groups were

reached as well. A free theatre ticket was offered as inducement to participate as were copies of the study results for an individual upon request.

DATA COLLECTION

Training Session

Subjects were required to attend a training session prior to beginning the study. In the event that participants were unable to attend a scheduled training session, they were instructed in study procedures on an individual basis by one of the researchers. At each training session the general instructions for completion of the data collection were outlined. Subjects were informed of the large amount of effort involved in carefully recording all data. To assure participants of the confidentiality of their responses, each made up his own nine digit identification (I.D.) code number. The number was to consist of the subject's day of birth, his height in inches, and the first three digits of his social security number. Each subject recorded his number on all forms, questionnaires, and food records.

Diet Records

Each subject kept 24-hour dietary records (Appendix A) for each of the five days that he participated in the study. The records were kept for five consecutive days from Saturday through the following Wednesday. Five days

were used, including a sample of both weekend and week days, to ensure that any differences which may have existed in dietary intakes between the weekend and week days would be taken into account.

Subjects were instructed to record everything they ate and drank, including alcoholic beverages, drugs, and dietary supplements. Amount ingested as well as method of preparation was recorded for each item consumed. The time that each item was consumed and the place where it was consumed was recorded as a probe to help subjects remember everything they had consumed within each 24-hour period. No restrictions were placed on subjects' dietary intakes or habits; each was encouraged to follow his normal daily diet routine.

During each training session a demonstration was performed by the researchers which illustrated the amounts of food contained in common household measures (dietary items were recorded in common household units of measure). A guide for portion size estimations (Appendix B), and a sample food record (Appendix C) were provided to each subject to help him have a better understanding of how to accurately record his dietary intakes.

Records were returned daily to a cart on third floor of Wallace Hall beginning on Monday of each week to ensure that each day's intake was recorded promptly and not lost.

Additional Forms

Each subject was given a Consent to Participate Form prior to beginning the study. The consent form outlined the purpose of the study and the responsibilities for each subject to the study and details of what the subjects would be asked to do. This was the only form that contained the subject's name, however his I.D. code number was not included. I.D. code numbers and subject names were not used together in an effort to maintain the anonymity of each subject.

A questionnaire administered for each subject was designed to access the usual habits of each. It was a detailed questionnaire to gather information concerning each subject's usual alcohol intake and the types of alcoholic beverages consumed within the previous month. Alcohol was reported as the number of drinks per day for each category of alcoholic beverage listed. However, for the study analysis only the alcohol consumption information given on the food intake records was used for each subject.

The Cornell Medical Index Health Questionnaire for Men was given to each subject. For this portion of the larger study self-reported weight was obtained from the questionnaire for each participant.

DATA ANALYSIS

Coding Food Records

Each subject's set of completed food records was hand coded for computer analysis. In some cases fewer than five consecutive records were obtained. These were included in data analysis and were averaged over the number of days available for study. However, subjects from whom fewer than three consecutive days of food records were obtained were excluded from the analysis.

The coding manual used was that resulting from the 1977-78 Nationwide Food Consumption Survey which converts common household units of measure into gram-weights (37). A specific code number or set of code numbers was used for each food and beverage item recorded by the subjects. Each code number, made up of seven digits, was marked adjacent to the food item it represented. In the case that an item such as a casserole, not listed in the code book, required a series of code numbers the numbers were continued at the bottom of the food record form. Each food code was followed by the amount of the item recorded in grams. For example, one cup of whole milk was recorded as 111-1100; 244.

Training Coders

In the fall of 1981 two coders were hired on the basis of their abilities to accurately and consistently code a set of sample food intake records. Both coders were students from the Department of Human Nutrition and Foods at Virginia Tech. The coders were trained and worked with the food records to code each food and beverage item per subject per day of study. The entire set of food records for an individual was coded by one person to keep a high level of consistency within each subject. However, in the event that a coder could not complete a subject's records the coding was completed by another coder.

Each coder was given a set of guidelines for coding the data (Appendix D) with instruction on the use of the code manual. The entire coding process was discussed with the coders, but they were not given detailed information concerning the objectives of the study or of the specific variables in which the researchers were interested. This was done in an effort to control for any biases that could have entered into the study in the coding.

Coders were informed of the importance of accurately and consistently coding data. They were instructed as to the amount of time and effort involved with the coding

process before either had begun to work. Weekly meetings were held to discuss problems and questions and to decide on solutions to them. Coders were encouraged to bring any and all comments or questions to the meetings. Coders were also encouraged to discuss between themselves which codes had been used for certain items and where, in the code manual, certain food items could be found. Coders were instructed to keep file cards on any and all recipes used for food items not found in the code manual. In some cases coders wrote these recipes or ingredient lists on the food record sheets. This was done at the point where they dissected the food item and listed the codes for uncommon or combination items. Coders were asked to use recipes for items not found in the code manual from common, widely used cookbooks such as: Joy of Cooking (38) or Betty Crocker Cookbook (39) whenever possible. A food dictionary (40) was provided which listed many foods and beverages and the ingredients they contained.

Of particular importance to the coders were the food items listed in the code manual as, "Not Further Specified," (NFS) and the column for each food item headed, "Serving not Specified." In the case that a subject failed to record either the type or amount of an item consumed or both, coders used foods and amounts under these labels to represent what he ate. These labeled items allowed for a

greater degree of consistency between the coders. For example, if a subject simply recorded milk and did not record the type or amount consumed the coders used the following code: 111-0000; 244.

One coder dropped out of the study before all the food records had been coded. In the interest of time additional coders were required to help code the remaining records. The primary researcher for this study began coding as did two other graduate students. The new coders went through the same training process as previously mentioned. In an effort to keep the data as consistent as possible the primary researcher checked through the records completed by the two new coders. All coders initialed their completed food records so that any noticeable discrepencies in coding could be discussed with them and resolved.

ALCOHOL CONSUMPTION

Data for consumption of alcohol was obtained from the food records and hand calculated and reported as grams of absolute alcohol for averaged daily intake for each subject per study period. The alcohol intake for each subject was based on the reported consumption on the food intake records. For all alcoholic beverages other than beer and related products (e.g. ale, malt, and light beer), grams of absolute alcohol were calculated

per drink consumed as reported by Bowes and Church (41). Because the percentage alcohol by weight in beer products tends to vary across the country and from brewery to brewery, the investigators used average percentage by weight values obtained from the U.S. Brewers Association, Inc. (42).

	Product		Alcohol Content (percent by weight)
Beers:	high beer, ale, malt	-	4.3
	premium beer	-	3.6
	light beer	-	3.0
Wine:		-	11.0

Cooking with alcoholic beverages was common practice among some subjects. Although alcohol tends to evaporate during cooking, researchers treated any alcohol used in cooking foods the same as alcoholic beverages consumed by drinking.

COMPUTER PROGRAM

Running Axelbo

The Axelbo nutrient evaluation program, developed by Samuel P. Bowen for Julein Axelson and Phyllis E. Bowen, was used for this study. "The Axelbo program is a software package which allows nutrition researchers to input food codes for the USDA food tape and have these codes

translated into nutrients present in the diet of up to 10 subjects for 7 days each and with up to 50 different items per day. The program is constructed to take advantage of the interactive terminal system known as CMS on the computer (43)."

A set of coded food records for each subject was typed into the computer, keeping each reported day of the study period separated from the other days. This was done to make it possible for analysis of either mean intakes over the entire study period or individual daily analysis during the study period. Dietary data were processed through the program in groups of 10 with 5 days of data for each subject.

Axelbo Output

The output of each lot of data processed was divided into four parts. The first part contained tables of each food item and its nutrient breakdown. The tables were divided by subject and by day. Listed in each table were the food item codes, abbreviated item descriptions and the amounts of each nutrient contained in each item. The second part contained the daily totals of each nutrient per individual study participant. It also gave the mean, standard deviation, and coefficient of variation for each. The third and fourth parts of the output were designed to be used as input in other computer programs such as in

SAS, Statistical Analysis System (44). The third part again listed the matched food codes for each food item and listed the nutrients for each in tabular form, but in a different form. The fourth part was a repeat of the daily nutrient values per individual which was also in a different form than before.

The first part of the computer program output was used as a check to determine whether or not coded food items matched the tape. Mismatches were corrected and the corrected values became part of the final data set.

Food items were selected, hand calculated for nutrients using Composition of Foods, Agriculture Handbook No. 8 (1-6) revised 1978-80 (45), and compared to those values run through the USDA tape to assure the validity of the Axelbo nutrient evaluation program.

Inquiries for further information on the use of the Axelbo nutrient evaluation program may be directed to Phyllis E. Bowen (46).

STATISTICAL ANALYSES

Mean values with standard deviations were calculated for alcohol and the selected nutrients for both the total sample and for each group of alcohol consumers and non drinkers. The Statistical Analysis System (SAS) (44) was used to determine correlations and regressions.

Chapter IV

Results and Discussion

POPULATION DESCRIPTION

A total of 171 free living male subjects, aged 18-56 years, were included in the analysis procedures. Subjects who reported incomplete data, such as fewer than three days of recorded food/beverage intake, were excluded from the sample. No preference was given to any racial/ethnic groups, however the majority of subjects were white. Because few subjects represented minorities all discussion of the study results and comparisons to previous research were based on data reported for white males.

Participating subjects complied with the instructions and guidelines of the study and consumed their normal, daily, free choice diets. The fact that subjects were volunteers who were aware that this study was concerned with environmental factors affecting health suggests that each would be willing to give an accurate account of his usual habits and consumption.

The mean age and body mass for all study participants was 26±8.1 years and 75±10 kg respectively. (Data is presented in Appendix E for age, weight, alcohol consumption, and intake of selected nutrients per individual.) The

mean age was low because the majority of subjects were recruited from the students attending Virginia Tech. The mean body mass for age of the participants was in close agreement with those reported by the Health and Nutrition Examination Survey (HANES II) 1971-1974 (47). The HANES II report indicated that white males between the ages of 18 and 74 years averaged 78.2 kg. Comparing the mean weight for mean age, the HANES II age group 18 through 34 weighed 77.8 kg which was similar to that reported for 25 year olds in the present study. Data from the HANES II report was used to calculate derived mean values for the age groups paralleling the ages of subjects in this study. These groups were 18-19, 20-24, and 25-34 year olds for kilocalories, protein, and the selected micronutrients. For mean body weight the age groups were 18-24 and 25-34 year olds. These derived mean values closely approximated the values for 25-34 year old males (HANES II). In addition the mean age for subjects in this study was 26 years. Therefore the 25-34 year old group from HANES was used for purposes of comparison.

Data for consumption of energy nutrients expressed as mean daily kilocalories, as kilocalories per kgBw, and as percentage of mean daily kilocalories is shown in Table 1. The data reported for the HANES II group compared with data from these subjects had slightly lower mean daily kilocalorie intake and fewer kilocalories per kilogram body

Table 1

Comparison of Mean Daily Energy Intake Values for Male Subjects (age 18 to 56) in this Study with Similar Subjects (age 25 to 34) from the HANES' Reports, Expressed as Mean Value, per Kilogram Body Weight, and as Percentage of Mean Daily Kilocalories

	This Study, N=171			HANES, N=672		
	Mean	Per KgBW	% Kcal	Mean	Per KgBW	% Kcal
Energy, kcal	2858 ± 700	39 ± 9.2	——	2765	34.5	——
Alcohol, g	16 ± 20.9	0.2 ± 0.3	3.8	——	——	——
Protein, g	100 ± 26.8	1.3 ± 0.4	14.0	109.5	1.4	15.8
Fat, g	120 ± 36.7	1.6 ± 0.5	37.7	——	——	——
Carbohydrate, g	326 ± 92.2	4.4 ± 1.3	45.6	——	——	——

weight although mean body weight was greater. One explanation for this could be that a large number of subjects in the present study were below age 25 and typically consumed more kilocalories. As reflected in the HANES II report (47), the mean number of kilocalories consumed daily by 18 and 19 year olds was 3,018; decreased to 2,944 in the 20 to 24 year group; and further decreased to 2,765 kilocalories, in the 25-34 year olds. Another possible reason for the differences could be that alcoholic beverages were not reported by respondents in the HANES II report.

A third possible reason for the lower body weight accompanied by a higher mean daily caloric intake of this study as compared to the 25-34 year old group of the HANES II report may be the result of greater levels of physical activity among the younger members of the present study.

Of the energy nutrients, protein intake reported by HANES II (Table 1) was higher than that of this study. However, allowing for the higher body weights of the HANES II population, ages 25-34, the grams of protein per kgBw of both groups were essentially the same.

The close agreement with nutrient data collected for men of similar ages indicated that the ability of the men in this study to recall and record foods and beverages consumed compared favorably with the HANES II report for which a 24 hour recall was conducted by trained interviewers.

ALCOHOL CONSUMPTION

Sample Size

A total of 171 subjects were included in the analysis procedures. Of this number 111 were alcohol consumers who reported drinking some form of alcoholic beverage within the five day study period recorded. The remaining 60 subjects reported no alcohol consumption. This does not mean that the 60 were abstainers. Some of them may have been infrequent drinkers, binge drinkers, or week-end drinkers who were not drinking during the particular time they participated in this study. Two subjects who reported consuming alcoholic beverages were excluded from other parts of the analysis because the only data for them was total alcohol consumed and body weight.

