

the result may be some very expensive new plumbing in several plants, with the bill likely to be passed on to consumers.

To some analysts, the steam line problem bespeaks a poor quality of systems engineering in reactor design, a subject not broached in the safety report. In any case, how this problem escaped the commission's elaborate process of safety review remains a mystery.

It may be true, as the AEC claims, that such difficulties are the predictable growing pains of a burgeoning new technology. It remains to be shown, however, that the industry's difficult

puberty has not endangered the safety of the public—or the success of what ultimately is a multibillion dollar investment by the public in a complex new technology. Nor does AEC's safety report attempt to refute the critic's argument that growing pains in a potentially dangerous technology argue for slower growth.

The JCAE is under considerable pressure, from within and without, to address such questions. Not the least of the external pressures comes from consumer advocate Ralph Nader's recent entry into the fray, with a vow to go to the courts, to Congress, and to the stockholders of the nation's utilities

with the message that nuclear power is riven with "bad economics, dangerously immature science, and incestuous politics."

Whether the usually friendly Joint Committee is up to the task of a trenchant inquiry into reactor safety is another question. But certainly its job was not made any easier by an imperious self-analysis that concludes with the thought that nuclear safety is a subject of controversy today partly because of a "growing mistrust of technology" and partly because government and industry efforts at disseminating "public information" have been insufficient.

—ROBERT GILLETTE

Alcoholism: On-the-Job Referrals Mean Early Detection, Treatment

The development, over the past few years, of alcoholism programs for employees in both government and industry could turn out to be a giant stride in the history of preventive medicine. There have been no dramatic breakthroughs in treatment. What is happening is the result of increasing awareness that it is possible to identify and treat a victim of alcoholism—one of the four most serious diseases in this country—years before he has become skid row material.

For some two decades, the experts have claimed that alcoholism is a disease. But it has not been treated as such by physicians, psychiatrists, hospitals, insurance companies, employers, or the public at large. Most people now know it's a disease, but they still don't believe it.

The past few years, though, have seen some changes. One of the most significant advances was the passage in 1970 of the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act, otherwise known as the Hughes Act [named for its sponsor, Senator Harold Hughes (D-Iowa), himself a recovered alcoholic]. This act transformed the National Center for Prevention and Control of Alcoholism into the higher-level National Institute on Al-

cohol Abuse and Alcoholism (NIAAA) and authorized the expenditure of \$300 million over 5 years—a gigantic increase over the center's annual budget of about \$5 million, most of which went into basic research. Now the emphasis is moving into applied studies and treatment.

Only about 5 percent of the nation's alcoholics are of the down-and-out, derelict variety. Most of the rest hold jobs and make up 4 to 8 percent of the total work force. The Hughes Act recognizes this fact. It has directed the Civil Service Commission, the nation's largest employer, to get all government agencies to set up programs for their employees. In addition, there has been established an Occupational Programs Branch within the NIAAA that gives grants to states for the training of "occupational program consultants." Two individuals from each state are trained by the government and then unleashed to, respectively, help set up state and local employee programs and encourage private companies to get into the act.

"The NIAAA Occupational Programs Branch has shifted the emphasis from skid row alcoholism to where it really is—namely, next door, down the street, and in the office," says Harrison Trice, professor of industrial and labor rela-

tions at Cornell University who has done research and consulting on alcoholism and employee health since the mid-1950's.

Private entities, such as the Christopher D. Smithers Foundation of New York, the Cornell Center for Occupational Health and Alcoholism, and the National Council on Alcoholism (NCA), have for years been promoting research and education in this field.

Now it appears that all these efforts are beginning to bear fruit. Employee alcoholism programs require little in the way of new money or added personnel. Programs rely on a variety of community resources, the chief of which is Alcoholics Anonymous (AA), and are usually set up as part of an organization's personnel department or health division. If a company's employees are unionized, procedures are generally decided upon by a joint union-management committee. In any case, the support of top management is essential.

