

Just What Can A 19th Century Bottle Tell Us?

ABSTRACT

Like all artifacts, 19th century bottles reveal different kinds of information. Formal characteristics, contextual patterns, and behavioral correlates to patterns of material culture, are all familiar avenues of inquiry in archaeology. An ongoing project at the University of Arizona depends on the analysis of bottles in large measure, in order to study patterns of alcohol consumption among selected ethnic and economic groups. The actual amount of alcohol consumed appears to be an individual decision. The results support treatment programs for alcohol abuse that focus on the individual and not the group.

The title of this article is not a trivial question. Much current research in historical archaeology depends on the interpretation of bottles. Research designs are becoming quite sophisticated. The question—what can a 19th century bottle tell us—is of necessary interest and relevance to many archaeologists. Rephrasing the question in general terms underscores its importance. What is the informational value of our artifacts? This article begins with a brief exploration of the kinds of information bottles supply. It goes on to discuss how this information can play a part in the study of complex human behaviors. An ongoing study of the role of alcoholic beverages among selected urban ethnic and economic groups is discussed in some detail. Contributions to modern society that archaeologists can make with the results of this and similar studies are considered.

Bottles have formal characteristics noted by every archaeologist, including size, shape, volume, color, weight, and historical information. All measurements of form help classifying artifacts, recognizing bottle types, dating periods of manufacture, understanding technological change and documenting industrial development. Even the physical properties of fluids can be ascertained by an examination of form (Jones 1971; Lorrain 1968;

Miller and Sullivan 1981; Newman 1970; Switzer 1974; White 1978; Wilson 1961). Much of the needed information is found in studies dedicated specifically to the collector of glass antiques (Cohen 1975; Colcleaser 1965, 1966; Davis and Davis 1967; Ferrars and Ferrars 1966; Freeman 1964; Kendrick 1963; Lyons and Lyons 1967; Munsey 1970; Toulouse 1969a, 1969b, 1971; Yount 1967). Additional information is presented in histories of glass manufacturing (Angus-Butterworth 1948; Meigh 1972; Scoville 1948).

Study of the provenience of bottles, their condition, and the association of these bottles with other recognizable artifacts, suggests patterns of use and preservation. Once manufactured, bottles are not necessarily emptied immediately. When emptied of original contents, bottles are often recycled and reused. Those which finally enter archeological context are often smashed, and the remaining pieces may be moved about extensively. Investigating the paths of bottles from initial systemic context to final location in the ground allows an understanding of site formation and past behavior (Hill 1982a, 1982b). In methodological terms, the information gained from observing formal characteristics is compared to what is learned from analyzing context and association to arrive at statements concerning complex behavioral and formation processes (Fontana 1968; Staski and Wilk 1981).

A third category of information revealed by bottles is that which can be used to make significant contributions to modern society. Historical archaeologists and other scholars who depend to a large degree on information from bottles are asking some very interesting questions about trade and economics, political organization, social stratification, household variability, ethnicity, and conditions of life on the frontier (Fontana 1968; Schuyler 1972; Staski and Wilk 1981; Switzer 1974; Toulouse 1970; Wilson 1981). A thorough review of these and other studies is beyond the scope of this article. It is clear, nevertheless, that a general pattern of research is developing. The significance of understanding human behavior, revealed to archaeologists by the formal characteristics and contexts of bottles, is becoming the focus of many studies.

This third kind of information has significance in that it has the potential of contributing to the improvement of the current human condition. One of the paramount values of archaeology (as with any science) lies in its potential ability to help improve aspects of our own lives (King 1981; Staski 1983a). In accordance with this philosophy, one project at the University of Arizona deals explicitly with this potential contribution. The topical focus of this research involves the delineation of how patterns of alcoholic beverage consumption and drinking pathologies correlate with patterns of ethnic affiliation, socioeconomic status, and family structure. Initial investigations have concentrated on the refuse of living residents of Tucson, Arizona. Continuing research (described below) in part focuses on urban populations from the late 19th century. The goals of this study include accurate descriptions and useful explanations of drinking behavior, along with evaluations of various solutions to present-day problems of alcohol abuse.

This study of alcohol consumption emerged from a larger modern material culture research program. "Le Projet du Garbage" has been conducting urban archaeology of living groups for over 10 years. The "Projet" has emphasized, theoretically and methodologically, the use and comparison of diverse measures: attitudes, observed behavior, and material culture (Rathje 1974, 1978, 1979; Rathje and Hughes 1975; Rathje and McCarthy 1977). Although there are complexities in the data analysis, several interesting patterns regarding drinking behavior have emerged.