Mean Consumption

Mean daily alcohol consumption (Table 2) for all subjects was 16±20.9 g absolute alcohol. When considering all drinkers, the mean daily consumption was 24±21.9 g. For example, 24 g absolute alcohol would be found in approximately 2 12-oz. beers, 2 4-oz. glasses of wine, or in 2 oz. whiskey.

Mean daily alcohol consumption by group (Table 2) for high, moderate, and low drinkers was 43±22.6 g, 16±4.7 g, and 4.7±2.1 g respectively. The high group contained 43

Table 2

Mean Daily Energy Intake, Alcohol Intake and Range, and the Percentage Contribution of Each Energy Nutrient

Category of Subjects	n	Energy	Alcohol Intake	Range of Alcohol Intake	Percentage of Kilocalories			
					Protein	Fat	Carbo-hydrate	Alcohol
		kcal	g	g				
Low	88	2794±691*	1.5± 2.5*	0.0- 8.8	14.3	39.3	47.5	0.4
Drinkers	28	2918±507	4.7± 2.1	1.1- 8.8	15.1	39.0	45.6	1.1
Non Drinkers	60	2735±759	0.0	0.0- 0.0	13.8	39.2	48.4	0.0
Moderate Drinkers	40	2918±716	16 ± 4.7	7.7- 29.3	14.2	37.5	45.5	3.7
High Drinkers	43	2935±707	43 ±22.6	20.0-114.0	13.2	35.1	41.9	10.3
All Drinkers	111	2925±660	24 ±21.9	1.1-114.0	14.0	36.9	44.1	5.7
All Subjects	171	2858±700	16 ±20.9	0.0-114.0	14.0	37.7	45.6	3.8

*Mean ± Standard Deviation

subjects, the moderate group was comprised of 40 subjects and there were 28 drinkers in the low group. The remaining 60 subjects in the low group reported no alcohol consumption. The mean daily alcohol consumption of subjects in this study was 16±20.9 g which was in close agreement with that reported in the Tecumseh, Michigan study, 15±32 g (48).

The mean consumption of subjects in the high group, in which subjects consumed an average of more than 20 g alcohol per day, was 43±22.6 g. The mean alcohol consumption of the high group was lower than that reported by Jones et al. (9) who trichotomized drinkers into heavy (50+ g), moderate (25 to 49 g), and low (1 to 24 g) consumers. Hasunen et al. (11) used 30+ g per day for their heavy drinkers in which the average alcohol consumption, 47.8 g per day, was similar to that of this study.

Alcohol Kilocalories

The percentages of total kilocalories contributed by alcohol for the three groups of drinkers in the present study (Table 2) were lower than those reported by Jones et al. (9). Jones reported that heavy drinkers consumed 20.5 percent of total kilocalories from alcohol, moderate drinkers consumed 12.8 percent, and low drinkers 5.0 percent. Hartroft (23) reported that moderate, social

drinkers consumed between 5 and 10 percent of their mean daily kilocalorie intake as alcohol. The Hartroft estimate was lower than that of the moderate group in the Jones study, but corresponded favorably to that of the high group (10.2 percent) in this study. The moderate group in this study (3.7 percent) was lower than the Hartroft estimate and was lower than the low group percentage reported by Jones.

From the relatively low percentage of total kilocalories attributed to alcohol in the three groups of drinkers in the present study it appears that the sample studied may have been slightly below expected values for alcohol consumption. A possible explanation may be that the type of person who would volunteer for a study related to health would not be a typically heavy drinker. Some subjects may have altered their usual alcohol consumption, especially beer, during the course of the study to ease the burden of increased urine production. Another possibility was that some participants, being involved with the university may have had lifestyles which were orderly and well disciplined that did not lend themselves to excessive alcohol consumption.

In the United States drinking in any amount has been reported to peak in the 21 to 34 age group and to decline steadily for each older age group of men. Furthermore

for men, heavier drinking is highest in the 18 to 20 age group (2). The HANES II report also stated that the highest proportion of "heavier" drinkers occurred among men 18-20 and 35-39 years, while the lowest proportion was in the oldest age groups. The highest proportions of drinkers were found among those aged 21-24 years, but "heavier" drinking among men was more frequent in the 18-20 year group than in the 21-24 year group (49). Although alcohol consumption for subjects in this study was relatively low, the age range of high consumers was consistent with the findings reported in the HANES II report (47).

Energy Consumption and Alcohol

A focus of this study was to determine whether or not kilocalories from alcohol in the diet had an additive effect to existing mean daily kilocalorie consumption or if kilocalories from alcohol displaced some portion of the kilocalories derived from the traditional energy nutrients. Because alcohol contributes 7 kcal/g (21) and has been found to contribute approximately 10 percent of total kilocalories for drinkers, it has been considered to be an important source of energy for people who consume alcohol (23).

Kilocalories from alcohol would be additive if the amounts of protein, fat, and carbohydrate were not changed. The kilocalories from these three traditional energy

yielding nutrients would be similar between drinkers and nondrinkers if alcohol was excluded from the total kilocalorie consumption of the drinkers. Kilocalories from alcohol would be displacement if total kilocalories were the same for drinkers and nondrinkers when alcohol was included. If alcohol were excluded the kilocalories from protein, fat, and carbohydrate would be dissimilar. Alcohol consumers would be ingesting either more total kilocalories than nondrinkers (additive) or the proportions of kilocalories from one or all of the traditional sources of energy would be reduced (displacement).

Mean kilocalorie consumption is displayed in Table 2 for each group of subjects, as well as mean daily alcohol intake, and the percentage of mean daily kilocalories contributed by alcohol, protein, fat, and carbohydrate. The mean daily nutrient intake (Table 3) was varied among the groups. The nondrinkers ate the least protein and the high drinkers ate the least fat and carbohydrate.

However, although the percentages of the traditional energy sources were decreased in the present study the results do not necessarily imply that the kilocalories from alcohol were additive. Kilocalories from alcohol could be additive if the grams of protein, fat, and carbohydrate consumed remained the same. For example, total mean kilocalories for the moderate and low drinkers in

Table 3

Mean Daily Nutrient Intake of 171 Male Subjects Age 18 to 56 Classified as High, Moderate, and Low Consumers of Alcohol and Non Drinkers

Nutrient	Total N=171	Alcohol Drinkers			Non Drinkers N=60
		High N=43	Moderate N=40	Low N=28	
Energy, kcal	2858 ± 700	2935 ± 707	2918 ± 716	2918 ± 507	2735 ± 759
Protein, g	99.9 ± 26.8	97.0 ± 27.5	103.5 ± 27.5	110.4 ± 24.5	94.7 ± 27.4
Fat, g	119.8 ± 36.7	114.3 ± 34.0	121.7 ± 35.7	126.5 ± 25.7	119.4 ± 43.3
Carbohydrate, g	325.7 ± 92.2	307.6 ± 68.3	331.9 ± 103.2	332.8 ± 76.6	331.1 ± 105.5
Calcium, mg	1180 ± 479	984 ± 350	1307 ± 548	1326 ± 456	1169 ± 480
Iron, mg	17.4 ± 5.4	15.7 ± 4.8	17.9 ± 5.0	18.9 ± 6.3	17.4 ± 5.6
Magnesium, mg	395 ± 116	408 ± 110	415 ± 120	403 ± 108	368 ± 120
Phosphorus, mg	1777 ± 499	1748 ± 440	1912 ± 579	1896 ± 403	1653 ± 499
Vitamin A, I.U.	6338 ±3994	5054 ±3449	6452 ±3275	7830 ±4689	6485 ±4247
Thiamin, mg	1.77± 0.61	1.50± 0.53	1.92± 0.59	1.92± 0.57	1.80± 0.63
Riboflavin, mg	2.48± 0.84	2.22± 0.69	2.72± 0.87	2.66± 0.81	2.42± 0.89
Niacin, mg	25.5 ± 8.4	27.9 ± 8.5	26.2 ± 6.8	27.4 ± 9.3	22.5 ± 8.2
Vitamin B_6, mg	2.06± 0.76	2.20± 0.75	2.12± 0.69	2.24± 0.86	1.85± 0.74
Vitamin B_{12}, mcg	5.88± 4.67	6.24± 7.66	6.51± 3.92	5.80± 1.99	5.53± 2.89
Vitamin C, mg	134 ± 81	116 ± 64	144 ± 90	131 ± 70	142 ± 90
Alcohol, g	15.56± 20.91	43.06± 22.55	15.61± 4.73	4.65± 2.10	0.00± 0.00

this study were the same, but the percentages were not the same nor were the grams of protein, fat, and carbohydrate the same. No conclusions can be drawn from these data because the individual subjects were not asked to report their daily food intake with and without alcohol.

The nondrinkers in this study weighed less and consumed fewer kilocalories than did the alcohol consumers (Table 4). The mean total kilocalorie intake for drinkers in the low drinkers and for moderate drinkers was similar, but the mean body weight of the low drinkers was slightly higher. The high drinkers consumed the greatest number of kilocalories, but had a lower mean weight than either of the other two drinking groups. However, these differences among the groups were slight.

Correlation of mean daily alcohol intake with mean daily energy intake from protein, fat, and carbohydrate for all subjects is displayed in Table 5. Energy value was significantly correlated with alcohol consumption (Tables 5, 6). As alcohol consumption was increased, energy consumption also increased. None of the traditional energy nutrients was significantly associated with alcohol intake.

For drinkers only, the mean energy intake was significantly ($p < 0.01$) associated with increased alcohol consumption (Table 6). The energy nutrients were not correlated with alcohol consumption.

Table 4

Mean Total Daily Energy Intake; Mean Total Energy Expressed as Units per Kilogram Body Weight; and Mean Body Weight of 171 Male Subjects Age 18 to 56; Classified as High, Moderate, and Low-Including Non Drinkers-Consumers of Alcohol

Category of Subjects	N	Energy Intake*		Body Weight*
		kcal	kcal/KgBW	Kg
Low	88	2794 ± 691	38.0 ± 9.9	74.6 ± 10.6
Drinkers	28	2918 ± 507	38.6 ± 8.8	77.6 ± 12.6
Non Drinkers	60	2735 ± 759	37.7 ± 10	73.2 ± 9.3
Moderate Drinkers	40	2918 ± 716	38.4 ± 8.9	76.4 ± 9.8
High Drinkers	43	2935 ± 707	39.8 ± 8.0	74.2 ± 8.9
All Drinkers	111	2925 ± 660	39.0 ± 8.5	75.8 ± 10.3
Total	171	2858 ± 700	38.5 ± 9.2	74.9 ± 10.0

*Mean ± Standard Deviation

Table 5

Correlation of Mean Total Daily Alcohol with Mean Total Daily Nutrient Intake for 171 Male Subjects Age 18 to 56 (two sided test)

Variable	Mean	S.D.	r
Alcohol, g	16	20.9	——
Energy, kcal	2858	700.0	0.24**
Protein, g	100	26.8	0.08
Fat, g	120	36.7	0.03
Carbohydrate, g	326	92.2	0.00
Calcium, mg	1180	478.7	-0.16*
Iron, mg	17	5.4	-0.10
Magnesium, mg	395	116.5	0.25***
Phosphorus, mg	1777	499.0	0.14
Vitamin A, I.U.	6337	3993.5	-0.15
Thiamin, mg	2	0.6	-0.16*
Riboflavin, mg	2	0.8	-0.04
Niacin, mg	25	8.4	0.33***
Vitamin B6, mg	2	0.8	0.23**
Vitamin B12, mcg	6	4.7	-0.02
Vitamin C, mg	134	81.5	-0.08

*p < 0.05
**p < 0.01
***p < 0.001

Table 6

Correlation of Mean Total Daily Alcohol with Mean Total Daily Nutrient Intake for 111 Male Drinkers Age 18 to 56 (two sided test)

Variable	Mean	S.D.	r
Alcohol, g	23.8	21.7	——
Energy, kcal	2925	659.9	0.26**
Protein, g	102.7	26.2	0.00
Fat, g	120.0	32.8	0.04
Carbohydrate, g	322.7	84.5	0.03
Calcium, mg	1186.5	480.2	-0.25**
Iron, mg	17.3	5.4	-0.14
Magnesium, mg	409.4	112.5	0.24**
Phosphorus, mg	1844.2	488.3	0.06
Vitamin A, I.U.	6258.0	3866.9	-0.21*
Thiamin, mg	1.7	0.6	-0.22*
Riboflavin, mg	2.5	0.8	-0.11
Niacin, mg	27.2	8.1	0.29**
Vitamin B6, mg	2.2	0.7	0.18
Vitamin B12, mg	6.2	5.4	-0.10
Vitamin C, mg	129.6	76.3	-0.07

*$p < 0.05$
**$p < 0.01$

Correlations of alcohol intake per kilogram body weight with mean total energy intake from protein, fat, and carbohydrate per kilogram body weight (Table 7) were calculated for all subjects. None of the traditional energy nutrients were significantly associated although there may have been some importance to the sign of the correlation values.

Energy intake for all drinkers per kilogram body weight was positively correlated with alcohol intake per kilogram body weight ($p < 0.05$) as shown in Table 8. These findings indicate that as the amount of alcohol consumed was increased the number of kilocalories consumed was also increased.