The biggest difficulty in the treatment of an alcoholic is motivating him to seek help. For this purpose, as Trice points out, no one is in a better position than his employer, who has the power—through the threat of firing or demotion—to intervene in a worker's life, as well as the right to do so once the problem begins to interfere with his work. Neither logic nor tears has the same effect on a problem drinker as the fear of losing what may be his last link to respectability—his job.

Company procedures vary, but most follow the principles set out by the NCA's labor-management committee, which was established in 1969. First, in a company where unions are in-

volved, a program must be a union-management operation separate from the collective bargaining process. If management goes ahead on its own, it invariably runs into trouble from the union, which is almost compelled to "protect" an employee. The company makes it clear that it sees alcoholism as a disease, not a disgrace. Supervisors, who see employees on a day-to-day basis, are the key to a good program. A supervisor is instructed that, if he notices a deterioration in job performance, he is to keep careful track of the employee's lapses. It is only in advanced cases of alcoholism that the employee comes to work exhibiting signs of drunkenness. Usually the signs are more indirect: increase in accidents, increased lateness, long lunch hours, frequent Monday absences, poor quality of work, fatigue, irritability, worsening of relationships with other employees, and—invariably—a wealth of increasingly lame-sounding excuses and rationalizations for the foregoing behavior. Supervisors, once it is clear that things aren't improving, are then supposed to have a little talk with the employee. Drinking is not mentioned unless the signs are unmistakable. In any case, a supervisor is not to act as diagnostician—rather, he informs the problem employee that the company's counseling services are available and warns him that continued poor work will not be tolerated. The next step is a confrontation with the alcohol program director, who explains to him that he has a choice of either accepting help or losing his job. He is told that if he decides to enter the program his case will be kept confidential and that there will be no black marks on his record. Then, with the employee's consent—and it is rarely withheld if the case is properly presented—a course of treatment is mapped out.

Frequently this involves several days of detoxification in a hospital, followed by a few weeks in a rehabilitation institution. The employee then comes back to his job and attends AA meetings several times a week, supplemented, if necessary, by group therapy or private psychiatric aid. In some cases, the company counselor has regular, informal sessions with a group of company alcoholics but the emphasis is on using community facilities.

Following this general outline of treatment, officials in both government and private industry have found the

success rate to be between 60 and 80 percent, a striking statistic in comparison to the recovery rate of all alcoholics who undergo treatment, which is estimated at about 20 percent. What it amounts to is bald coercion ("firing therapy," one AFL-CIO official calls it), and it tends to work.

Government Approach

Here is how things are shaping up in the federal government. The model program, and undoubtedly the largest budgeted (\$197,000 for fiscal year 1973), is at the Health Services and Mental Health Administration (HSMHA). Supervisors at HSMHA are trained at bimonthly, day-long sessions that outgoing Secretary of Health, Education, and Welfare Elliot Richardson has ordered all HEW supervisors to attend. There they get some statistics—of the 2.8 million government employees, at least 140,000 can be expected to be alcoholics. George Retholz, director of the HSMHA program, tells the supervisors that alcoholism is no respecter of sex or status. Of alcoholics in government, 50 percent have attended college, 45 percent are professional-managerial, and, despite statistics to the contrary, women are turning out to be just as vulnerable as men. Supervisors are told signs of alcoholism and associated mental problems—a suicidal person, for example, can be seen suddenly giving away a prized possession. Supervisors are advised not to suggest to an employee that he has either a drinking or a mental problem because of the stigmas attached to both. Feelings of supervisors are explored at the training session: anger, disgust, frustration at the behavior of an errant employee, and—when the confrontation between worker and supervisor becomes inevitable—the fear of unpleasantness, of harming the working rapport, or driving the employee "around the bend." Prime among the weaponry of the alcoholic is what is generally known as "denial," and therefore a careful combination of tact and toughness is required of both supervisors and, later, program personnel.