Early analysis was limited to a consideration of beer consumption. Residents of a sample of households (N = 73) were questioned about a number of consumption habits. Refuse from these same households was collected over a five week period. Comparisons of interview and refuse data revealed certain discrepancies. It was initially believed that accuracy in reporting rates and quantities of consumption to interviewers varied most along ethnic lines (Le Projet du Garbage 1978:50-65). Analyses of responses and trash from three census tracts in Tucson that differ in ethnic and economic composition show this clearly. In middle-income Anglo Tract 40.05, only two families out of 10

reporting no beer purchased had beer containers in their trash. In Tract 38, a low-income Mexican-American and Anglo neighborhood, 10 of the 12 households that claimed not to buy beer threw out beer containers. The low-income Mexican-American community of Tract 11 contained nine "never purchase" families out of 11 sampled that discarded beer containers. That ethnicity is the crucial independent variable, and not income, was apparently confirmed by individual household analysis. In fact, 18 of the 19 "non-reporting" households that consumed beer are Mexican-American (Le Projet du Garbage 1978:61, 64).

Why Mexican-Americans should under-report beer consumption significantly more often than Anglos was not entirely clear. Regrettably, the literature concerning Mexican-American mental health issues in general, and Mexican-American attitudes toward alcohol use and abuse in particular, is scant indeed (Boulete 1976; Vega 1980:3-5). It is possible, however, to suggest tentatively a number of attitudinal factors that may influence responses. The relatively low utilization of mental health facilities by Mexican-Americans (Vega 1980:10) reflects the perceived capacity of the family and community either to prevent mental problems or to absorb such problems should they occur (Jaco 1959, 1960; Madsen 1964; Miranda 1980:27-29; Valle and Vega 1980). It has also been suggested that mental illness, including drinking pathologies, is a highly stigmatized condition within the Mexican-American community (Vega 1980:6). The combination of these two related attitudes might explain why Mexican-Americans give inaccurate descriptions of their drinking behavior. A similar situation is found among Jewish-Americans, who are considered in more detail below.

The role of ethnicity in reporting accuracy has recently been questioned (Staski 1983b). When all alcohol types are considered (beer, wine, and hard liquor—see below) degree of reporting accuracy does not appear to follow ethnic lines. What is more, a certain number of household residents appear to *over-report* the amount of alcohol consumed as determined from refuse. Over-reporting, and the unclear relationship between reporting accuracy and ethnicity, appear to be results of

recycling behavior which cannot be measured systematically. Nevertheless, it still appears that general attitudes about alcohol use are ethnic phenomena (MacAndrew and Edgerton 1969; Staski 1983b).

Initially, actual drinking consumption rates and quantities were thought to vary most directly with income and wealth. Average consumption of beer per household for the entire sample is 21.0, 93.56, and 93.19 ounces per week for Tracts 40.05, 38, and 11, respectively. It is notable that there is little difference between Tracts 11 and 38. Both are low-income (median annual income, approximately \$4,500, 1970 census) though 38 is mixed Anglo and Mexican-American. Tract 11 is exclusively Mexican-American. Tract 40.05 stands out because it is middle-income (median annual income approximately \$10,709, 1970 census). Income appears to be the crucial independent variable here. Poorer people seemingly drink more, at least in so far as beer is concerned.

However, further analysis of total alcohol consumption as suggested by household refuse once again does not support earlier findings. A goal of this research is to estimate from refuse data the incidence of drinking pathologies among groups, and determine how incidence relates to various social variables such as ethnicity and economic status. Medical literature strongly suggests that, within populations, the average per capita intake of the drug ethyl alcohol is highly correlated with the incidence of pathologies (Clark and Kricka 1980; World Health Organization 1980:19-21). Therefore, material evidence for the three types of alcoholic beverages—beer, wine, and hard liquor—should be combined for this analysis. Suggested rates of intake are converted to amounts of ethyl alcohol. Beer is most often 4.5% ethyl alcohol, while wine averages 12%. Hard liquors range from 35 to nearly 80%, although most have an average of about 40 to 45% (Stables 1979:5). Fortified wines, such as sherry (20% ethyl alcohol) are included in the hard liquor category. However, they make up less than 5% of the hard liquor sample. An estimated average is that ethyl alcohol composes 40% of hard liquor. By simply multiplying the quantities for beer, wine, and hard liquor

intake by 0.045, 0.12, and 0.4, respectively, and combining these amounts for each household, an estimate is derived for the average total of ethyl alcohol consumed per household per week (Figures 1-3).