Micronutrients

The nutrients calcium and thiamin ($p < 0.05$), vitamin B6 ($p < 0.01$), and magnesium and niacin ($p < 0.001$) were significantly correlated with alcohol intake for all subjects in this study (Table 5). Vitamin A (Table 6) was significantly correlated ($p < 0.05$) for the 111 subjects who were drinkers while vitamin B6 (Table 5) was significantly correlated ($p < 0.01$) for all subjects only.

From these data it seems that the consumption of alcoholic beverages significantly ($p < 0.05$) increases kilocalorie intake, however at a cost of decreased intake

Table 7

Correlation of Alcohol Intake Expressed as Grams per Kilogram Body Weight with Nutrient Intake per Kilogram Body Weight of 171 Males Age 18 to 56 (two sided test)

Variable	Mean	Std. Dev.	r
Alcohol g/kg	0.2	0.3	——
Energy kcal/kg	38.5	9.2	0.16*
Protein g/kg	1.3	0.4	0.02
Fat g/kg	1.6	0.5	-0.06
Carbohydrate g/kg	4.4	1.3	-0.06
Calcium mg/kg	16.1	7.0	-0.19*
Iron mg/kg	0.2	0.1	-0.13
Magnesium mg/kg	5.4	1.7	0.20**
Phosphorus mg/kg	24.1	7.0	0.08
Vitamin A IU/kg	86.1	55.9	-0.17*
Thiamin mg/kg	tr[a]	0.0	-0.20**
Riboflavin mg/kg	tr[a]	0.0	-0.09
Niacin mg/kg	0.3	0.1	0.29***
Vitamin B6 mg/kg	tr[a]	0.0	0.18*
Vitamin B12 mg/kg	0.1	0.1	0.01
Vitamin C mg/kg	1.8	1.1	-0.11

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$
[a]Values denoted as tr (trace amounts) were too small when calculated to have meaning

Table 8

Correlations of Alcohol Intake Expressed as Grams per Kilogram Body Weight with Nutrient Intake per Kilogram Body Weight of 111 Male Drinkers Age 18 to 56 (two sided test)

Variable	Mean	Std. Dev.	r
Alcohol g/kg	0.3	0.3	——
Energy kcal/kg	39.0	8.5	0.20*
Protein g/kg	1.4	0.3	-0.04
Fat g/kg	1.6	0.4	-0.05
Carbohydrate g/kg	4.3	1.2	0.00
Calcium mg/kg	15.9	6.9	-0.27*
Iron mg/kg	0.2	0.1	-0.15
Magnesium mg/kg	5.5	1.6	0.22*
Phosphorus mg/kg	24.7	6.8	0.02
Vitamin A IU/kg	83.8	53.0	-0.21*
Thiamin mg/kg	tr[a]	0.0	-0.25*
Riboflavin mg/kg	tr[a]	0.0	-0.14
Niacin mg/kg	0.4	0.1	0.26*
Vitamin B6 mg/kg	tr[a]	0.0	0.15
Vitamin B12 mcg/kg	0.1	0.1	-0.05
Vitamin C mg/kg	1.7	1.0	-0.08

*$p < 0.05$

[a]Values denoted as tr (trace amounts) were too small when calculated to have meaning

of calcium, vitamin A, and thiamin. For calcium the significance was greater ($p < 0.01$).

Regression analysis (Table 9) also indicated a relationship between intake of alcohol and consumption of the nutrients calcium, vitamin A, and thiamin ($p < 0.05$), and magnesium, niacin, and vitamin B6 ($p < 0.01$) for all subjects. For drinkers (Table 10) regression analysis indicated a significant relationship ($p < 0.01$) for calcium, magnesium, and niacin with alcohol intake.

Regression Analysis

The effect of mean daily alcohol intake on mean daily energy intake across the total sample (Table 8) was similar to that when only drinkers (Table 9) were studied. The effect of mean daily alcohol intake on mean daily energy value would be expected to be higher when considering only the drinkers (Table 9) in the sample. By adding 66 more people to the sample, nondrinkers added to the drinkers (Table 9), the slope did not change although the sample size was larger.

The F values in Tables 9 and 10 indicate a significant relationship between the intake of some nutrients and the intake of alcohol. However, all values for R-square are small and the significance of the relationship is a result of the large sample size.

Table 9

Regression Analysis for Mean Total Daily Intake of Nutrients for 171 Males Age 18 to 56 with Mean Daily Alcohol as the Independent Variable

Variable	R-Square	Slope	F
Energy, kcal	0.06	8.3	10.06**
Protein, g	0.01	0.1	1.10
Fat, g	0.00	0.1	0.12
Carbohydrate, g	0.00	0.0	0.00
Calcium, mg	0.03	-3.8	4.30*
Iron, mg	0.01	0.0	1.61
Magnesium, mg	0.06	1.5	11.39**
Phosphorus, mg	0.02	3.6	3.55
Vitamin A, I.U.	0.02	-29.8	3.86*
Thiamin, mg	0.03	0.0	4.59*
Riboflavin, mg	0.00	0.0	0.32
Niacin, mg	0.11	0.1	20.89**
Vitamin B6, mg	0.05	0.0	9.72**
Vitamin B12, mcg	0.00	0.0	0.06
Vitamin C, mg	0.01	-0.3	1.15

*$p < 0.05$
**$p < 0.01$

Table 10

Regression Analysis for Mean Total Daily Intake of Nutrients for 111 Male Drinkers Age 18 to 56 with Mean Daily Alcohol as the Independent Variable

Variable	R-Square	Slope	F
Energy, kcal	0.07	8.3	8.01**
Protein, g	0.00	0.0	0.00
Fat, g	0.00	0.1	0.15
Carbohydrate, g	0.00	0.1	0.13
Calcium, mg	0.06	-5.8	7.17**
Iron, mg	0.02	0.0	2.12
Magnesium, mg	0.06	1.3	6.93**
Phosphorus, mg	0.00	1.5	0.45
Vitamin A, I.U.	0.04	-38.7	4.89*
Thiamin, mg	0.05	0.0	5.42*
Riboflavin, mg	0.01	0.0	1.38
Niacin, mg	0.08	0.1	9.86**
Vitamin B6, mg	0.03	0.0	3.66
Vitamin B12, mcg	0.01	0.0	1.06
Vitamin C, mg	0.00	-0.3	0.49

*$p < 0.05$
**$p < 0.01$

Alcohol Consumption and Energy per KgBW

Because the importance of body size cannot be dismissed, regression analysis was completed to examine the association between alcohol intake and energy intake per kgBW (Table 11) for all subjects. Considering all drinkers (Table 12) the F value for the relationship between energy intake and alcohol intake, both based on a per kilogram body weight basis, was slightly higher than a similar F value for all subjects.

Regression analyses for relationship between alcohol and the nutrients considered, expressed as per kilogram body weight basis, were similar to those values expressed as mean daily intake. There was some significance indicated for relationship between alcohol intake and some nutrients, however the R-square values were low.

In retrospect, looking at these data and projecting for future sutdies consideration should be given to:

1) recruiting one group of subjects to serve as their own controls, i.e. two periods of free choice diet one with and one without drinking alcohol.
2) making an effort to narrow the age range of the subjects to not more than one decade.

Table 11

Regression Analysis for Nutrients as a Function of Body Weight for 171 Male Subjects with Alcohol Intake Expressed as Grams per Kilogram Body Weight as the Independent Variable

Variable	R-Square	Slope	F
Energy, kcal/kg	0.03	5.6	4.39*
Protein, g/kg	0.00	0.0	0.08
Fat, g/kg	0.00	-0.1	0.53
Carbohydrate, g/kg	0.00	-0.3	0.53
Calcium, mg/kg	0.04	-5.0	6.27*
Iron, mg/kg	0.02	0.0	3.09
Magnesium, mg/kg	0.04	1.3	7.07*
Phosphorus, mg/kg	0.01	2.2	1.15
Vitamin A, I.U./kg	0.03	-35.4	4.79*
Thiamin, mg/kg	0.04	0.0	7.25*
Riboflavin, mg/kg	0.01	0.0	1.23
Niacin, mg/kg	0.08	0.1	15.02*
Vitamin B6, mg/kg	0.03	0.0	5.84*
Vitamin B12, mcg/kg	0.00	0.0	0.01
Vitamin C, mg/kg	0.01	-0.5	2.10

*$p < 0.05$

Table 12

Regression Analysis for Nutrients as a Function of Body Weight for 111 Male Drinkers with Alcohol Intake Expressed as Gram Per Kilogram Body Weight as the Independent Variable

Variable	R-Square	Slope	F
Energy, kcal/kg	0.04	6.3	4.49*
Protein, g/kg	0.00	-0.1	0.16
Fat, g/kg	0.00	-0.1	0.26
Carbohydrate, g/kg	0.00	0.0	0.00
Calcium, mg/kg	0.07	-6.8	8.22**
Iron, mg/kg	0.02	0.0	2.58
Magnesium, mg/kg	0.05	1.3	5.47*
Phosphorus, mg/kg	0.00	0.6	0.06
Vitamin A, I.U./kg	0.05	-42.1	5.23*
Thiamin, mg/kg	0.06	0.0	7.01**
Riboflavin, mg/kg	0.02	0.0	2.07
Niacin, mg/kg	0.07	0.11	8.05**
Vitamin B6, mg/kg	0.02	0.0	2.54*
Vitamin B12, mcg/kg	0.00	-0.0	0.29
Vitamin C, mg/kg	0.01	-0.3	0.71

*$p < 0.05$
**$p < 0.01$

3) recruiting middle aged subjects, who routinely ingest fewer kilocalories than younger ones, to measure the effects of alcohol consumption on nutrient intake.
4) provide instruction to subjects on recording dietary intake data which would distinguish between fluid ounce and ounce weight.

Chapter V

Summary and Conclusions

Alcohol consumption was assessed as to its effect on energy intake, including the three traditional energy nutrients protein, fat, and carbohydrate and other selected nutrients over a five day period. One hundred seventy-one men, including 60 nondrinkers participated in this study. Each participant kept food and beverage intake diary records with items recorded in common household measures. Each food item was hand coded and processed through the Axelbo computer program for nutrient analysis on the Virginia Tech computer. Mean daily intake values for energy and the nutrients protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and vitamin C were calculated and data were analyzed to determine correlation and regression.

The first objective of this study was:

> To measure the effects of alcohol consumption relative to body size on the consumption of the energy supplying nutrients, protein, fat, and carbohydrate.

It seems to have made little difference with these subjects whether the values were expressed as mean daily intake or on a per kilogram body weight basis.

The second objective was:

> To determine the relationship between the consumption of alcohol and of selected nutrients in the diet per se, and calculated to reflect body size (Calcium, Fe, Mg, Phos, Thia, Ribo, Niac, VA, etc.)

The expression of nutrient intake based on body size made no difference in the significance of results. There was a significant relationship between calcium, magnesium, vitamin A, thiamin, niacin, and vitamin B6 and alcohol intake for all subjects. These relationships were slightly more pronounced for all drinkers. The intakes of calcium and vitamin A were apparently lower for drinkers as indicated by the negative value for slope.

Although there appears to be a trend in the intake of alcohol and the consumption of some selected nutrients, it cannot be concluded for the population of this study that kilocalories from alcohol had an effect on nutrient intake. Because many of the subjects were younger than 25 years and their kilocalorie consumption was great, the kilocalories contributed by alcohol constituted only a

small portion of their mean daily kilocalories. The daily kilocalorie needs are great enough in young men that the kilocalories from alchol may be used up without affecting their intake of other nutrients.

BIBLIOGRAPHY

1. Roe DA. Alcohol and the Diet. Westport: AVI Publishing Company, Inc., 1979.

2. Third Special Report to the U.S. Congress on Alcohol and Health. U.S. Dept. Health Educ. Wel. Rockville, M.D., 1978.

3. Fourth Special Report to the U.S. Congress on Alcohol and Health. U.S. Dept. Health Hum. Serv. Rockville, M.D., 1981.

4. Bebb HT, Harold MS, Houser B, Witchi JC, Littell AS, Fuller, RK. Calorie and nutrient contribution of alcoholic beverages to the usual diets of 155 adults. Am J Clin Nutr 1971; 24:1042-52.

5. Yano K, Rhoads GG, Kagan A. Coffee, alcohol, and risk of conorary heart disease among Japanese men living in Hawaii. N Eng J Med 1977; 297: 405-9.

6. Hennekens CH, Willett W, Rosner B, Cole DS, Mayrent SL. Effects of beer, wine and liquor in coronary deaths. JAMA 1979; 242:1973-74.

7. LaPorte RE, Cresanta JL, Juller LH. The relationship of alcohol consumption to atherosclerotic heart disease. Prev Med 1980; 9:22-40.

8. Garcia-Palmieri MR, Sorlie P, Tillotson J, Costas R, Codero E, Rodriquez M. Relationship of dietary intake to subsequent coronary heart disease incidence: the Puerto Rico Heart Health Program. Am J Clin Nutr 1980; 33:1818-27.

9. Jones BR, Barrett-Connor E, Criqui MH, Holdbrook MJ. A community study of calorie and nutrient intake in drinkers and nondrinkers of alcohol. Am J Clin Nutr 1982; 35:135-39.

