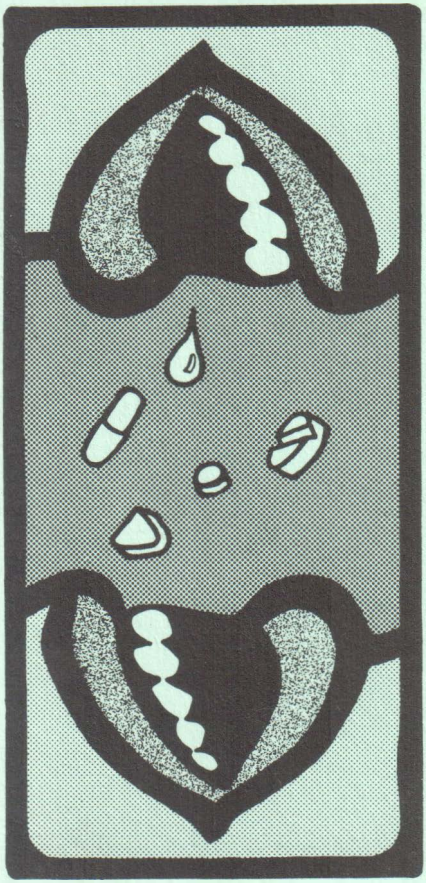

PACIFIC INFORMATION SERVICE ON STREET-DRUGS

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VOL. THREE NO. 4

GLUE SNIFFING AND THE ANESTHETICS -- COMMENTS RELATIVE TO THE PRACTICE OF DISSOLVING INHIBITIONS WITH SOLVENTS -- ALCOHOL AND MARIJUANA

The inhalation of model airplane glue to cause inebriation began to be a fad around 1960(1-3). However, getting high on gasoline started earlier(4), and social sniffing of ether and other anesthetic vapors goes back even earlier in time(5). While the indiscriminate use of street drugs appears to be decreasing due to the spread of truthful information about these drugs to high school and college students, solvent sniffing continues on unabated. This is probably because the sniffers are generally the socially- and economically-deprived young (8 - 16 years of age), and because readable and truthful discussions about sniffing have not been written and distributed to this age group(6).

Traditionally, the sniffing substances are used in two ways: (i) the agent is spread or poured on a rag which is then held folded over the mouth and nose during inhalation, and (ii) placed on cloth or cotton which is dumped in a plastic bag, the opening of which is held over the mouth and nose. With a little reflection, one realizes that the plastic bag technique is quite dangerous. The body needs approximately 10 - 15 percent oxygen in the inspired air to live. Rebreathing a bag's contents quickly depletes the naturally present oxygen and replaces it with carbon dioxide. If a person slips into euphoria, delerium, or unconsciousness with the bag still in place, a suffocation death results (7-12). When aerosol products are being sniffed, the plastic bag method is invariably used.

Aerosol hair sprays present another danger that is little appreciated. Such products contain various dissolved varnish- and lacquer-like substances to make them work. These agents cannot be broken down by the body and begin to coat the lung spaces just as varnish coats raw wood. The usual exchange of respiratory gases in the lungs is impaired and health suffers. Hairdressers who routinely use such hair sprays in their work commonly suffer an occupational disease known as thesaurosis -- if not diagnosed in time, this disease can be fatal. A sniffer is asking for thesaurosis when he puts hair spray(or any spray paint, spray varnish, etc.) in a bag and breathes in deeply (13).

What are the active euphoriant substances in the model glues, the cleaning solutions, the lighter fluids, the rubber cements, the fingernail polish removers, the liquid solders, the hair sprays? Some of these are: toluene (toluol), acetone, benzene (benzol), ethyl acetate, ethylene dichloride, trichloroethylene, naphtha, carbon tetrachloride, trichloroethane, trichlorofluoromethane, dichlorodifluoromethane, cryofluorane, isobutane, vinyl chloride, hexane, cyclohexane, ethyl ether (ether), chloroform, etc.