Retholz says that a HSMHA counselor in his meeting with an employee will show him where he stands on a chart depicting the stages of alcoholic deterioration. This has a way of breaking down the defenses, says Retholz, because most alcoholics "think their problem is too unique to verbalize."

Retholz is pleased with the HSMHA program, which has three full-time counselors and, after 9 months in operation, 65 people in treatment. The counselors' offices are located behind the visitors' information center so that employees do not have to fear being seen going in and out. The program itself has high visibility. Pamphlets are distributed desk-to-desk on a bimonthly basis; they discuss alcoholism and its manifestations and supply a "hot line" number that any worried employee can call anonymously. Retholz says that orders for the pamphlet are pouring in from all over the country.

In the private sector, where, according to the NCA, alcoholism is costing employers some \$10 billion a year in lost productivity, the new awareness is just beginning to seep in.

So far, only about 300 companies and businesses have some sort of program. The vast majority remain oblivious to the advantages of such a program, deny the problem, or are afraid to take the step for fear their public image will be damaged. Ross Von Wiegand, NCA director of labor-management services, says that an informal survey of the "Fortune 500" indicates that only 30 or 40 of them have or are planning meaningful programs. Many others will claim that they treat alcoholism as a disease, but treatment usually consists of referring an employee to treatment only after he has begun to manifest the later stages of the disease.

Companies that are taking aggressive steps are still very sensitive about adverse public reaction. Marion Sadler, vice-chairman of American Airlines, said his company was on edge about an article in the *Harvard Business Review* mentioning their program, which is unique in the airline business. Their fears proved unfounded.

Nonetheless, "Industry is terribly paranoid about getting the wrong kinds of feelings directed towards them because of the stigma toward alcoholism in the country," says Don Sandin, director of the new "personal guidance program" at Merrill Lynch, Pierce, Fenner, and Smith in New York. Sandin says such a program is nothing but good common business sense, but he divulges little about his company's effort because of its "highly confidential" nature. Sandin says the company has been very pleased with the results of the program, which includes referring family and friends of the employee to

Alanon, an AA offshoot set up for that purpose.

Further uptown is the New York headquarters of General Motors (GM), which last year became the first auto company to announce the establishment of a corporation-wide program. GM is also acutely sensitive to the possibility that people will think an alcoholism program means that "GM must have more drunks." "The problem has been kept in the closet," says Nicholas Pace, an internist who is director of the program. "It takes guts to come forward." Most major automobile companies have now set up employee programs in cooperation with the United Auto Workers union. Combined labor-management committees are in the process of being set up at every GM plant.

Not all programs are of recent vintage—two old-timers that deserve mention are DuPont and Eastman Kodak. Another is at the New York Transit Authority (TA), which *Science* visited. The TA, according to program director Joseph Warren, is the first civil service agency to take such a step. Despite the fact that the workers are unionized, it is basically a management-run operation and, in its early years, it was plagued by union complaints of "witch hunts." It was pretty much by chance, however, that the program came into existence at all. It was started on a part-time basis in 1951 by a TA em-

ployee who recovered from alcoholism on his own, with the help of AA. He asked for a regular program, but the TA had the conventional reaction: "We don't have a problem—and when we do, we fire them." But in 1956 (after they had hired Warren, who himself was a practicing alcoholic at the time), they agreed to have a full-time counselor on a trial basis. Warren now has under him seven counselors at the Brooklyn headquarters and two in Manhattan, all of them arrested alcoholics. Of TA's 42,000 employees, close to 300 enter the program each year.