At first glance, it appears that the middle-income residents of Tract 40.05 consume more alcohol than the lower-income residents of the other tracts. However, the Mann Whitney U Test (for distributions that are not normal) shows the differences between tracts to be insignificant. These results can be explained in two ways. First, variation of income within tracts may be so great as to mask a correlation of income and quantity of alcohol consumed. Second, income and quantity of consumption of the drug might not be significantly correlated when total alcohol intake is considered. Comparisons of alcohol intake and income at the level of the individual household support the second of these explanations. At this stage of analysis, absolutely no correlation between income and amount of drinking whatsoever has been found.

Analysis of individual households now indicates that no available social measure correlates signifi-

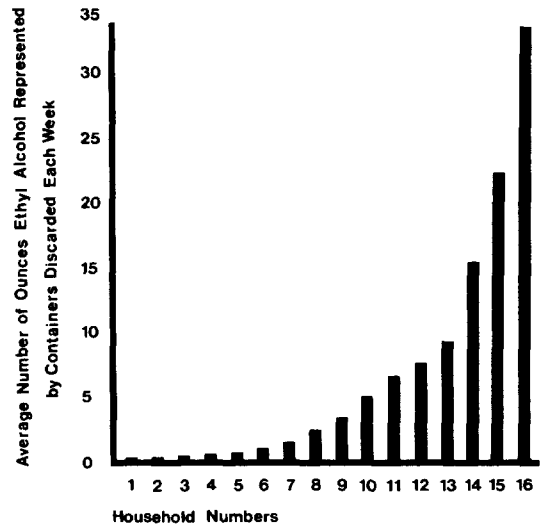


FIGURE 1. Average weekly rate of household ethyl alcohol consumption as indicated by refuse, for a sample of households from Tract 11, Tucson, Arizona.

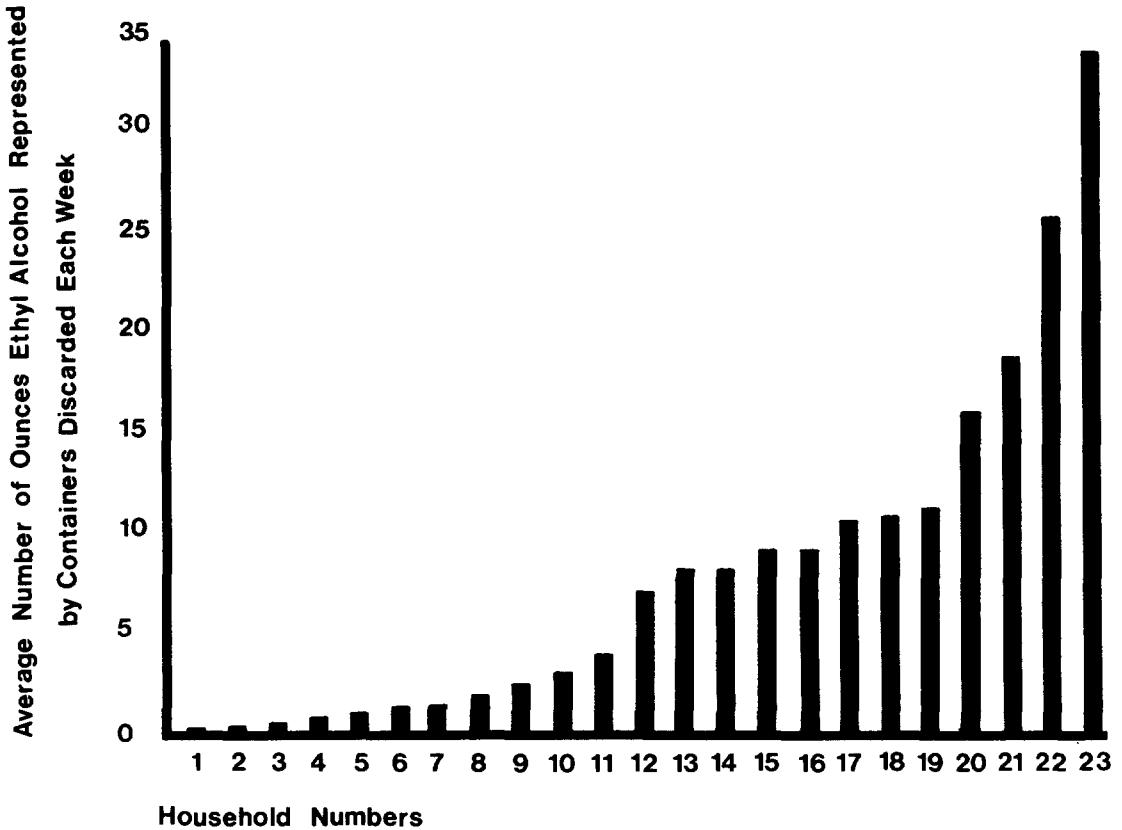


FIGURE 2. Average weekly rate of household ethyl alcohol consumption as indicated by refuse, for a sample of households from Tract 38, Tucson, Arizona.