What is the common denominator of the active substances? The phenomenon that pharmacologists call "anesthesia." When one thinks of the term, "anesthesia," the first substance we think of is usually ether. Ether is a truly addicting substance and was once a notorious drug of abuse. Journalistic accounts of the "ether parties" of the post Civil War period mimic the sensationalistic reporting of "pot parties" today(5). The complex phenomenon of anesthesia can even be caused by the rare

gases such as xenon that are chemically non-reactive. Hence the pharmacological effect is thought to be due to the physical properties of the anesthetic chemical rather than to its chemical properties. The internal human body functions in a water medium -- the addition of a foreign solvent to this aqueous medium affects all nervous tissue in an anesthetic-like manner. Since anesthetics affect nervous tissue both in the body and in the brain, these agents are characterized as non-specific drugs. They can be contrasted with specific drugs such as the barbiturates and morphine that affect only certain nervous centers in the brain. The anesthetic effect is much like taking a live wire and grounding it. This "grounding" effect appears to take place wherever two nerves meet (the so-called synapse area). The more complex a nervous pathway, the more the synapses, and the more susceptible that pathway is to blockade with an anesthetic. The ability to play an effective game of chess (very complex polysynaptic circuits) is blocked with a very low dose of ether (low blood level), while the ability to drive a car is relatively unaffected (complex polysynaptic circuits, but somewhat less complex). Higher levels of ether will effectively block the ability to drive a car safely, while the ability to eat (involving relatively simple polysynaptic circuits) is essentially unaffected. Complex learned or social responses to the environment are blocked with very low doses while simple "built in" (intuitive) and emotional responses are not. Stated more simply: the anesthetics first depress the "higher centers" -- but with increasing dosage, even the "lower centers" can be blocked.

The symptomatology of the anesthetic phenomenon has been well documented by the medical profession. Only by carefully watching the sequential appearance of the symptoms (as the blood level of ether is raised by the anesthesiologist) can surgical anesthesia in a hospital operating theatre be carried out safely: (14)

Stage I (Induction Stage): warmth of skin, sense of smell depressed, narrowing of attention, decreased hearing acuity, exaggerated interpretation of sensations, euphoria, disturbed perception of time and space, pupils of the eye either normal in size or slightly enlarged, skeletal muscle relaxation, hesitation before attempting some complex manual task, slight incoordination in such tasks, inhibition of short term memory (person forgets what he was going to say before he speaks), strong analgesia, etc.

Stage II (Excitement Stage): slurred speech, hallucinations, staggering if standing, struggling if touched, loud voice, shouting, pulse rapid, blood pressure elevated, flushed skin, irregular respiration, widely dilated pupils, motor excitement, increased muscular tone, does not recognize environment, vomiting, amnesia, heavy analgesia.

Stage III (Anesthesia Stage): muscles relax, pupils contract back to normal size and do not respond to light, person is obviously unconscious, face is pale, respiration as if in sleep, a touch to the cornea of the eye will not cause the individual to blink, eyeballs will be seen moving back and forth although their movements may not be coordinated, swallowing motions can be seen in the neck muscles, general anesthesia. As the ether concentration in the blood is raised the eyeballs become fixed, blood pressure drops, the pulse slows, the pupils begin to dilate progressively, profound surgical anesthesia results.

Stage IV (Respiratory Arrest Stage): the diaphragm becomes paralyzed and respiration stops. The person will die unless artificial respiration is instituted.

Stage V (Cardiac Arrest Stage): blood pressure falls as the cardiac muscle loses its capacity to conduct electrical impulses. The heart stops and death ensues.

Anesthetics are valuable agents -- they alone have made possible the rapid advances in modern surgery made during the past fifty years. What separates clinically-used anesthetic drugs from anesthetic solvents such as toluene? Only one thing: toxicity! If toluene were relatively non-toxic, it would certainly be used as an anesthetic clinically. The manufacturer would certainly make more money that way! He'd sell it that way if he legally could! Even ether is somewhat toxic -- after anesthesia, albumin is found in the urine and the kidneys may not function normally for a while. But the toxicity is transient. Operations with chloroform in the United States are commonly limited to no more than 15 minutes of full anesthesia. If operations are continued on longer than that, permanent liver damage results as well as some kidney damage. Only a handful of anesthetic substances are known that are sufficiently non-toxic to allow clinical use -- ethylene and nitrous oxide (laughing gas) are probably the least toxic.