10. Tofler OB, Saker BM, Rollo KA, Burvill MJ, Stenhouse N. Electrocardiogram of the social drinker in Perth, Western Australia. Br Heart J 1969; 31: 306-13.

11. Hasunen K, Pekkarinen M, Nuutinen O. Alcohol consumption and dietary intake of Finnish men. Nutr Metab 1976; 20:176 (Abst.).

12. Mulford HA. Drinking and deviant drinking, U.S.A., 1963. Quart J Studies Alc. 1964; 25:634-51.

13. Riley JW, Marden CF. The social pattern of alcoholic drinking. Quart J Studies Alc. 1947; 8:265.

14. Cahalan D, Cisin IH. American drinking practices: summary of findings from a national probability sample: I. Extent of drinking by population subgroups. Quart J Studies Alc. 1968; 29:130-51.

15. Second Special Report to the U.S. Congress on Alcohol and Health. U.S. Dept. Health Educ Wel. Rockville, M.D., 1974.

16. Barnes GM, Russell M. Drinking patterns in Western New York State. Quart J Studies Alc. 1978; 39: 1148-57.

17. Harford TC, Mills GS. Age-related trends in alcohol consumption. J Studies Alc. 1978; 39:207-10.

18. Cahalan D, Cisin IH, Corssley HM. American drinking practices: summary of findings from a national probability sample: II. measurement of massed versus spaced drinking. Quart J Studies Alc. 1967; 29:642-56.

19. Kopplin DA, Greenfield TK, Wong HZ. Changing patterns of substance use on campus: a four-year follow-up study. Internat J Addict. 1977; 12:73-94.

20. Nationwide Food Consumption Survey 1977-78, Preliminary Report No. 2: Food and nutrient intakes of individuals in 1 day in the United States, spring 1977. U.S. Dept. Agr. Washington, D.C. 1978.

21. Recommended Dietary Allowances (9th ed.). National Research Council. Washington: National Academy of Sciences, 1980.

22. Page L, Friend B. The Changing United States Diet. BioSci. 28:192-97, 1978.

23. Hartroft WS. Alcohol, metabolism, and liver disease. Introductory remarks. Fed Proc. 1967; 26:1432-35.

24. Hasunen K, Pekkarinen M, Nuutinen O. Alcohol consumption and dietary intake of Finnish men. Nutr Metab. 1977; 21 (suppl. 1):132-33.

25. Barboriak JJ, Rooney CB, Leitschuh TH, Anderson AJ. Alcohol and nutrient intake of elderly men. J Am Dietet Assoc. 1978; 72:493-95.

26. Pernanen K. Validity of survey data on alcohol use. In: Gibbins RJ, Israel Y, Kalant H, Popham RE, Schmidt W, Smart RG, ed. Research Advances in Alcohol and Drugs Problems. Vol. 1. New York: John Wiley and Sons, 1974.

27. Patterns of alcohol consumption. Alc Health Res World; Spring:2-5, 1981.

28. Blair E, Sudman S, Bradburn NM, Stocking C. How to ask questions about drinking and sex: response effects in measuring consumer behavior. J Mkt Res; 14:316-21, 1977.

29. Young CM, Hagan GC, Tucker RE, Foster WD. A comparison of dietary study methods. 2. Dietary history versus seven day record versus 24 hour recall. J Am Dietet Assoc. 28:218-22, 1952.

30. Marr JW. Individual dietary surveys: purposes and methods. World Rev Nutr Dietet. 13:105, 1971.

31. Gersovity M, Madden JP, Smiciklas-Wright H. Validity of the 24-hr. dietary recall and seven-day record for group comparisons. J Am Dietet Assoc. 73: 48-55, 1978.

32. Beaton GH, Milner J, Corey P, McGuire V, Cousins M, Stewart E, deRamos M, Hewitt D, Grambsch PV, Kassim N, Little JA. Sources of variance in 24-hour dietary recall data: implications for nutrition study design and interpretation. Am J Clin Nutr; 32:2546-59, 1979.

33. Garn SM, Larkin FA, Cole P. The real problem with one day records. Am J Clin Nutr. 31:1114, 1978.

34. Adelson S F. Some problems in collecting dietary data from individuals. J Am Dietet Assoc. 36: 453-61, 1959.

35. Young CM, Chalmers FW, Church HN, Clayton MM, Murphy GC, Tucker RE. Subjects' estimation of food intake and calculated nutritive value of the diet. J Am Dietet Assoc. 29:1216-20, 1953.

36. Leverton RM, Marsh AG. Comparison of food intakes for weekdays and for Saturday and Sunday. J H Econ. 31:111-114, 1939.

37. Manual of Food Codes and Conversions of Measures to Gram-weight for Use with Individual Food Intake Data from 1977-78 Nationwide Food Consumption Survey. U.S. Dept. Agr. Washington, D.C., 1979.

38. Rombauer IS, Becker MR. Joy of Cooking. Indianapolis: The Bobbs-Merrill Company, Inc., 1978.

39. Betty Crocker's Cookbook. Racine: Western Publishing Company, Inc., 1978.

40. Simon AL, Howe. R. Dictionary of Gastronomy. Woodstock: The Overlook Press, 1978.

41. Bowes' and Church's Food Values of Portions Commonly Used (11th ed.). Philadelphia: Lippincott, 1969.

42. Technical Department Report, 1980. Technical Dept., U.S. Brewers Assoc., Inc., Washington, D.C., 1980.

43. Bowen SP. Instructions for running Axelbo. 1982.

44. SAS User's Guide, 1979 Edition. Statistical Analysis System, version 79.6. Cary: SAS Institute Inc., 1979.

45. Adams CF. Nutritive Value of American Foods in Common Units. Agriculture Handbook No. 456. Washington: Agr Res Serv., US Dept Agr., 1975.

46. Phyllis E. Bowen, College of Associated Health Professions, Department of Nutrition and Medical Dietetics, University of Illinois at Chicago, 808 South Wood Street, Chicago, Illinois 60612.

47. Weight and Height of Adults, 18-74 Years of Age: United States, 1971-74 (HANES II). U. S. Dept Health Educ Wel, National Center for Health Statistics. Hyattsville, MD, 1979.

48. Harburg E, Ozgoren F, Hawthorne V, Schock A. Community norms of alcohol usage and blood pressure: Tecumseh, Michigan. Am J Pub Health. 70:813-20, 1980.

49. Dietary Intake Findings (HANES II). United States, 1971-1974. U. S. Dept Health Educ Wel, National Center for Health Statistics. Hyattsville, MD, 1977.

FOOD AND DRUG INTAKE RECORD DAY: Sat Sun Mon Tues Wed (Circle One) CODE#____/____/____

(Record starts when you get up in the morning. Add night-time snacks, drinks, drugs.)

Food Code (leave blank)	Time	Location	Description of Food & Beverages (include preparation)	Amount

Description of Drug Taken	Amount

Please answer these questions.*

1. Have you had any exposure to pesticides, solvents or other chemicals today?
   Yes No Don't know
2. Was today's intake different from your usual habits? Yes No Don't know
3. Did you engage in any unusually strenuous exercise today? Yes No Don't know
4. Are you on a special diet?
   Yes No Don't know

*If you answered Yes to any above please explain on back.

Did you remember to record everything?

Appendix B

PORTION SIZE ESTIMATION GUIDE

Schedule of Requirements for the Study

Saturday - Record all food eaten and drugs taken starting when you get up in morning Saturday. Include late-night and early morning snacks consumed before you retire Saturday night on Saturday's food and drug record.

Sunday - Record all food eaten and drugs taken starting when you get up in the morning Sunday. Again include late-night and early morning snacks consumed before you retire Sunday night on Sunday's food and drug record.

Monday - Begin to collect urine in bottles provided with the 2nd voiding of Monday. The 1st voiding when you get up in the morning should be discarded. If you did not sleep discard urine voided before 9 a.m. or before eating whichever event occurs earliest in your day. Collect all urine voided during Monday. Record all food eaten and drugs taken.

Tuesday - The 1st urine voiding should be collected in Monday's bottles since this represents urine produced while you were sleeping. Return bottles with urine to Refrigerator on 2nd floor of Wallace Hall (Call _____ if you have a problem) and pick up empty bottles for Tuesday. Collect urine for Tuesday from second voiding and continue to collect the rest of the day. Return Food and Drug Intake Records for Saturday, Sunday and Monday and pick up new Food and Drug Intake Forms.

Wednesday - The 1st voiding should be collected in Tuesday's bottles. Return bottles with urine to Refrigerator on 2nd floor of Wallace Hall and pick up empty bottles for Wednesday. Collect urine for Wednesday from second voiding and continue to collect the rest of the day. Return Food and Drug Intake Record for Tuesday and pick up new Food and Drug Intake Forms.

Thursday - The 1st voiding should be collected in Wednesday's bottles with urine to Refrigerator on 2nd floor of Wallace Hall. Return Food and Drug Intake Record for Wednesday. You are finished! PICK UP YOUR FREE THEATER TICKET.

2

Directions for keeping your 5-day Intake Record

1. Fill in your CODE number in upper left of each Intake Record sheet. Your CODE is your birthday, your height in inches, and the first three digits of your Social Security number.

2. You will fill out the Intake Records Saturday through Wednesday. One sheet is provided for each 24 hour period (to). Circle the correct day on the top of each sheet.

3. Please record EVERYTHING you eat (all meals and snacks) and drink along with alcohol consumed and/or anything that is ingested, injected, or inhaled (eg. drugs). Describe each of the items as completely as possible and be specific concerning amounts, methods of preparation, when and where you ate each.

4. Eat as you are normally used to eating.

Suggestions

-TYPE OF ITEM- be specific. If you are unsure about a certain item, list all its ingredients or contents.

-DESCRIPTION OF ITEM- List common and brand names when possible. Include methods of intake and preparation of item. For example, describe how foods were cooked and if anything was added to them like fats, sauces, sugar, cream, spices, etc. Specify what form the item was in-example, Centrum multivitamin in tablet form.

PORTION GUIDE (how to record amounts)

1. FOOD - Use common household measures such as cups, tablespoons (T.), teaspoons (t.), ounces (both liquid and dry measure) and their fractions. You may use numbers to describe amounts of certain foods-example, 1 banana, 2 pats margarine, 10 pretzels, etc. For beverages use liquid measure in ounces-example, 8 oz. whole milk (1/2 pint or 1 cup), 1 mug instant coffee, 6 oz., etc. Meats must be described in ounces when possible-example, 1 medium hamburger, 3 oz., 2 slices roast beef, 3 oz., etc.*

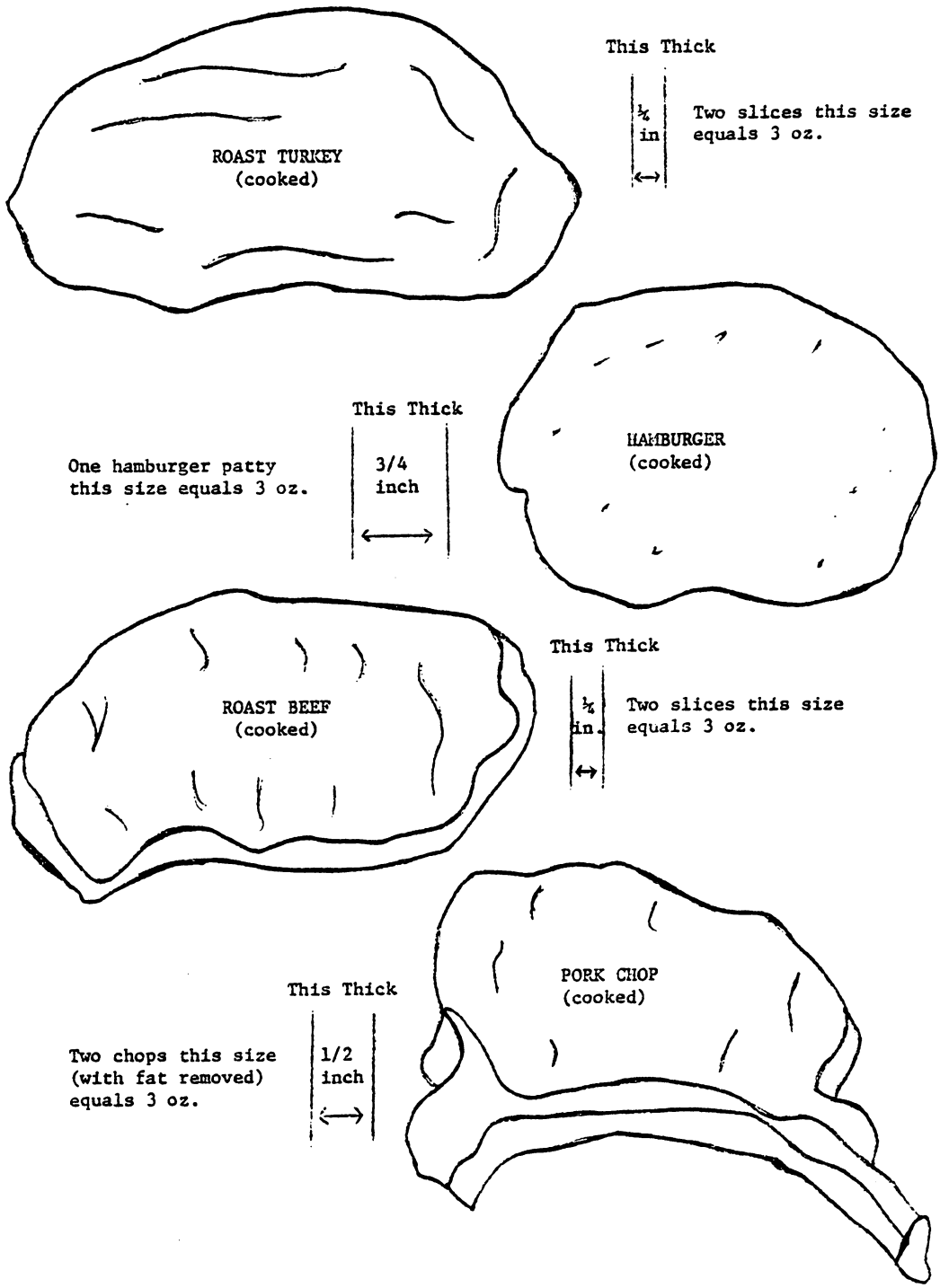
2. ALCOHOL - Use liquid measure in ounces for each drink consumed and describe and list separately. State whether wine, beer, liquor, liqueur, or mixed drink. If mixed, name of drink and what it was mixed with. State number of jiggers used and alcohol content.