cantly with the actual amount of ethyl alcohol consumed. Variables studied so far include income, wealth, education level, ethnic affiliation, size of family, and number of adults in household. Analysis is continuing, and the possibility of sample error has not been ruled out. However, this startling result, should it be confirmed, is not very disquieting if a number of facts are considered. The data suggest that quantities of alcohol consumed, and thus the incidence of pathological drinking (Clark and Kricka 1980; World Health Organization 1980), is determined for the most part by individual and not social characteristics. This conclusion is supported by the majority of practitioners in the field who are treating problem drinking on a daily basis. Those who treat alcohol

problems recognize that they occur in all kinds of people. The most efficacious treatment consists of small group and "one-on-one" counseling programs. Educating the individual patient about the harm of excessive drinking, not changing his or her social roles, is most effective (Davies 1980). On the other hand, social responses to alcohol consumption, such as Prohibition and the various attempts to raise the price of alcohol to levels that would discourage use (The Royal College of Psychiatrists 1979:96-97) have met with failure.

Thus, the results of the project at this time support the clinical literature and contradict the majority of the sociological literature (see below). This phase of the alcohol study suggests that treatment programs that focus on the individual are more

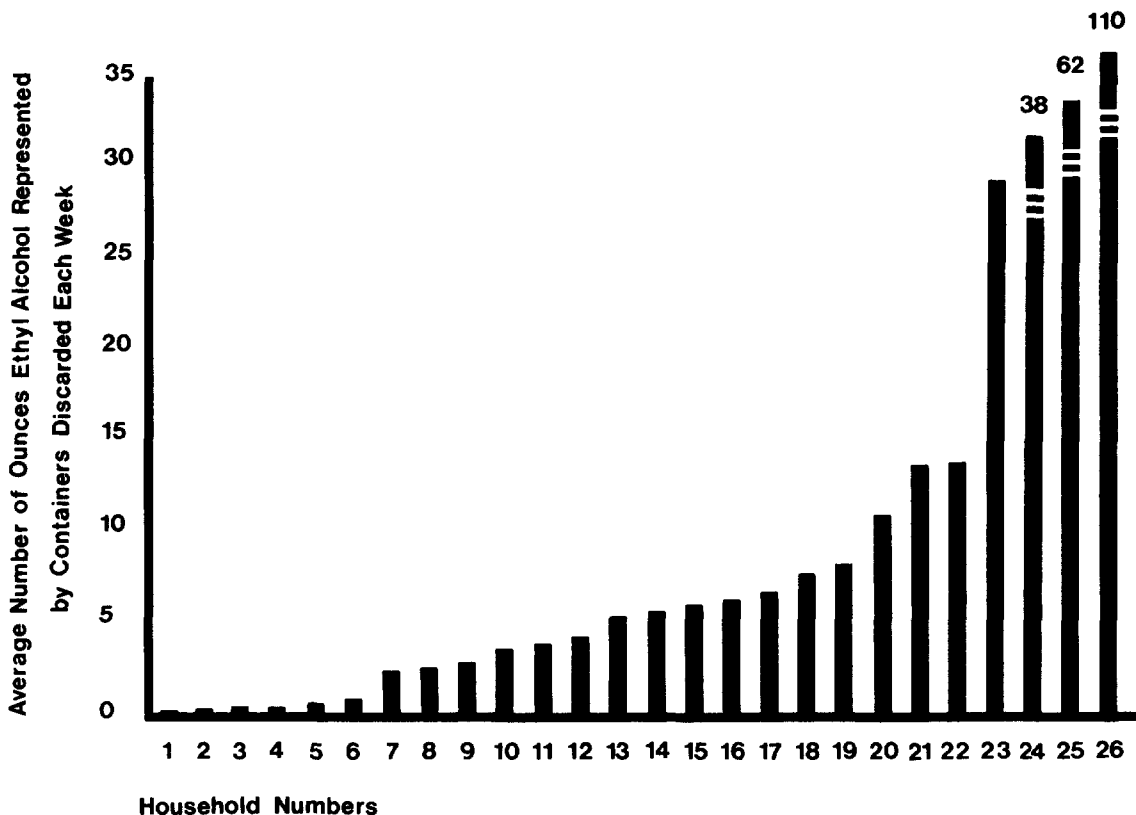


FIGURE 3. Average weekly rate of household ethyl alcohol consumption as indicated by refuse, for a sample of households from Tract 40.05, Tucson, Arizona.