The kidney and the liver appear to be the organs most commonly affected by the toxic anesthetics -- these are the bodily organs concerned with the break-down and removal of foreign chemicals. The chronic sniffer of solvent anesthetics (barring suffocation and thesaurosis) tends not to sicken and die in a dramatic fashion that can be correlated with his sniffing habit. The toxic syndrome is quite subtle and hard to detect until permanent damage has resulted. The individual becomes more susceptible to infections. If he gets cuts or wounds, they tend not to heal as rapidly as normal. Headaches. amnesia, and paranoid reactions are often reported. Toxic effects of the solvents tend to be non-reversible.

In addition, certain agents are known to cause some degree of brain damage (9,16-20), and toluene, benzene, and xylene depress bone marrow (2,21). This effect on bone marrow results in abnormal blood cell counts and various anemic states. Lethal anemia can be produced if the sniffer has pre-existing sickle-cell disease(22) -- this disease state is frequently found in Blacks.

Just like the abusers of ether after the Civil War, the chronic solvent sniffer develops both tolerance to the agent (more is needed to get the same degree of euphoria) and dependence (if the anesthetic is not taken, a withdrawal syndrome will set in). The withdrawal syndrome consists of chills, a delerium-tremens state, severe headache, abdominal pain, muscular cramps and hallucinations(8,16,23).

Trichloroethane and chemically-related solvents have been shown to cause severe cardiac irregularities and occasionally acute death(24-25). Toluene has also been implicated in this regard(26).

Having gone this far in a discussion of "anesthetic" abuse and misuse, it is only realistic to round out the picture and discuss the most widely abused "anesthetic" agent and put its use into perspective.

Pharmacologically, alcohol (ethyl alcohol, ethanol) is an anesthetic. Its response pattern is the same as ether although alcohol is drunk and ether is inhaled. We can re-define the Stage I or the Induction Stage of ether anesthesia as equivalent to the "drunk but in control" phase of alcohol intoxication. We can re-define the Stage II or Excitement Stage of ether as equivalent to the "drunk and out of control" phase of alcohol intoxication; and the Stage III or Anesthesia Stage of ether as equivalent to the "coma" phase of alcohol "poisoning." Alcohol will produce respiratory and cardiac arrest. Alcohol could be sniffed effectively, if it were just a bit more volatile. It will volatilize nicely if warmed, but like most solvents it is flammable. Keep away from heat and matches!

The blood concentration of ether to produce anesthesia is reported as 0.10 - 0.15 percent. The concentration of pure alcohol to produce anesthesia has been estimated as 0.30 - 0.40 percent. Therefore, we can say that ether is 2 - 4 times more potent an anesthetic than alcohol (0.30/0.15 = 2; 0.40/0.10 =4). Nitrous oxide (laughing gas) is so non-potent that the pharmacologic effects cannot progress much beyond Stage II even though one breathes 90 percent of the gas (remember that a human must breathe in at least 10 - 15 percent oxygen to stay alive). Since Stage II can hardly be exceeded, the dominant effects of nitrous oxide are the symptoms of the Excitement Stage -- hence its nickname of "laughing gas." On the other hand, chloroform will produce anesthesia with blood levels of only 0.01 - 0.015 percent; therefore, it is 10 times more potent than ether and 20 - 40 times more potent an anesthetic than ethanol(14).