The TA takes a tough approach. Company regulations say anyone who displays signs of inebriation on the job is in for trouble, and anyone who acts funny, like a motorman who misses two stops in a row or a stationman who gets into a fight, gets trundled up to Warren's office. "When a guy comes in, he's intimidated by the Establishment coat and tie," says Warren, "so we deliberately let out a nice juicy curse word," which puts him at his ease. Warren, speaking as one who has been there, cannot overemphasize the danger of "killing them with kindness." He is also wise to the ways of a drinker who manipulates his supervisors by putting on an extra good performance after a reprimand or a binge. "The alcoholic is using them by effective production between drunks."

Warren points out that supervisors

have to be trained in objectivity. A non-drinker will have little tolerance for the alcoholic, and there is danger of friction on the job when the employee returns from his drying-out. On the other hand, a supervisor who himself drinks too much is inclined to cover up for an errant underling.

Once Warren and his troops enter the picture, there is little dallying. If an employee is suspected of being boozed up, he is sent to the company clinic for a blood alcohol test. If this verifies suspicions, he comes to Warren's office, where they "attack his denial system." Judging from the yells coming through the wall during the interview with *Science*, this can be a very dramatic affair. (Warren says that, in the early days of the program, a union representative often came along to defend the employee, but he usually ended up seeing that no one benefited by shielding him.)

Following the confrontation, the employee is sent, if necessary, to Mt. Carmel Hospital in New Jersey for a 4-day detoxification program. Blue Cross, the insurance carrier, covers this, but Warren says the company tries to bypass the insurance. Instead, the company pays, and the employee is docked \$25 a week out of his paycheck on his return. The reason is twofold. First, this is a way of erasing any mention of alcoholism from the employee's record:

(Continued on page 413)

RESEARCH NEWS

Photorespiration: Key to Increasing Plant Productivity?

The photosynthetic conversion of solar energy to chemical energy is essential for the maintenance of life on Earth. Certain plant species are two to three times more efficient than others at the photosynthetic fixation of CO₂ into useful organic compounds (Table 1). Although some important crops, such as sugarcane and maize, are high-efficiency plants, most, including soybeans, peanuts, cereal grains, and cotton, belong to the inefficient category. Recent research advances in the plant sciences have delineated some of the fundamental differences between these two categories of plants.

These advances, in a broad spectrum of scientific disciplines, are of potentially great consequence from an economic point of view because they suggest the possibility of increasing the yields of the inefficient food and fiber crops by as much as 50 percent.

A battery of criteria may be used to distinguish the more efficient species from the less efficient; these include differences in pathways for assimilating CO₂, the amount of photorespiratory CO₂ evolution, and the responses of the plants to alterations in O₂ concentration, temperature, and light intensity. Although there is little disagree-

ment concerning the existence of these differences, there is substantial controversy about the mechanism of their relationship to plant productivity.

The high-efficiency plants are frequently called C₄ plants because they contain enzymes for a series of reactions that form four-carbon acids—such as oxaloacetic, malic, and aspartic acids—as the first products of CO₂ assimilation. H. P. Kortschak at the Hawaiian Sugarcane Experiment Station, Honolulu, and M. D. Hatch and C. R. Slack at the David North Plant Research Centre, Queensland, Australia, found that in sugarcane and certain

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NEWS AND COMMENT

(Continued from page 365)

"New York City is not sophisticated enough to treat alcoholism as a disease," says Warren flatly. Second, TA believes that employee payment will act as a deterrent. "I want this last drink to be a crisis," says Warren. "They say an alcoholic has to reach his bottom. I want to raise his bottom."