useful than social reform movements when it comes to treating alcohol-related problems. It also shows that groups of people—ethnic, economic, or otherwise—are not made up of certain kinds of drinkers. The origin of drinking patterns and problems is neither found in the nature of ethnic groups nor, apparently, in economic conditions. Of course, the social nature of alcohol consumption cannot be denied, as many patterns of drinking and responses to the effects of drinking are social in nature (MacAndrew and Edgerton 1969; see below). All that is suggested is that the extent of ethyl alcohol consumption, and thus the incidence of pathological drinking, might be determined by characteristics of individuals.

Recent analysis suggests that household structure and composition may play important roles in determining an individual's use of alcohol. It appears that the degree of "internal social heterogeneity" within a household—the difference in social positions of related household heads—strongly correlates with both the choice to use alcohol and the amount of alcohol consumed (Staski 1983b). Social position is measured by consideration of occupation type, age, and years of education. Households in which husband and wife hold similar social positions are scenes of very little or no drinking. Households in which the social positions of spouses are quite different all exhibit heavy drinking behavior relative to the bal-

ance of the sample. Although this analysis is preliminary, it can be interpreted in a way consistent with previous findings. Individuals in households with great internal social heterogeneity might experience high degrees of stress, since different social positions lead to different expectations and thus to conflicting views and opinions. Heads of households with similar social positions apparently are under less stress and demonstrate greater stability throughout their lives. Elevated alcohol consumption may be a response to stress by some household heads with different social positions.

This study of alcohol consumption is now moving into a second phase, which involves the archaeological analysis of household trash from late 19th century urban sites. The goal is to ascertain the amount of ethyl alcohol consumed among certain immigrant groups from that time. The research design is in the final stages of development. Emphasis is given to patterns of alcoholic beverage consumption among Jewish-Americans and Irish-Americans.

Social historians and sociologists have consistently accepted as fact that these two ethnic groups represent the extremes in terms of amount of alcohol consumed and incidence of drinking pathologies (Bales 1944, 1946; Glad 1947; Skolnick 1957). Jewish-Americans are described as rarely suffering the effects of problem or heavy drinking, despite regular consumption of alcoholic beverages (Cheinisse 1908; Glatt 1970; Landman 1952; Snyder 1954, 1958). Irish-Americans are depicted as always having experienced an incidence of drinking pathologies far above that of other groups (Bales 1962; Stivers 1976). The reason for the purported difference is said to be located in the nature of the ethnic groups.

Obviously, the results of research with refuse from Tucson, Arizona, show that these descriptions should not be accepted uncritically. What historians and sociologists have done, it appears, is to accept popular stereotypes of ethnic drinking patterns, originally formed in Europe (Jellinek 1941; Stivers 1976) and reinforced after immigration to the United States (Bernheimer 1905; Fishberg 1911; Riis 1890; MaGuire 1868).

By doing so, the stereotypes have been given legitimacy and have been perpetuated to the present.

Investigations have traditionally focused on expressed attitudes, not behavior. Using the traditional survey methods of interview and questionnaire, scholars have tended to simplify the role of attitudes to the point that patterns of cognition are assumed to be directly translatable into patterns of action. Degrees of cooperation, bias, and recall—all factors that influence the accuracy of information given by respondents—are not taken into account (Sinaiko and Broedling 1975). Actual behavior is seldom observed. Material culture is never studied. Interviews seemingly reveal that American Jews drink regularly, but rarely over-indulge. However, they also show that Jews abhor drunkenness, especially among themselves. The Irish, on the other hand, have never held such a strong sentiment. Undoubtedly, attitudes about drinking and drunkenness affect what people say about their drinking habits. Many scholars fail to acknowledge that all attitudes held by a group work as a system and influence what people remember to tell, and choose to tell, the interviewer.

Other sources of data, such as hospital admission records for alcohol-induced diseases and arrest records for drinking-related crimes, are also inadequate. In these cases, scholars have tended to ignore the role of attitudes in shaping behavior. To the Irish, drinking has for several hundred years been considered a social, public activity. In Ireland during the 18th and early 19th centuries, the consumption of alcohol was an integral part of a number of social events, including marriages, births, funerals, and significant economic transactions. Drinking was also institutionally associated with many occupations, serving the function of linking new workers with the corporate work group (Stivers 1976:15–22). The pub served a crucial sociopolitical role by integrating the community, allowing communication and the exchange of ideas among many individuals. Later in the 19th century, this role was transferred to America. Public drinking met an important social need of the Irish-American immigrant. These drinking patterns did

not necessarily involve heavy drinking or develop into pathologies. Yet, the behavior was considered repugnant by the Anglo-Protestant majority (Fallows 1979:36, 50–51) and the stereotype of the “drunk Irishman” spread.