The first use of alcohol has been documented as being around 6,000 B.C. by the peoples in the Mediterranean basin. Its use has been soberly and not-so-soberly discussed and debated since that time. Generally society has divided itself into two camps: the "wets" who believe that its use will cure all of the ills of society, and the "drys" who believe that alcohol use is the source of all the ills of society. Those who will not study history are forced to repeat it. Legislators should remember this. Prior to Prohibition, drinking of alcohol was truly socially unacceptable in the United States. Prohibition was passed because of the "will of the people." During Prohibition, a very complex sociological phenomenon took place, whereby the drinking of alcohol became socially respectable as respect for law and order fell to new lows. And now (after Prohibition) in our present society, we have an unusual drug abuse problem since society now obliges many people to consume alcohol even though they may dislike it or may suffer allegic upsets fron it. When we realize that social sanctions for alcohol have become compelling -- stigmatizing those who will not drink as "odd," preventing others from rising in their professions and jobs because they will not drink with clients -- then we realize the hold that an addicting drug can have on society. In 1970, there were 86,000 alcohol-related deaths in the United States. This can be compared with the 55,000 - 60,000 Vietman G.I. deaths in the period from 1962 - 1972. One-year statistics versus ten-year statistics!

Alcohol unequivocally causes tolerance and dependence and is addicting. The World Health Organization estimates that there are 12 million true alcohol addicts in the United States. The State of

California has the highest percentage incidence of alcoholics. The delerium tremens or "pink elephant" syndrome in the alcoholic without a drink is a classic example of a withdrawal syndrome. If it were not for the usual age difference, it would be nearly impossible to tell the withdrawal of the glue sniffer from the withdrawal of the alcohol addict. The sniffer addict is, of course, a much younger person. Alcohol drinkers never consider themselves as "alcoholics" and certainly never consider themselves as "addicts!" Heavy drinkers usually characterize the "alcoholic" as (i) one who drinks alone, (ii) one who drinks in the morning, (iii) an individual who goes on real binges, (iv) someone who consumes large amounts in a short period of time, (v) one who gets drunk easily, or (vi) one who does not get drunk easily. The only scientific observation that one can make from this is that heavy drinkers always define the alcoholic by the traits that they, themselves, do not possess(27).

The attitude of society towards alcohol and the person who misuses it in 1974 is not the attitude of society toward alcohol and its users in 1914. Yet alcohol in 1914 was the same chemically and pharmacologically as now. The attitude of society towards alcohol in 1974 is not the attitude of society in 1974 towards glue sniffers -- and is not the attitude of society in 1974 towards marijuana smokers! The euphoriant active ingredient of marijuana is tetrahydrocannabinol. Alcohol, ether, toluene, and tetrahydrocannabinol are all anesthetic agents -- although the methods of administering each to get euphoria are quite different. It is apparent that the ideas of society change, but the pharmacological properties do not change. Chemically, physically, and pharmacologically, tetrahydrocannabinol is a complex alcohol. Dr. James Goddard once made a similar statement publically. Even though he was competent and the head of the Food and Drug Administration, he was then hounded by emotional politicians and vilified by the outraged American press until he was forced to resign. Consequently, further explanations are indicated here to force home the truth. As has been indicated here already, the anesthetic phenomenon is an unusual mixture of apparent stimulation and depression, relaxation and aggression, hallucinations and unconsciousness. What you see in an individual depends on the dosage (blood level). Consequently the present scientific literature can be "bent" by those propagandists wanting to prove that marijuana is all bad and equally "bent" by those wanting to prove that it is entirely good. The truth (as usual) is somewhere in between these extremes of "wet" and "dry."

When alcohol is drunk, the time for a single drink to be absorbed into the blood and begin to exert its effect ranges from 20 - 30 minutes (or longer) depending on what else is in the stomach. Because of this lag time, alcohol drinkers always tend to overdrink -- meaning that in the first half-hour one drinks two cocktails and just begins to feel the first. The feeling is "good" and so more alcohol appears to be indicated. In a hour's time, an individual may have consumed six drinks and just be feeling the onset of drink #3. Drink #6 is in the stomach and will, of course, eventually be absorbed -- the drinker begins to get into Stage II of anesthesia. He becomes loud, unpleasant -- he vomits; he passes out cold. Marijuana smokers indicate that this is a bad scene, and they are right.