3. DRUGS - This includes both prescription and controlled social drug forms. List common and generic name when possible and describe dosage including strength. Describe form in which item was taken. For example, 1 small joint of marihuana.

*See attached MEAT GUIDE.

3

PORTION GUIDE MEATS



Appendix C

SAMPLE FOOD RECORD

FOOD AND DRUG INTAKE RECORD DAY: Sat Sun Mon Tues Wed (Circle One) CODE#____/____/____

(Record starts when you get up in the morning. Add night-time snacks, drinks, drugs.)

Food Code (leave blank)	Time	Location	Description of Food & Beverages (include preparation)	Amount	Description of Drug Taken	Amount
	7:30 a.m.	Home	Fried eggs in margarine	2 medium eggs 1 Tbsp. margarine	Marijuana - joint	4 hits
	7:30 a.m.	Home	Kroger Enriched White Bread, toast	2 slices	Bayer Aspirin	2 tablets
	7:30 a.m.	Home	Frozen Concentrate Orange Juice	8 ounces		
	7:30 a.m.	Home	Whole Milk	8 ounces		
	10:15 a.m.	Squires Snack Bar	Coke	12 ounces		
	10:15 a.m.	Squires Snack Bar	Wise Potato Chips - Plain	about 20 chips		
	12:30 p.m.	Cafeteria	Broiled ground beef hamburger	6 ounces (2)		
	12:30 p.m.	Cafeteria	Hamburger roll - white bread	2 rolls		
	12:30 p.m.	Cafeteria	Tomato catsup	4 Tbsp.		
	12:30 p.m.	Cafeteria	Dill pickle slices	6 slices		
	12:30 p.m.	Cafeteria	French Fries	25 strips		
	12:30 p.m.	Cafeteria	American cheese	2 slices		
	12:30 p.m.	Cafeteria	Lowfat milk	12 ounces		
	12:30 p.m.	Cafeteria	Raw red apple	1 medium		
	12:30 p.m.	Cafeteria	Commercial Chocolate Chip Cookies	4 cookies		
	3:00 p.m.	Department office	Coffee - instant	8 ounces		
	3:00 p.m.	Department Office	Cream, half-n-half	1 Tbsp.		
	6:30 p.m.	Restaurant	12" Cheese Pizza	6 slices		
	6:30 p.m.	Restaurant	Miller Lite Beer - 12 oz. can	3 cans		
	11:45 p.m.	Home	Skippy Smooth Peanut butter	3 Tbsp.		
	11:45 p.m.	Home	Graham Crackers, 2 1/2"	8 crackers		
	11:45 p.m.	Home	Chocolate Ice Cream	1 cup		
	12:30 a.m.	Home	Whole Milk, warmed	4 ounces		

Did you remember to record everything?

Please answer these questions.*

1. Have you had any exposure to pesticides, solvents or other chemicals today?
   Yes No Don't know
2. Was today's intake different from your usual habits? Yes No Don't know
3. Did you engage in any unusually strenuous exercise today? Yes No Don't know
4. Are you on a special diet?
   Yes No Don't know

*If you answered Yes to any above please explain on back.

Appendix D

GUIDELINES FOR CODING

1. Initial all food records.
2. Write down questions and bring to weekly meetings.
3. Any food items you are not sure of leave blank and we will discuss them together.
4. When in doubt: check a food dictionary, a recipe (cookbook), or ask.
5. For food items not listed in the code book make up an index card with the main ingredients listed, their amounts and code numbers. This is to be done on a 1-serving basis when possible.
6. Keep time sheets.
7. Assume all meat products are cooked unless specified.
8. Tossed salad - include 1 serving of dressing.
9. Use "Serving not specified" column when serving or portion size not specified.
10. Use "Not further specified" for unspecified food within a certain food group (eg. milk. Use "Milk, NFS" because milk type was not specified).
11. Large serving = 1½ x regular serving.
12. 1 cup coffee or tea = 1 6 oz. serving.

Appendix E

POPULATION DATA

The following tables contain all the raw data obtained on the 171 subjects who were included in the final analyses. The column headings are defined as follows:

ICODE:	subject identification code
WEIGHT:	body weight in pounds
SEX:	0 = male 1 = female
ALCOHOL:	total grams alcohol per subject study period
DAYS:	number of days of complete food records
AGE:	age in years
ENERGY:	kilocalories/day
PROT:	grams dietary protein/day
FAT:	grams dietary fat/day
CARBO:	grams dietary carbohydrate/day
CALC:	milligrams dietary calcium/day
IRON:	milligrams dietary iron/day
MAGN:	milligrams dietary magnesium/day
PHOS:	milligrams dietary phosphorus/day
VITA:	I.U. dietary vitamin A/day
THIA:	milligrams dietary thiamin/day
RIB:	milligrams dietary riboflavin/day
NIAC:	milligrams dietary niacin/day
VB6:	milligrams dietary vitamin B6/day
VB12:	micrograms dietary vitamin B12/day
VITC:	milligrams dietary vitamin C/day

IDCODE	WEIGHT	SEX	ALCOHOL	DAYS	AGE
2669109	140	0	39.0	5	21
9967146	150	0	77.0	5	37
1672303	185	0	427.5	5	24
2670231	160	0	39.0	5	26
0674229	175	0	0.0	5	19
1670016	145	0	0.0	5	23
1271412	155	0	176.6	5	27
237042224	148	0	117.0	5	
1969118	152	0	182.0	5	24
2074242	167	0	33.0	5	26
1972155	145	0	108.0	5	22
11511459	175	0	22.0	5	23
1772224	163	0	22.0	5	25
1770231	165	0	0.0	5	23
567236	145	0	197.3	5	29
0669231	147	0	5.5	5	20
2872227	170	0	363.6	5	25
1673227	210	0	325.6	5	22
2070474	160	0	70.8	5	32
21360242	185	0	0.0	5	
0768024	150	0	91.0	5	32
3069051	165	0	0.0	5	
1170405	155	0	26.9	5	28
1975512	180	0	80.4	5	48
2370228	145	0	104.0	5	20
0475170	195	0	156.0	5	20
42558720 19	170	0	52.0	5	22
2467185	138	0	134.2	5	30
2470218	148	0	43.3	5	23
0669177	155	0	0.0	5	26
1473452	217	0	70.5	5	20
3170235	155	0	13.0	5	18
1562231	155	0	15.1	5	19
1874223	210	0	136.2	5	21
2174225	158	0	82.2	5	19
2572219	175	0	247.0	5	18
1768223	150	0	117.0	5	20
12720	150	0	0.0	5	20
2874230	220	0	117.0	4	20
575231	170	0	108.2	5	20
1170329	144	0	0.0	5	28
0970225	160	0	17.3	5	20
2570222	150	0	0.0	5	21
2072224	195	0	136.8	5	20
976175228	185	0	91.0	5	19
1969225	190	0	279.1	5	21
2270230	150	0	93.0	5	23
72767229	145	0	255.4	4	21
2373266	155	0	123.3	3	20
2072230			242.4	4	
1168231	148	0	0.0	5	19
1170227					

IDCODE	WEIGHT	SEX	ALCOHOL	DAYS	AGE
1865225	145	0	0.0	5	21
1577225	160	0	0.0	5	21
316510294	150	0	78.0	5	24
1672229	175	0	13.0	3	31
1472217	150	0	11.5	5	23
1274485	210	0	39.0	5	41
1072223	155	0	156.0	5	28
1875223	162	0	0.0	5	19
1571237	155	0	13.0	5	19
970226		0	254.6	5	
1972229					
2776223	160	0	0.0	5	22
2867553			16.5	5	
2773419	194	0	55.0	5	44
471227	165	0	11.0	5	56
559151	150	0	170.0	5	22
2871534	160	0	0.0	5	43
479224	135	0	0.0	5	29
1871561	180	0	0.0	5	32
466227	143	0	0.0	5	34
1168383	145	0	23.3	5	31
1472400	180	0	97.2	5	31
2170143	160	0	95.9	5	35
2874225	135	0	0.0	5	31
12744851	210		107.2	5	41
2776232	195	0	78.0	5	26
372239	160	0	161.1	5	25
1660570	145	0	111.2	5	20
2974476	215	0	77.8	5	42
12172229	205	0	0.0	5	28
1270422	143	0	0.0	5	35
179224					
415971150	163	0	111.6	5	21
2169227	155	0	77.4	5	47
1678266			117.0	5	
1572070	165	0	29.1	5	23
1973248	162	0	0.0	5	19
51263218	173	0	0.0	5	21
2172085	172	0	75.0	5	19
546271226	170	0	0.0	4	18
1774226	168	0	203.2	5	20
2073264	160	0	43.2	5	21
2869121	200	0	41.2	5	27
51871226	145	0	0.0	5	18
2466449	185	0	112.0	4	25
1870059	162	0	169.0	5	20
20510235	185	0	0.0	5	48
0270230	145	0	140.6	5	45
4165871231	200	0	235.6	5	22
1172026	150	0	31.0	5	30
270215	165	0	143.0	5	20
1769101			188.6	5	

IDCODE	WEIGHT	SEX	ALCOHOL	DAYS	AGE
1169228	145	0	73.5	5	19
2875227	180	0	177.2	5	22
469224			229.0	5	
876226	190	0	281.2	4	22
374219			186.5	5	
21469226	180	0	30.2	5	22
1672061	145	0	91.1	5	23
1775231	245	0	6.5	5	29
12672197	195	0	0.0	5	43
668451	135	0	17.3	5	22
1135669226	135	0	107.5	5	24
2164228	145	1	42.5	5	20
0568236	135	1	0.0	5	23
865110549	160	0	0.0	5	26
1072151	155	0	82.3	5	21
11773226	185	0	78.0	5	23
1469217	150	0	281.7	5	24
2264475	123	1	94.5	5	27
3363236	150	1	0.0	5	23
174098	170	0	33.0	5	32
770298	165	0	0.0	5	24
1166031	140	0	288.3	5	45
1063153	135	1	56.5	5	24
660303			0.0	5	
162226	104	1	0.0	5	22
10721510			0.0	5	
765184	111	1	39.2	5	36
1369219					
60464219	140	1	26.6	5	23
52065047	110	1	66.5	5	26
1860229	95	1	73.2	5	23
2472553	184	0	0.0	5	22
263308	108	1	0.0	5	23
368228	152		53.5	5	23
1370488	165	0	126.	5	36
2673543	145	0	0.0	5	19
2871228					
1663225	145	1	49.2	5	31
2474444	175	0	0.0	5	19
1761470	140	1	25.6	5	35
372199		1	11.0	5	23
816168409	130	1	0.0	5	19
1775222	160	0	0.0	5	18
1667228	123	1	0.0	5	19
2171234	150	0	0.0	5	19
2167225	175	0	0.0	5	21
2175228	172	0	0.0	5	20
1868229					
1272286	155	0	0.0	5	18
2166224	140	0	127.1	4	21
1967113	135	0	21.6	5	25
2959245	180	0			30