Jews, on the other hand, have tended to confine drinking to the privacy of the home, among family members. Religious doctrine, combined with the realization that the dominant society must not be given perceived license to persecute them, have led the Jews to conceal any and all unacceptable behavior (Patai 1977:433–447). Public admission of drinking heavily or having a drinking problem—allowing oneself to be arrested for drunken behavior or seeking out medical help—has been and continues to be more difficult for Jewish-Americans than for Irish-Americans. The Irish appear to have a greater incidence of drinking problems because culturally it is not as difficult to let the presence of the pathology be known.

A study conducted several years ago shows that similarly distinguishable behavior patterns among the Navajo and Hopi lead to similarly differing stereotypes. The publically drinking Navajo are popularly believed to have a much greater problem with alcohol than the privately drinking Hopi. Interestingly, records of deaths due to cirrhosis of the liver do not indicate that the former have a greater incidence of drinking pathologies than the latter. In fact, the Navajo are slightly below the national average, while the Hopi exhibit nearly the highest rate for the disease (Kunitz et al. 1968; Kuntiz et al. 1971; Levy and Kunitz 1971, 1974). Incidence of cirrhosis is the only behavioral measure that does not *intrinsically* suffer from bias or cultural loading. Among scholars in the health fields the most widely used method of estimating the prevalence of alcoholic pathologies has been the “Jellinek Estimation Formula,” which is based on cirrhosis mortality data (Jellinek 1947; Jolliffe and Jellinek 1941; Keller 1962; Pearl et al. 1962). With some minor revisions, mortality rates from cirrhosis continue to be the best measure of the rate of alcohol abuse (Brenner 1975; Terris 1967). The distinction between pure physiological effect, which is reflected in cirrhosis rates, and culturally determined patterns of drunken comportment,

which is reflected in rates of public drunkenness, attitudes towards drinking, hospital admission and crime rates, must be kept in mind (MacAndrew and Edgerton 1969).

Using rates of death by cirrhosis can, nevertheless, be problematic. Complexities arise when the accuracy and precision of older records are considered. Room (1968) uses rates of death due to alcohol and liver diseases to show that at the turn of the century Irish-Americans died from cirrhosis at a disproportionately high rate, while the Jewish-American rate was exceptionally low. His data came from the 11th United States Census of 1890, the first to include detailed information on ethnic groups (United States Government 1892:xix), chiefly because of the invention of electrical card sorters which could handle great amounts of data rapidly (United States Government 1892:xvii; Wright 1900:74). The mortality data indeed reflect the traditional view of Irish-American and Jewish-American drinking habits (United States Government 1895:40–43, for example). Yet, even census officials at the time recognized certain shortcomings of these records (United States Government 1892:xxi). Approximately two-thirds of the mortality data were recognized at the time of their collection to be unreliable. Rates of mortality differed so drastically in similar areas of the country that the only explanation possible was recording error (United States Government 1896:264; Wright 1900:71).

What is more, the lack of medical sophistication in 1890 led to what are now recognized as arbitrary and inaccurate determinations of cause of death. Doctors and hospital staff were subject to their own cultural biases and stereotypes, and these affected their judgments (Chase 1980:220). Among the poor, many deaths remained hidden, never to be recorded. In general, the accuracy of death records from the late 19th century is in doubt.

Essentially, then, the ways that 19th century Irish-Americans and Jewish-Americans really “handled” alcohol remain unclear. These ways may have been far different than traditional descriptions. There is an obvious need for an archaeological study of these drinking patterns.

Material culture from 19th century urban contexts can be approached in the same way Le Projet du Garbage studies the trash of today. Modern refuse is equivalent to 19th century refuse recovered from urban backyards, privies, and wells in socially and behaviorally meaningful ways. Both assemblages consist of domestic trash. The roles of formation processes (such as scavenging) and socio-technological changes (such as the introduction and development of municipal sanitation services) can be controlled. Many urban backyards are well-protected sites (Staski 1982). Sanitation services had little impact on 19th century urban slums (Melosi 1981).

The excellent dating capabilities of historical archaeology, due mostly to the presence of documentation and historic information on material culture, also allow temporal correspondences of modern and 19th century deposits to be made. Dates and durations of dumping can be measured with assurance. Furthermore, the presence of documentation allows the control of certain 19th century demographic variables. For example, the approximate number of people involved in forming any particular backyard trash deposit can be known. Ethnicity, wealth, income and occupation of occupants are also available from historic records. Population correspondence between modern and 19th century trash is achievable.