The marijuana smoker takes the volatile principles of the weed into

his lungs and (like ether inhalation or glue sniffing) there is very little lag time associated with the onset of the intoxication. This inebriation is easy to titrate in a smoker and one can keep his blood level continuously in Stage I of anesthesia. If too much is inhaled, the brain "forgets" to direct the arm to carry the cigarette to the lip to get further overdosage. In a few minutes, the individual is back in control in Stage I again. Marihuana smokers rarely make bad scenes; those that do happen are very transient. The lack of bad scenes does not mean that they are better people than the alcohol lovers -- it just means that they are taking their anesthetic by a different route, a route that has a sort of "fail-safe" mechanism built in(27).

Concentrated marijuana is hashish. Unlike plant marihuana, it can be both smoked and eaten. It can be cooked into potent candy, brownies, etc. Eaten hashish (like alcohol) takes time to be absorbed and act. Hashish eaters tend to overdose (unless they know better) and become drunk and ugly. In North Africa there is a great social distinction between the hemp smoker and the hashish eater -- the latter is an outcast in polite society. This is reflected in the fact that the term "assassin" comes from the term "hashshashin" which means those "addicted to hashish." The eating of hashish or concentrated marijuana extracts (hash oil) leads to high blood levels and both physical and emotional dependence -- these abusers experience a withdrawal syndrome very much like that of the alcoholic's delerium tremens and the sniffer's "come down."

As a pharmacological class of drugs, the anesthetics are not stimulants even though people feel stimulated with low blood levels. The higher cortical centers of the brain are inhibited first resulting in a blockade of learned inhibitions (learned during social contacts and life experiences), thus the person feels more free, more happy, and less restricted. He becomes euphoric even though the drug is a depressant. The anesthetics appeal to up-tights who have cares and tensions -- conscious, but slightly anesthetized, they relax. The world cannot touch them. The anesthetics tend to narrow one's attention to only a few objects (or subjects) at a time -- this focusing effect is often considered valuable by people in arts and literature. While the individual is in Stage I, space and time perception is altered and reaction time and association time are slowed -- this makes a person a dangerous driver. People taking anesthetics cannot be trusted operating any sort of machinery, and the laws are just in this regard. True hallucinations are not experienced during Stage I, but in Stage II they are common. However, the person will usually not be able to remember the details of the hallucination later, since Stage II is also the stage when amnesia is also experienced. A true hallucinatory agent (e.g., LSD, mescaline, psilocybin, etc.) allows the subject to move about without incoordination and to recall the experience in great detail later. Contrary to a number of other authorities, the present author maintains that alcohol, ether, toluene, tetrahydrocannabinol, and all of the other anesthetics are not true (or specific) hallucinogens.

The toxicity of the anesthetics has been debated earlier in this essay except for that of alcohol and marijuana. Unlike most of the other anesthetics and unlike tetrahydrocannabinol, uncontaminated alcohol (e.g. vodka) is metabolized readily in the body into relatively harmless substances (carbon dioxide and water). This happens only with moderate

(not heavy) use, and only if the person has an adequate daily intake of the B-complex vitamins. However, most people consume alcohol that is contaminated with a variety of other chemicals -- such beverages include whisky, bourbon, wine, beer, etc. A full discussion of the toxicity of these contaminated alcohols would require many pages of discussion and is not relevant here. The toxicity of tetrahydrocannabinol-like agents is still under scientific debate. However, if one considers that both alcohol and marijuana have been used by societies since prehistory, common sense indicates that the toxicity of the cannabinols must not be too dramatically different from that of alcohol. The Bible often appears to endorse the use of alcohol, just as The Koran appears to endorse the use of marijuana. Multitudes of people have used each drug without falling over acutely dead. Multitudes have used these drugs in excess and unwisely. The ideas and practices of societies continually change, but the pharmacologic properties of the anesthetics in man do not change.

One can only advise people insisting on anesthesia that they use alcohol or marihuana rationally and in moderation -- and that they stay away from the toxic solvents.

-- Marvin H. Malone

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Published By: School of Pharmacy
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Stockton, California 95211
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