IDCODE	WEIGHT	SEX	ALCOHOL	DAYS	AGE
1766072	125	1	40.0	5	24
1971224	171	0	0.0	5	18
1568225	120	1	22.0	4	19
3062479	154	1	000.0	5	40
2072229	165	0	0.0	5	20
1286066231	143	1	0.0	5	21
101567143	140	0	0.0	5	32
12275169226	160	0	159.0	5	29
0372382	160	0	84.4	5	18
0670231	152	0	0.0	5	21
0470230	155	0	90.2	5	19
1965231					
23070216	175	0	496.6	5	27
1987869	160	0	0.0	5	34
6572239	200	0	0.0	4	
765234	190	0	0.0	5	29
1769229	145	0	0.0	5	18
12275963225	170	0	120.8	5	21
32369481	184	0	0.0	5	53
2569228	155	0	466.8	5	24
1370316	165	0	0.0	5	26
220375025	178	0	51.8	5	30
0270153	160	1	45.5	5	24
1574229	170	0	9.0	3	30
1370178	142	0	65.3	5	23
8174224	230	0	0.0	5	23
1970414	165	0	85.5	5	33
968201	190	0	68.8	5	63
11974217	172	0	114.6	5	26
1367228	142	0			
45470537	160	0	57.7	4	27
1170454	200	0	44.0	5	40
2872225	165	0	0.0	5	36
1863550	120	0	0.0	5	30
0767338	150	0	143.0	5	34
2070224	134	0	152.6	5	21
574228	195	0	34.6	5	19
1871299		0	313.6	3	
1	162	0	204.2	5	19
2	165	0	13.0	4	19
3	147	0	0.0	5	24
4	156	0	192.5	5	19
5	136	0	26.0	5	18
6	156	0	0.0	5	20
7	158	0	0.0	5	18
8	165	0	0.0	5	28
9	182	0	569.2	5	25
10	176	0	0.0	5	21
11	158	0	248.3	5	25
12	168	0	38.6	5	25
13	131	0	0.0	5	20
14	196	0	22.0	5	28

IDCODE	WEIGHT	SEX	ALCOHOL	DAYS	AGE
15	175	0	13.0	5	25
16	186	0	13.0	2	19
17	149	0	0.0	5	21
18	147	0	0.0	5	27
19	156	0	0.0	5	23
20	144	0	59.0	5	30
21	145	0	26.0	3	20
211	167	0	79.0	5	27
161	198	0	311.4	5	23
22	230	0	33.0	5	31
1663231	110	0	0.0	5	24
53064143	105	1	0.0	5	22

IDCODE	ENERGY	PROT	FAT	CARBO
567236	2373.	74.3	90.1	249.1
0970225	3108.	116.7	135.8	360.7
2570222	2824.	101.1	114.8	346.9
471227	2508.	86.1	114.0	289.3
2867553	1719.	76.9	83.8	162.1
12744851	2778.	112.9	110.6	303.3
2974476	3962.	137.3	189.0	409.2
2169227	2139.	79.6	102.5	204.2
1678266	4118.	129.5	190.2	438.6
1572070	2951.	143.3	121.7	318.3
970226	2732.	81.8	112.3	263.8
1672229	1864.	84.8	83.3	192.4
316510294	2495.	92.9	107.9	257.0
1472217	3038.	138.9	133.4	329.7
1274485	2593.	90.5	106.5	317.9
1072223	2256.	101.8	80.5	232.1
1875223	3652.	109.8	221.1	332.9
372239	2249.	69.2	88.4	258.5
1571237	2860.	111.9	138.9	298.1
2871534	2124.	69.9	90.8	263.5
374219	3124.	81.3	130.3	351.1
559151	2737.	106.7	107.4	283.2
479224	2863.	92.5	136.8	322.9
466227	2667.	139.9	106.1	296.1
1168383	2271.	90.5	119.0	204.5
1472400	2948.	116.8	121.8	309.4
2170143	2656.	91.6	86.3	354.6
2776232	3166.	127.3	118.3	380.7
20510235	1679.	63.3	82.0	177.0
0270230	2290.	88.8	84.4	239.5
4165871231	3216.	113.0	134.2	316.0
1172026	2996.	136.3	132.9	352.5
270215	3090.	97.2	143.7	314.8
1769101	2595.	76.0	97.3	284.7
1169228	3413.	104.8	114.3	468.7
2875227	2541.	87.4	83.5	305.6
469224	2463.	85.4	92.1	242.0
876226	4508.	158.1	185.7	431.7
1469217	1905.	60.4	53.2	213.4
21469226	2164.	62.3	82.7	256.3
1775231	3218.	118.1	140.0	369.5
12672197	4137.	159.8	197.3	458.3
6572239	2408.	107.2	93.5	284.4
668451	2819.	131.5	160.5	212.1
1135669226	2335.	80.9	92.1	275.3
1166031	1855.	70.9	57.3	156.0
770298	3189.	132.0	163.6	311.9
174098	2472.	92.6	110.7	277.2
1072151	2645.	92.5	102.9	302.7
11773226	3186.	105.1	137.5	359.5
3363236	1091.	51.5	42.1	131.6
1761470	1578.	62.5	75.0	155.6

IDCODE	ENERGY	PROT	FAT	CARBO
33064143	2126.	75.9	73.0	310.3
45470537	3486.	124.0	115.7	491.5
0372382	3478.	102.3	137.4	443.4
0670231	3304.	122.1	135.5	431.5
0470230	4185.	154.6	190.6	444.6
1170454	2522.	100.0	85.2	325.1
968201	1370.	63.2	71.7	70.1
1970414	1329.	47.9	66.6	105.0
1370178	2251.	90.0	64.7	307.9
1574229	2485.	88.2	113.7	277.6
11974217	3550.	136.2	168.5	344.5
1775222	4479.	144.3	227.6	479.1
2167225	2064.	55.4	80.8	286.3
2175228	2982.	107.1	165.0	261.7
1272286	4843.	175.6	236.3	509.1
2166224	2106.	65.8	66.3	281.9
1967113	2982.	125.8	122.2	342.2
101567143	2463.	126.4	64.0	352.9
12275169226	3072.	78.6	132.3	346.7
2072229	3123.	115.8	133.5	371.7
1971224	3446.	115.5	137.0	450.5
162226	2392.	57.4	123.3	276.5
765184	2310.	83.7	103.7	267.1
60464219	2060.	81.1	67.6	275.6
1663231	1759.	73.4	78.6	208.3
816168409	2177.	73.9	92.3	265.9
1766072	2273.	88.3	98.1	255.9
3062479	1764.	73.4	72.1	210.6
0270153	1931.	67.9	89.2	200.8
1667228	871.	47.8	34.0	97.8
1286066231	1416.	50.0	68.7	156.5
263308	1733.	74.0	81.3	170.8
52065047	1486.	41.0	46.0	211.4
1663223	2099.	56.7	101.2	236.7
1860229	2029.	66.3	79.6	250.9
1568225	1734.	55.2	70.3	222.1
2264475	2015.	65.3	97.3	185.3
1063153	2063.	66.9	82.3	263.8
2572219	3215.	119.0	123.9	313.9
2270230	3238.	109.1	123.1	406.3
1562231	3516.	103.8	141.3	460.3
2174225	3066.	111.0	140.6	319.1
1874223	3338.	101.0	137.9	383.8
2072230	2650.	88.3	95.9	252.9
72767229	2715.	97.9	83.5	281.8
1865225	2280.	99.4	87.4	279.9
3170235	3746.	116.0	152.8	483.9
1473452	4225.	122.6	174.2	530.4
1660570	3330.	85.3	147.8	356.6
1370316	2896.	106.6	125.3	361.6
1270422	1496.	44.9	65.5	189.2
12275963225	2992.	88.9	112.0	363.2

IDCODE	ENERGY	PROT	FAT	CARBO
2171234	3351.	96.5	113.0	493.0
865110549	1957.	58.6	94.1	234.3
2874225	3604.	86.6	101.8	613.2
1871561	2629.	90.4	94.4	359.3
2776223	1852.	67.4	68.8	252.9
1168231	2403.	83.5	107.2	282.9
368228	2727.	93.3	132.1	280.8
2472553	2349.	69.2	91.4	321.1
1577225	2206.	81.8	99.4	262.1
1672061	2445.	67.8	97.6	303.6
575231	3734.	144.1	160.7	393.2
1170405	2676.	99.1	121.8	298.7
12720	2855.	77.9	156.6	294.7
1768223	2217.	66.8	92.4	244.7
2373266	2573.	89.3	89.7	282.9
1871229	3012.	127.0	92.2	225.7
51263218	3131.	117.7	126.5	394.1
2466449	1873.	54.1	74.3	187.4
2959245	2004.	86.1	109.3	182.8
546271226	4194.	106.3	168.3	578.7
0767338	2012.	49.5	91.5	197.0
1863550	1804.	48.8	84.0	221.6
2872225	3294.	123.9	170.9	334.5
32369481	2321.	93.0	117.5	219.3
2569228	4166.	126.2	147.6	431.5
574228	1783.	55.5	97.0	163.7
415971150	2278.	84.5	98.7	231.4
1774226	3642.	135.4	158.4	349.3
2172085	2985.	79.4	118.7	387.4
2073264	1982.	75.3	93.1	198.3
2669109	2705.	108.1	118.6	294.6
2869121	2493.	90.8	107.5	288.0
2074242	2986.	129.2	101.3	321.4
51871226	2634.	85.7	118.3	313.1
1271412	2361.	103.9	87.0	212.3
220375025	3606.	118.0	139.0	471.2
2673543	2645.	108.5	128.9	266.7
1672303	3204.	80.6	99.4	346.8
2670231	3242.	109.9	130.7	405.2
1870059	3341.	131.8	129.9	337.3
0674229	3231.	94.3	132.9	431.1
237042224	2933.	80.7	111.6	367.5
1969118	2641.	98.2	92.2	291.8
1670016	2398.	82.8	87.9	329.4
9967146	2374.	103.7	90.2	253.9
2070474	2813.	114.7	109.0	333.0
21360242	3685.	128.0	156.1	453.6
0475170	2789.	87.8	102.4	337.5
4255872019	2820.	95.6	124.2	304.6
2467185	2555.	90.9	125.5	225.9
2470218	3452.	94.8	135.3	449.3
0669177	2227.	105.4	52.8	330.9

IDCODE	ENERGY	PROT	FAT	CARBO
3069051	2112.	66.7	103.5	230.3
1975512	1967.	108.2	99.2	146.6
2370228	2452.	75.6	75.9	333.5
0669231	2910.	106.7	109.4	382.8
11511459	2814.	93.6	102.6	389.9
2872227	3655.	114.1	149.8	348.8
1769229	2858.	73.7	44.9	567.7
0768024	2677.	72.3	102.2	350.8
1370488	3054.	115.3	130.4	294.5
1772224	3225.	108.1	124.7	429.0
1972155	3101.	103.3	128.6	352.1
1973248	3066.	114.7	136.1	348.5
1673227	3679.	89.8	153.9	347.6
2874230	3812.	165.6	203.4	281.1
12172229	3990.	135.9	201.0	419.5
8174224	1274.	51.1	52.5	152.3
1770231	2928.	94.4	130.2	357.9
2474444	3798.	95.7	139.1	557.4
2773419	2438.	85.0	107.7	275.1
976175228	3110.	114.9	150.3	299.1
765234	2675.	66.6	132.4	304.9
1969225	3297.	90.0	131.1	346.2
1170329	2279.	87.7	128.3	212.9
1	3318.	126.9	150.8	303.3
2	2735.	117.3	120.2	294.3
3	3040.	94.4	146.2	345.0
4	3325.	122.5	139.7	353.6
5	3179.	113.8	133.2	386.6
6	2288.	68.3	97.8	290.5
7	2891.	84.8	124.9	372.7
8	2428.	89.4	129.6	222.7
9	4103.	113.5	133.6	450.3
10	2193.	73.6	85.6	290.0
11	3821.	118.4	140.1	382.3
12	3184.	152.3	120.0	374.2
13	2929.	114.5	152.4	279.2
14	3858.	166.6	193.8	368.1
15	4104.	145.1	177.3	475.6
16	2810.	76.4	106.5	380.7
17	1921.	58.7	80.9	237.8
18	2294.	83.1	100.6	286.0
19	2390.	76.2	125.9	251.2
20	1415.	42.0	51.1	175.2
161	4745.	157.9	210.0	405.8
21	2262.	109.5	105.6	195.1
211	3257.	105.8	172.2	296.8
22	3190.	101.0	155.2	323.8
1987889	1321.	84.4	38.0	178.5
2370216	2254.	59.3	83.8	164.2
2164228	2120.	54.8	77.3	303.8
0568236	1634.	48.8	66.9	215.6
1672061	2590.	72.3	72.3	389.7

IDCODE	ENERGY	PROT	FAT	CARBO
2070224.	2879.	110.4	93.8	329.0

IDCODE	CALC	IRON	MAGN	PHOS
567236	1127.	10.5	386.	1641.
0970225	1291.	15.9	386.	1982.
2570222	1245.	16.4	272.	1752.
471227	1018.	14.5	362.	1455.
2867553	379.	11.0	227.	926.
12744851	1558.	14.1	372.	1855.
2974476	1885.	28.7	556.	2351.
2169227	665.	16.4	332.	1255.
1678266	1346.	23.1	552.	2453.
1572070	1657.	22.4	436.	2100.
970226	755.	14.3	339.	1446.
1672229	556.	13.2	291.	1263.
316510294	1202.	13.7	296.	1647.
1472217	2024.	17.8	608.	2552.
1274485	1274.	16.4	406.	1792.
1072223	908.	13.5	465.	1803.
1875223	1297.	18.1	570.	2010.
372239	899.	11.2	327.	1330.
1571237	1073.	15.0	386.	1763.
2871534	574.	14.9	264.	1105.
374219	889.	13.7	361.	1470.
559151	794.	17.0	305.	1339.
479224	877.	18.1	314.	1619.
466227	1073.	26.4	397.	1947.
1168383	1012.	13.0	270.	1491.
1472400	1129.	19.0	337.	1666.
2170143	1419.	13.6	396.	1826.
2776232	1756.	24.8	636.	2440.
20510235	664.	9.9	219.	949.
0270230	719.	15.1	355.	1327.
4165871231	1003.	17.1	431.	2027.
1172026	1480.	39.2	665.	2739.
270215	1034.	13.7	313.	1652.
1769101	706.	13.7	336.	1583.
1169228	1136.	20.5	414.	2087.
2875227	1124.	15.4	361.	1752.
469224	924.	11.9	342.	1696.
876226	1352.	23.9	585.	2662.
1469217	615.	9.7	338.	1183.
21469226	548.	11.0	209.	1167.
1775231	1391.	23.5	331.	2036.
12672197	2215.	30.9	649.	2863.
6572239	721.	18.7	353.	1672.
668451	1210.	17.4	381.	1851.
1135669226	1011.	13.7	361.	1524.
1166031	380.	12.0	494.	1404.
770298	1235.	26.7	459.	2279.
174098	1035.	14.7	341.	1542.
1072151	1020.	18.4	350.	1607.
11773226	854.	19.9	355.	1461.
3363236	632.	7.5	209.	929.
1761470	945.	11.7	323.	1311.