A number of potential distortions in the archaeological record must be mentioned. Seasonal variations in consumption rates, and holiday drinking, might both be controlled by careful analysis of the patterns of material culture. These distortions have been accounted for in modern material culture and are found to be insignificant in their effects (Staski 1983b). A more powerful distortion, the role of public drinking, creates a more problematic issue. As discussed above, public drinking appears to be an attitudinal factor that correlates with ethnicity. At this time, no systematic archaeological method to control for the role of public drinking is available. Many 19th century bars can be linked historically to specific ethnic groups. Refuse from such bars can be located and used to measure neighborhood consumption rates more accurately. Still, the amount of drinking

done in back alleys, front stoops, and on the street, and the number of bottles discarded away from household domestic refuse, remains unknown.

A possible solution to this problem is found in the fact that certain behaviors vary according to the quantity of alcohol consumed. A recognizable pattern of behaviors is associated with an increasing rate of alcohol consumption, and these behaviors can be seen in patterns of material culture. The number of bottles that originally held alcohol is thus only part of an archaeological measure of the quantity of alcohol consumed. Other items of material culture—categories of objects that reflect other, though related, behaviors—apparently have patterns in the archaeological record that reflect the amount of drinking that took place.

Preliminary study of modern material culture from Tucson, Arizona, and a review of the medical literature, suggest that decreasing intake of protein, increasing intake of sugar and medical products, and increasing waste of edible food all relate directly to the amount of alcohol consumed. These trends occur at the level of the household, not the individual drinker (Thomson et al. 1980; Wallgren and Barry 1970; Westcenter of Tucson n.d.). Analysis of household ethyl alcohol and medical product consumption rates, for instance (from the same sample of households discussed above) clearly shows a positive correlation. From the total sample of 73 households, there are 32 for which reliable measures of total ounces and number of items of medical goods are available. Over 90% of these medical products are high turnover, over-the-counter items. When weekly average intake of medical products is plotted against weekly average ethyl alcohol consumption, a highly dispersed but positive trend is apparent (Figure 4). High dispersion is to be expected, since there are a number of reasons besides the consumption of alcohol that lead people to use medical products.

In order to determine whether the differences in medical product use are significant for groups of drinkers, it is necessary to compare the rates of use for such groups. The sample of 32 households is divided at the median into "light drinking" and "heavy drinking" populations. The comparison of amounts of medical products consumed shows an