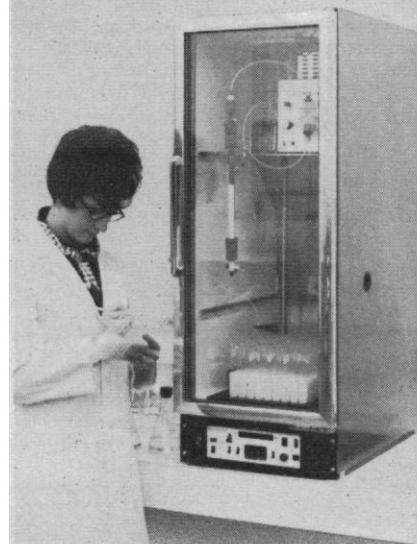
Warren is flexible in his handling of those who come into his office. It doesn't take long for him to spot those who use the program simply as a way to stay out of trouble. These people rarely get a second chance. But "I will go along with the guy who's really trying from now until eternity," says Warren, who has sent the same person through the hospitalization routine as many as six times. The TA, which says it has a success rate of about 65 percent, considers family involvement an important part of its program. If a man doesn't show up for work (95 percent of the employees are men), a counselor will visit his home to find out why. Warren says his staff went on 500 home visits last year. The program is straightforwardly publicized through such things as posters bearing the photograph of a counselor with the caption, "One of these men may save your life."

While the aforementioned programs are set up primarily for the purpose of identifying the alcoholic employee, they do not turn away from the other problems that invariably come into the net. Prime among these are marital and family troubles, financial problems, job dissatisfaction, emotional problems, other illnesses (multiple sclerosis, to take a depressing example, can exhibit the same symptoms as a bad hangover), drug problems, and even gambling. Alcohol counselors are generally prepared to give advice or direction for these troubles.

There are a few companies that have broad-gauged programs for the "troubled employee"—the kind of program Don Godwin of NIAAA's Occupational Programs Branch would like to see all alcoholism programs evolve into. One of the advantages of a troubled employee program is that it gets more self-referrals from alcoholics, who, no matter what the program is called, constitute half of any company's problem workers.

Two of the most outstanding examples of what Godwin calls the "broad brush" approach are programs at Hughes Aircraft in California and the

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Utah Division of Kennecott Copper. The Hughes "employee counseling program" advertises that it is available for family, legal, financial, emotional, drug, and alcohol problems for employees and members of their families. Kennecott has a community-oriented program called "Insight," which is really a kind of return to the best elements of old-style paternalism. The director, Otto Jones, can be reached by any employee, family member, or friend by dialing I-N-S-I-G-H-T. Jones will make an appointment to see a troubled caller anywhere at any time. He has dealt with an endless variety of problems, ranging from racial conflicts to LSD overdose, and the program has created a considerable amount of goodwill toward the company within the community, most of whose members have some connection with Kennecott.

Despite obvious successes, companies are still very reluctant to get involved with such programs. The fear that an organized and visible program will be construed by the public as evidence of massive alcoholism within the company cannot be overestimated. The fear is bolstered by ignorance: since full-blown alcoholism can take decades to develop, its overt manifestation on the job is rare.

So far, only big companies have programs, but Godwin of NIAAA already has visions of small companies banding together to set up a centralized counseling and referral service. Meanwhile, the NCA is encountering enthusiastic responses among the top management officials it has been meeting with at seminars in major cities throughout the country. As more and more problem drinkers learn, or are forced, to seek help before their addiction has become uncontrollable, even the medical profession may come around to diagnosing and treating America's number-one drug addiction for what it is.

—CONSTANCE HOLDEN

Erratum: In the report "Ragweed hay fever: Genetic control and linkage to HL-A haplotypes" by B. B. Levine *et al.* [178, 1201 (1972)], in line 4 of the abstract "HL-A associated IgE antibody responsiveness was antigen specific and extended also to IgE antibody production," should read, "HL-A associated IgE antibody responsiveness was antigen specific and extended also to IgG antibody production."

Erratum: Figure 3 of the report "Ultraviolet reflection of a male butterfly: Interference color caused by thin-layer elaboration of wing scales" by H. Ghiradella *et al.* [178, 1214 (1972)] was printed upside down. The figure was printed correctly on the cover. This was not done, as has been suggested, out of respect for the antipodal position of the third author, T. Eisner, who is currently in Australia.—ED.

26 JANUARY 1973

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