IDCODE	CALC	IRON	MAGN	PHOS
33064143	1167.	14.5	534.	1570.
45470537	1840.	24.1	480.	2871.
0372382	764.	17.7	337.	1651.
0670231	1388.	35.3	448.	1997.
0470230	1890.	24.0	479.	2607.
1170454	955.	23.5	521.	1596.
968201	493.	10.6	270.	875.
1970414	249.	9.1	154.	604.
1370178	960.	16.6	439.	1784.
1574229	640.	20.1	352.	1289.
11974217	1869.	19.3	508.	2675.
1775222	2520.	17.2	437.	2865.
2167225	522.	10.8	169.	910.
2175228	1519.	13.2	290.	1803.
1272286	2155.	27.9	631.	2897.
2166224	633.	13.0	316.	1293.
1967113	1584.	17.8	351.	1932.
101567143	2283.	28.2	558.	2615.
12275169226	884.	20.0	341.	1419.
2072229	1825.	15.6	333.	2287.
1971224	1056.	16.7	359.	1898.
162226	746.	9.7	237.	1072.
765184	1319.	15.0	432.	1667.
60464219	880.	13.4	324.	1544.
1663231	1212.	14.9	341.	1574.
816168409	628.	13.4	213.	1096.
1766072	1033.	15.0	336.	1737.
3062479	1030.	11.1	268.	1323.
0270153	1279.	9.7	296.	1364.
1667228	676.	8.3	183.	864.
1286066231	879.	9.6	249.	913.
263308	985.	10.7	249.	1248.
52065047	511.	8.6	227.	741.
1663223	812.	13.4	312.	1415.
1860229	1091.	14.2	352.	1352.
1568225	887.	9.8	256.	1256.
2264475	623.	10.9	246.	1145.
1063153	1175.	13.1	399.	1503.
2572219	748.	16.1	417.	1852.
2270230	1703.	20.8	437.	2257.
1562231	1148.	28.0	396.	1775.
2174225	1453.	14.9	356.	1998.
1874223	930.	17.5	447.	1655.
2072230	589.	14.3	381.	1631.
72767229	842.	13.2	486.	1948.
1865225	1497.	17.8	415.	1805.
3170235	1085.	19.1	406.	1844.
1473452	1280.	19.3	394.	2074.
1660570	1180.	13.4	349.	1506.
1370316	1720.	18.0	647.	2249.
1270422	813.	8.7	213.	1010.
12275963225	615.	16.2	273.	1293.

IDCODE	CALC	IRON	MAGN	PHOS
2171234	1414.	18.4	338.	1905.
865110549	678.	12.5	434.	1107.
2874225	1258.	20.9	406.	1590.
1871561	1039.	18.1	354.	1582.
2776223	678.	14.2	367.	1107.
1168231	858.	11.9	237.	1280.
368228	1296.	14.6	382.	1543.
2472553	704.	15.1	285.	1132.
1577225	788.	14.9	453.	1322.
1672061	913.	15.4	435.	1417.
575231	2288.	18.8	491.	2673.
1170405	1936.	20.9	505.	2036.
12720	794.	14.5	324.	1299.
1768223	510.	9.7	317.	1176.
2373266	1489.	12.5	378.	1875.
1871229	1210.	8.7	532.	2571.
51263218	1793.	24.2	596.	2306.
2466449	820.	8.0	153.	1006.
2959245	1096.	13.3	514.	1773.
546271226	1179.	20.7	411.	1817.
0767338	478.	9.6	335.	1079.
1863550	861.	9.0	239.	1087.
2872225	1167.	20.7	503.	2013.
32369481	782.	14.7	288.	1233.
2569228	1078.	15.3	522.	2438.
574228	737.	10.2	195.	1138.
415971150	630.	15.1	313.	1349.
1774226	771.	21.2	428.	2006.
2172085	894.	14.2	307.	1385.
2073264	1196.	9.7	238.	1465.
2669109	1352.	16.8	353.	1911.
2869121	916.	16.7	319.	1450.
2074242	869.	20.6	453.	1873.
51871226	843.	15.1	246.	1389.
1271412	469.	12.0	318.	1355.
220375025	1981.	27.3	672.	2728.
2673543	1948.	13.0	324.	2054.
1672303	682.	13.9	497.	1795.
2670231	2380.	19.2	550.	2461.
1870059	1238.	16.8	456.	2051.
0674229	1143.	17.1	311.	1592.
237042224	1335.	14.0	353.	1886.
1969118	897.	16.0	353.	1775.
1670016	1219.	16.0	345.	1538.
9967146	1004.	19.2	458.	1656.
2070474	2108.	20.5	740.	2783.
21360242	1557.	16.0	439.	2078.
0475170	1155.	11.2	409.	1745.
4255872019	1353.	16.1	476.	2091.
2467185	1312.	12.4	266.	1565.
2470218	1734.	18.1	441.	2284.
0669177	1478.	22.2	421.	1763.

IDCODE	CALC	IRON	MAGN	PHOS
3069051	789.	16.5	218.	1167.
1975512	706.	12.7	275.	1348.
2370228	662.	15.7	323.	1253.
0669231	1641.	17.1	385.	2182.
11511459	1335.	21.1	446.	1732.
2872227	744.	20.9	529.	1799.
1769229	1023.	31.4	498.	1492.
0768024	1195.	12.5	449.	1656.
1370488	1517.	17.0	379.	1988.
1772224	1757.	20.9	570.	2235.
1972155	1663.	31.3	382.	1949.
1973248	832.	19.1	338.	1673.
1673227	1522.	14.0	405.	1963.
2874230	1530.	20.6	460.	2552.
12172229	1406.	22.6	358.	2015.
8174224	687.	9.5	171.	888.
1770231	903.	17.4	341.	1469.
2474444	1184.	19.1	337.	1879.
2773419	862.	29.1	517.	1834.
976175228	2290.	13.0	434.	2465.
765234	703.	16.0	337.	1145.
1969225	861.	14.8	411.	1870.
1170329	1478.	14.8	576.	1814.
1	1537.	12.7	563.	2270.
2	1268.	13.9	320.	1685.
3	1504.	18.3	405.	1817.
4	1921.	28.7	691.	2608.
5	2795.	10.1	459.	2476.
6	642.	17.6	259.	1062.
7	1625.	13.8	404.	1763.
8	757.	12.5	257.	1229.
9	1181.	19.4	593.	2250.
10	862.	15.5	252.	1147.
11	1060.	19.3	612.	2321.
12	1856.	23.2	447.	2654.
13	577.	17.2	259.	1369.
14	1364.	24.0	407.	2310.
15	1662.	29.2	469.	2552.
16	1376.	35.0	346.	1507.
17	674.	10.9	199.	878.
18	1995.	13.8	544.	2080.
19	1019.	12.9	296.	1564.
20	500.	8.8	202.	749.
161	1353.	22.9	606.	2846.
21	587.	10.9	275.	1260.
211	592.	16.6	322.	1522.
22	1059.	16.4	297.	1789.
1987889	908.	14.4	398.	1451.
2370216	405.	10.4	142.	957.
2164228	758.	11.7	300.	1023.
0568236	626.	9.0	205.	959.
1672061	1038.	16.9	359.	1460.

IDCODE	CALC	IRON	MAGN	PHOS
2070224	1045.	19.5	444.	1848.

IDCODE	VITA	THIA	RIB	NIAC
567236	3547.	1.08	1.83	18.2
0970225	5773.	1.70	2.29	28.8
2570222	4899.	2.11	2.58	22.1
471227	9060.	1.68	2.05	17.7
2867553	2529.	0.91	1.19	24.6
12744851	4076.	1.42	2.64	25.3
2974476	13691.	2.68	3.54	34.3
2169227	3392.	1.39	1.85	25.5
1678266	5891.	2.36	3.00	27.3
1572070	7337.	2.83	4.02	33.9
970226	5175.	1.53	2.01	21.7
1672229	3672.	1.41	1.31	26.5
316510294	4972.	1.49	2.32	18.8
1472217	7690.	2.28	3.27	38.2
1274485	3524.	1.63	2.38	21.3
1072223	7500.	1.15	1.86	23.0
1875223	8152.	1.97	2.32	34.1
372239	5434.	1.24	1.68	18.3
1571237	2093.	1.22	1.59	30.4
2871534	4329.	1.65	1.57	16.0
374219	4846.	1.40	1.96	18.0
559151	5062.	1.75	1.73	28.2
479224	5369.	1.76	1.95	26.2
466227	6977.	2.28	3.23	39.1
1168383	6286.	1.47	1.99	18.5
1472400	3850.	2.05	2.28	27.6
2170143	5678.	2.06	2.88	20.5
2776232	7698.	2.52	2.85	31.4
20510235	2538.	1.29	1.75	13.0
0270230	3919.	1.18	1.81	27.6
4165871231	3388.	1.61	2.36	29.2
1172026	15281.	3.06	4.16	52.4
270215	4802.	1.34	2.27	22.8
1769101	2338.	1.13	1.82	23.4
1169228	2698.	2.36	2.82	30.0
2875227	3760.	1.29	2.47	20.9
469224	2189.	1.16	2.09	24.2
876226	7941.	2.27	3.48	42.6
1469217	5075.	0.70	1.31	19.5
21469226	2297.	0.77	1.29	16.1
1775231	6810.	2.60	3.29	36.8
12672197	18743.	2.59	4.23	36.6
6572239	2546.	1.26	1.71	22.8
668451	7807.	2.19	2.80	28.6
1135669226	6066.	1.36	1.93	20.3
1166031	1896.	0.82	1.54	29.6
770298	7182.	2.09	3.46	33.6
174098	2397.	1.66	1.94	20.8
1072151	4728.	1.48	2.50	24.8
11773226	3811.	1.81	2.50	33.6
3363236	4262.	0.67	1.09	12.6
1761470	2259.	0.98	1.33	14.0

IDCODE	VITA	THIA	RIB	NIAC
33064143	12473.	1.70	2.18	18.1
45470537	6075.	3.09	3.97	28.5
0372382	7812.	1.81	2.15	29.9
0670231	12266.	3.46	4.45	40.6
0470230	12167.	2.33	3.96	30.7
1170454	17698.	1.60	1.98	27.4
968201	6715.	0.75	1.11	16.0
1970414	4387.	0.76	0.92	12.5
1370178	14041.	2.10	3.17	33.5
1574229	9611.	1.52	1.88	28.3
11974217	6492.	2.76	3.68	31.1
1775222	5237.	2.15	4.10	22.1
2167225	4176.	0.94	1.13	12.9
2175228	4572.	1.43	2.44	17.8
1272286	7397.	3.36	4.11	41.3
2166224	1630.	0.58	1.32	15.4
1967113	7105.	1.90	2.48	29.8
101567143	8544.	3.79	5.03	35.9
12275169226	7006.	1.60	2.34	27.3
2072229	3195.	2.36	3.50	21.0
1971224	8541.	1.82	2.55	34.4
162226	4964.	1.03	1.38	13.6
765184	11648.	1.31	2.19	15.3
60464219	3939.	1.97	2.02	20.5
1663231	6192.	1.82	2.27	17.9
816168409	4506.	1.33	1.66	20.3
1766072	12122.	1.34	2.08	23.5
3062479	6552.	1.25	1.95	15.7
0270153	9617.	1.03	1.55	11.9
1667228	9764.	0.82	1.26	7.1
1286066231	4723.	0.78	1.29	7.8
263308	5750.	1.07	1.61	16.0
52065047	5823.	1.46	1.66	16.5
1663223	5807.	1.31	1.93	14.4
1860229	8132.	1.49	2.08	15.6
1568225	4442.	0.97	1.40	14.8
2264475	6403.	1.05	1.37	18.9
1063153	6500.	1.22	1.68	13.8
2572219	2581.	1.66	2.32	40.6
2270230	7726.	2.56	3.32	29.3
1562231	6583.	2.88	3.81	37.4
2174225	3784.	2.36	3.04	24.6
1874223	7029.	2.31	2.18	31.4
2072230	5296.	1.14	1.86	30.4
72767229	2825.	1.56	1.97	30.7
1865225	9659.	1.63	2.28	19.3
3170235	2989.	1.90	2.44	32.2
1473452	8176.	2.12	3.21	29.1
1660570	3582.	1.14	1.73	16.8
1370316	13945.	1.87	2.85	28.1
1270422	2881.	0.92	1.06	8.9
12275963225	3563.	1.95	1.58	22.4