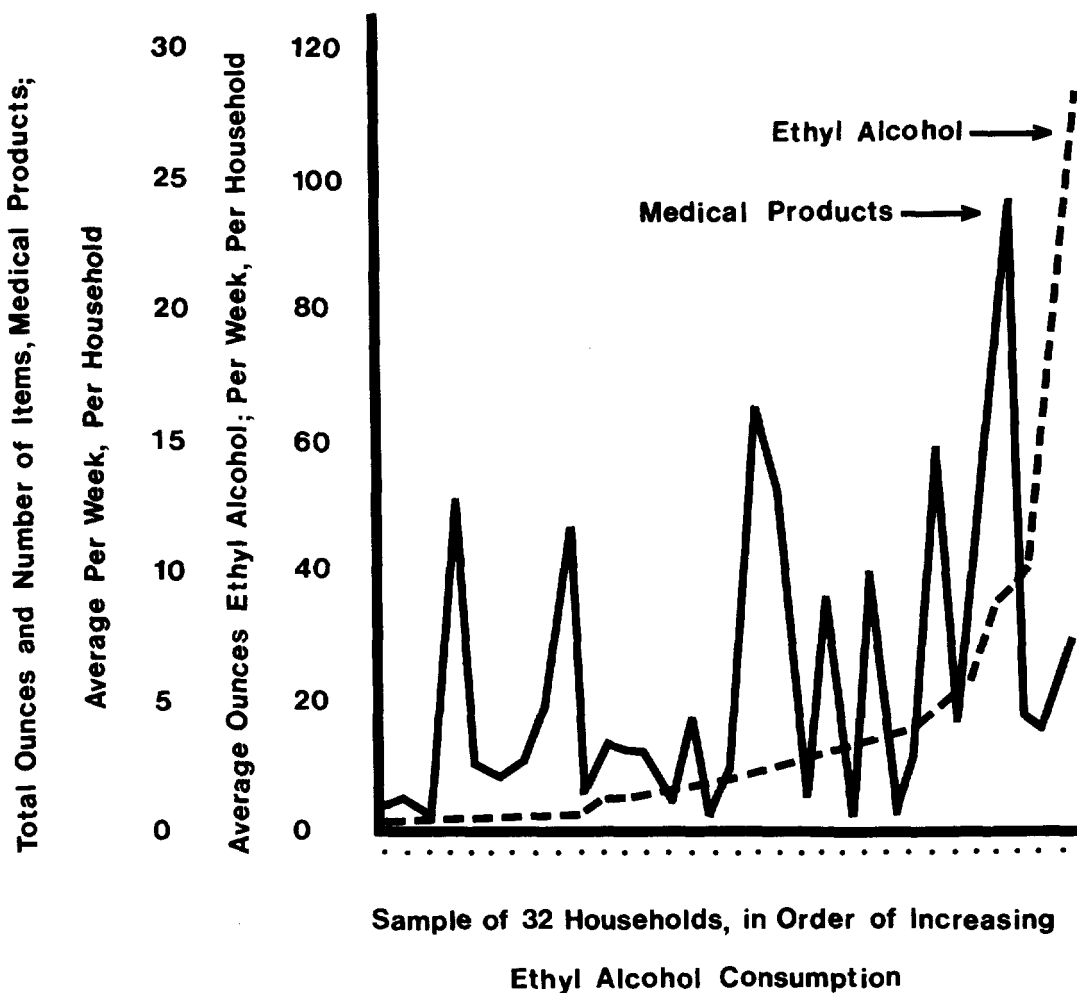


FIGURE 4. Number and total ounces of medical products found in household refuse, for a sample of households from Tracts 11, 38, and 40.05, Tucson, Arizona.

obvious difference now (Figure 5) which is, moreover, statistically significant (Mann Whitney U Test, significance at the .05 level). Considering again the fact that people change their rate of consumption of medical products for a number of reasons highlights the powerful nature of this correlation. Recognizing this and other behavioral trends archaeologically is difficult; nevertheless, progress is being made. The relationships between ethyl alcohol consumption on the one hand, and sugar

and protein ingestion on the other, remain unconfirmed at this time. Analysis of domestic faunal remains, once further systematized, will be the major approach to measuring protein consumption. Patterns of Patent and Proprietary medicine use as revealed in the archaeological record will aid in measuring the consumption of medicines. Other behavioral correspondences are presently being developed.

The archaeological study of 19th century Irish-

American and Jewish-American patterns of drinking is designed to accomplish a number of objectives. A more accurate description of how these immigrants used alcohol will arise. The patterns suggested by the first phase of this project (i.e., the modern material culture study) will either be strengthened or weakened. If strengthened, suggestions made earlier in this article regarding patterns of alcohol consumption will be fortified.

A methodological goal of this project is a better understanding of the degree of heterogeneity exhibited by household material culture and how this compares to the patterns and range of behaviors among residents. Measuring and accounting for variability in household material culture are fundamental objectives of much archaeological research. Only a small number of the kinds of material items and behaviors that pertain to households are considered by this project. A more complete understanding of how people live and lived will require many more.

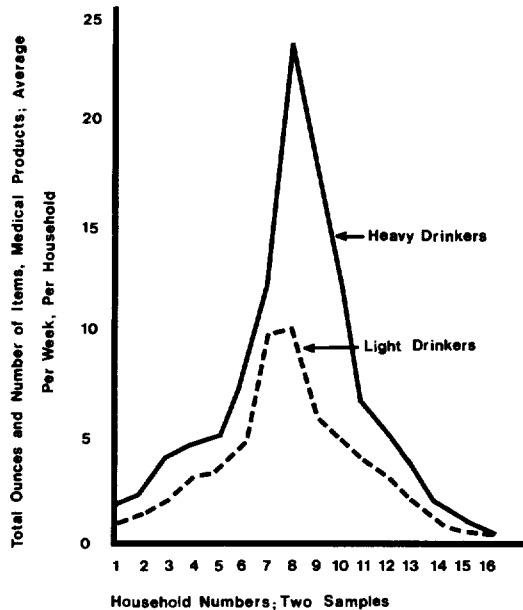


FIGURE 5. "Light Drinkers" vs. "Heavy Drinkers" compared in relation to the number of medical products and total ounces of medical products found in household refuse.

Bottles, as well as all other items of material culture, have the potential for saying a significant amount about human behavior if the right questions are asked and addressed properly. Historical archaeologists can study material culture, documents, behavior, attitudes—the entire range of human endeavors—and arrive at intriguing and meaningful statements about many human issues. Such statements lead the way to social solutions, and the solving of social and individual problems is what archaeologists more often should be attempting to achieve.

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