IDCODE	VITA	THIA	RIB	NIAC
2171234	4315.	1.66	2.61	20.9
865110549	7941.	1.27	1.40	19.6
2874225	14296.	2.17	2.36	21.7
1871561	5457.	1.75	2.20	25.6
2776223	6035.	1.27	1.40	17.2
1168231	4119.	1.83	2.06	20.4
368228	7597.	1.49	2.41	21.1
2472553	2987.	1.35	1.74	23.3
1577225	11018.	1.54	1.46	22.3
1672061	4650.	1.65	1.99	22.5
575231	6651.	2.43	4.45	32.9
1170405	18816.	1.91	3.43	20.2
12720	3037.	1.39	1.98	19.0
1768223	1762.	0.94	1.32	26.6
2373266	7244.	1.93	3.32	25.1
1871229	3152.	0.50	2.32	44.1
51263218	14409.	2.81	3.41	33.1
2466449	1425.	0.70	1.06	8.6
2959245	3058.	1.23	1.77	17.0
546271226	6613.	1.91	2.45	22.0
0767338	4545.	0.84	1.23	21.4
1863550	3243.	0.78	0.95	8.3
2872225	4827.	1.96	2.38	32.6
32369481	5005.	1.13	1.76	20.7
2569228	4362.	1.26	2.94	44.4
574228	2903.	0.89	1.18	13.1
415971150	3878.	1.30	1.83	22.5
1774226	4419.	2.41	2.56	31.8
2172085	5173.	1.36	2.12	20.2
2073264	2614.	1.44	2.06	13.0
2669109	7684.	1.56	2.71	22.2
2869121	7522.	1.71	1.98	23.3
2074242	7567.	1.68	2.29	38.8
51871226	3851.	1.33	1.98	16.7
1271412	1788.	0.98	1.44	29.7
220375025	14885.	3.06	4.07	32.4
2673543	4368.	1.95	3.31	16.0
1672303	4894.	1.37	2.27	38.3
2670231	7483.	1.78	3.24	18.5
1870059	3242.	1.68	2.85	38.5
0674229	5425.	1.91	3.08	24.7
237042224	3407.	1.45	2.56	19.8
1969118	4968.	1.59	2.40	26.7
1670016	4100.	1.49	2.31	16.1
9967146	3762.	1.94	2.34	29.7
2070474	12677.	2.19	3.85	31.9
21360242	9304.	1.59	2.74	20.9
0475170	3217.	1.01	2.08	22.7
4255872019	8043.	1.46	2.24	24.6
2467185	5752.	1.39	2.25	17.4
2470218	5203.	1.83	3.01	21.1
0669177	6826.	2.34	3.10	26.0

IDCODE	VITA	THIA	RIB	NIAC
3069051	3288.	1.55	1.61	14.0
1975512	3602.	1.27	1.60	25.9
2370228	7624.	1.67	2.34	31.2
0669231	9445.	2.13	2.95	23.3
11511459	15831.	2.30	2.74	24.9
2872227	9465.	1.39	1.95	28.5
1769229	25577.	3.72	3.88	40.9
0768024	8657.	1.15	1.84	18.3
1370488	4407.	1.88	2.75	23.5
1772224	13293.	2.03	2.73	23.2
1972155	16265.	2.90	3.88	32.2
1973248	4882.	2.29	2.43	24.8
1673227	5799.	1.48	2.44	25.3
2874230	5192.	2.57	3.15	42.9
12172229	5417.	1.84	3.08	28.6
8174224	3305.	0.80	1.22	9.7
1770231	5610.	1.46	1.89	22.3
2474444	3969.	1.78	2.44	21.6
2773419	8782.	2.36	2.87	34.1
976175228	4712.	1.95	4.02	23.0
765234	3740.	1.66	2.18	22.3
1969225	4311.	1.47	2.21	31.8
1170329	8831.	1.61	1.58	9.2
1	3143.	1.63	2.33	38.7
2	4597.	1.53	2.56	29.5
3	3697.	1.66	2.74	15.2
4	19948.	2.84	4.33	37.9
5	5827.	1.42	4.03	10.6
6	5283.	1.74	1.75	19.4
7	4208.	1.72	3.00	15.2
8	4587.	1.19	1.86	24.3
9	5533.	1.74	3.10	34.2
10	4537.	1.54	1.99	20.2
11	2576.	1.73	2.38	39.1
12	4388.	1.91	3.31	24.9
13	2454.	1.67	2.12	27.1
14	10846.	2.10	2.80	35.5
15	9230.	2.85	3.60	36.1
16	6361.	3.10	4.34	36.7
17	3326.	1.11	1.67	14.9
18	5115.	1.85	2.57	11.7
19	3973.	1.50	1.87	20.8
20	1584.	0.71	1.14	12.1
161	6626.	2.38	3.07	45.2
21	3134.	0.96	1.48	30.3
211	2402.	1.62	1.61	28.0
22	2619.	1.82	2.36	19.0
1987889	12764.	1.35	1.89	18.3
2370216	1702.	0.91	0.98	11.7
2164228	8789.	0.93	1.72	11.8
0568236	1764.	1.14	1.20	11.4
1672061	5026.	1.65	2.73	27.5

IDCODE	VITA	THIA	RIB	NIAC
2070224	4385.	2.04	2.45	29.8

IDCODE	VB6	VB12	VITC
567236	1.52	2.72	68.
0970225	2.14	4.61	155.
2570222	1.44	4.26	100.
471227	1.40	4.86	126.
2867553	1.47	4.22	98.
12744851	1.59	5.81	92.
2974476	3.15	11.19	267.
2169227	1.54	4.42	44.
1678266	2.31	19.42	169.
1572070	2.47	8.81	171.
970226	1.74	3.46	84.
1672229	1.94	2.87	224.
316510294	1.63	5.01	173.
1472217	2.78	6.91	145.
1274485	1.72	6.63	131.
1072223	2.05	18.38	110.
1875223	2.28	4.88	268.
372239	1.54	3.11	86.
1571237	1.53	3.06	34.
2871534	1.29	3.42	115.
374219	1.42	3.69	136.
559151	1.69	4.13	210.
479224	2.14	2.91	80.
466227	3.02	9.31	93.
1168383	1.50	5.99	34.
1472400	1.95	4.14	76.
2170143	1.75	5.72	346.
2776232	3.20	5.98	210.
20510235	1.72	4.10	39.
0270230	1.92	4.24	75.
4165871231	2.12	4.51	129.
1172026	5.11	9.60	333.
270215	1.56	4.96	84.
1769101	1.66	3.42	94.
1169228	1.62	3.88	106.
2875227	1.75	5.06	71.
469224	1.76	3.03	28.
876226	3.27	5.99	165.
1469217	1.53	2.09	76.
21469226	1.33	3.09	41.
1775231	2.20	5.65	79.
12672197	3.72	12.41	152.
6572239	2.01	4.08	43.
668451	2.64	7.65	141.
1135569226	1.64	24.58	178.
1166031	2.02	3.18	40.
770298	2.68	7.80	122.
174098	1.35	3.51	126.
1072151	2.08	4.54	104.
11773226	1.83	4.84	74.
3363236	1.52	2.84	77.
1761470	0.96	2.73	69.

IDCODE	VB6	VB12	VITC
33064143	2.36	3.48	252.
45470537	1.70	23.04	48.
0372382	2.09	3.26	114.
0670231	3.81	12.40	271.
0470230	2.62	9.43	228.
1170454	2.35	3.66	153.
968201	1.05	2.09	63.
1970414	0.88	2.33	72.
1370178	2.80	6.00	191.
1574229	1.61	4.09	50.
11974217	2.76	11.38	285.
1775222	1.89	9.12	124.
2167225	0.74	2.17	90.
2175228	1.52	5.31	76.
1272286	3.18	8.49	254.
2166224	1.14	47.53	57.
1967113	2.95	7.21	184.
101567143	2.69	7.73	360.
12275169226	2.78	8.23	147.
2072229	1.68	6.89	76.
1971224	2.16	4.81	353.
162226	0.89	1.75	83.
765184	1.40	4.00	131.
60464219	1.73	3.26	80.
1663231	2.21	8.26	180.
816168409	1.24	2.19	141.
1766072	1.83	3.78	139.
3062479	1.70	5.25	57.
0270153	1.05	2.85	130.
1667228	1.07	2.78	187.
1286066231	0.67	1.49	69.
263308	1.17	3.05	79.
52065047	1.14	0.81	88.
1663223	1.12	2.11	61.
1860229	1.63	3.64	142.
1568225	1.12	11.06	94.
2264475	1.22	2.56	79.
1063153	1.79	2.53	122.
2572219	2.48	4.96	127.
2270230	3.09	5.44	227.
1562231	3.72	9.93	114.
2174225	1.91	4.81	121.
1874223	1.92	3.98	321.
2072230	2.65	3.38	64.
72767229	2.52	3.73	273.
1865225	1.81	5.03	216.
3170235	1.57	4.73	136.
1473452	2.47	8.33	198.
1660570	1.30	2.31	116.
1370316	2.51	5.97	268.
1270422	0.77	2.16	79.
12275963225	1.45	3.17	124.

IDCODE	VB6	VB12	VITC
2171234	1.67	4.93	93.
865110549	1.25	1.25	114.
2874225	2.16	2.13	283.
1871561	1.54	3.22	110.
2776223	1.72	2.01	80.
1168231	1.40	4.15	117.
368228	1.56	3.87	52.
2472553	1.12	3.61	224.
1577225	1.57	1.60	83.
1672061	1.96	3.41	82.
575231	2.68	7.92	179.
1170405	2.14	6.16	196.
12720	1.18	3.35	189.
1768223	1.68	2.10	122.
2373266	2.48	4.98	130.
1871229	3.44	3.66	17.
51263218	2.37	6.65	173.
2466449	1.31	2.46	50.
2959245	1.49	3.19	45.
546271226	1.91	5.34	329.
0767338	1.38	2.13	32.
1863550	0.70	1.39	123.
2872225	2.33	6.17	110.
32369481	1.43	4.79	302.
2569228	3.54	4.44	55.
574228	1.01	2.05	41.
415971150	1.67	4.18	114.
1774226	2.75	6.89	287.
2172085	1.61	4.98	59.
2073264	1.19	12.84	67.
2669109	1.69	5.46	35.
2869121	1.66	4.97	121.
2074242	2.61	4.75	196.
51871226	1.50	5.21	86.
1271412	1.71	2.72	120.
220375025	3.77	11.18	386.
2673543	1.57	7.05	78.
1672303	2.64	3.59	63.
2670231	2.12	6.23	112.
1870059	2.74	5.43	66.
0674229	2.38	8.71	116.
237042224	1.78	7.04	117.
1969118	1.91	4.49	68.
1670016	1.23	3.56	180.
9967146	1.64	3.70	31.
2070474	2.61	8.19	175.
21360242	2.32	6.46	131.
0475170	1.97	3.38	57.
4255872019	1.83	4.05	99.
2467185	1.38	4.39	87.
2470218	2.17	7.03	121.
0669177	2.59	16.79	178.

IDCODE	VB6	VB12	VITC
3069051	1.24	3.29	73.
1975512	2.04	4.68	135.
2370228	2.40	2.86	130.
0669231	2.29	6.25	265.
11511459	3.00	5.73	164.
2872227	2.54	3.35	130.
1769229	4.44	7.33	415.
0768024	1.68	2.42	90.
1370488	2.17	5.85	70.
1772224	2.45	4.27	169.
1972155	3.59	10.99	226.
1973248	2.16	5.34	194.
1673227	1.73	3.05	101.
2874230	3.15	7.03	194.
12172229	1.94	8.50	46.
8174224	0.83	3.01	56.
1770231	1.39	3.66	84.
2474444	1.59	5.48	141.
2773419	3.22	7.69	163.
976175228	2.29	8.23	207.
765234	1.37	4.29	37.
1969225	2.72	3.22	71.
1170329	1.77	3.62	86.
1	2.47	4.15	94.
2	1.87	4.18	45.
3	1.24	5.07	39.
4	4.27	8.42	268.
5	1.63	7.55	62.
6	1.56	3.21	67.
7	1.56	4.95	113.
8	1.48	3.19	86.
9	2.63	3.54	96.
10	1.33	3.84	60.
11	2.77	4.98	77.
12	2.47	12.98	157.
13	1.74	5.46	87.
14	2.80	7.59	143.
15	2.91	7.63	101.
16	4.48	12.57	83.
17	0.95	3.14	83.
18	1.51	5.12	101.
19	1.44	2.08	72.
20	0.66	1.82	19.
161	4.07	6.50	237.
21	1.64	2.17	25.
211	1.56	5.46	129.
22	1.65	5.24	58.
1987889	2.32	3.26	225.
2370216	0.97	2.99	92.
2164228	1.14	1.50	189.
0568236	0.80	1.83	110.
1672061	2.39	5.42	50.

IDCODE	VB6	VB12	VITC
2070224	2.28	5.13	94.

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