



Sandia Corp.

Rolamite inventor Donald F. Wilkes describes how rollers and band move.

metal or plastic, bent in the form of an S. The rollers, as they move between the guides, touch only the flexible band. In operation, one or the other of the rollers is pushed or pulled externally, and the whole configuration moves along the parallel guides.

Since the band itself moves over the rollers at the same speed at which the rollers spin, there is no slipping or sliding of the rollers within the band. And that's important, because rolling friction is much smaller than sliding friction.

**Ball bearings** use the same principle of rolling friction. But Sandia claims experiments have shown the rolamite to have a tenth the friction of the best ball or roller bearings—so low, in fact, that no lubrication is needed in many applications.

Inventor Wilkes first came up with the rolamite concept while looking for a device that would measure acceleration, and turn on an electric circuit when the acceleration reached a certain point.

He was working with a suspension mechanism employing an S-shaped spring band as a component of the accelerometer.

It worked vertically, but was unstable and hard to attach to other devices.

Puzzling over it, Wilkes realized that, by trapping rollers in the bends of the S, he could make the device work horizontally, and the rolamite was born.

The rolamite serves the accelerometer with reliability and precision in a very small package. When the force of acceleration is great enough to

overcome the tension of the flexible band, the rollers move along the guides to a point where electric contact can be made.

Another application which Sandia engineers like very much is a highly sensitive thermostat, to switch on a circuit at a particular temperature. If one end of the band is made of a metal that expands faster than the rest of the band as temperature increases, then the rollers will be moved by changing temperatures. Because of the low friction, a rolamite thermostat is claimed to be four or five times as sensitive as a conventional thermostat using the differential-expansion principle.

How fast the rollers move, and how much force is needed to move them, depend among other factors on the size and weight of the rollers, the distance between guides, and the thickness of the band and its flexibility. Changing these factors can change the operation of the rolamite.

One of the most useful ways of changing roller speed and force is by cutting holes in the band. When the roller reaches a cutout it moves faster. Designing the shape and location of the cutout automatically regulates the operation of the rolamite.

**One kind** of cutout can be used to create what's called a negative spring action, a very elusive mechanical function. An ordinary spring creates a positive force: the farther it is pulled from its normal, unflexed position, the more force is required. But a triangular cutout on a rolamite band can be located so that the farther the roller moves

from the initial position, the less resistance it encounters.

The negative spring principle means that once the critical force is applied the rollers move faster and faster toward the end of their run, and the switching takes place more quickly.

Sandia Corp., which develops nuclear weapons for the Atomic Energy Commission, says the rolamite business is in its infancy, but there are at least 54 functions for the device so far discovered, including relays, bearings, pumps, pistons, brakes, cutting tools and shock absorbers.

**Patent rights** are being applied for by the AEC, which means that they will be available on no-charge licenses to any number of qualified producers.

Despite his lack of exclusive patent rights, inventor Wilkes is leaving the corporation, according to Sandia spokesmen, to start his own company. ♦

#### REPORT ON ALCOHOL

### Neither wet nor dry

Alcohol is so misused by the American public that to provide every problem drinker with treatment would require the energies of most of the physicians, psychiatrists, social workers, nurses and psychologists in the country.

California drinkers alone could take up the full time work of every psychiatrist and social worker, and even at that, each problem drinker would get no more than weekly contact with a psychiatrist and monthly contact with a social worker.

This is the state of the nation, as reported by a scientific commission on alcoholism this month. Nothing will suffice, says the commission, but prevention—American drinking patterns and attitudes have to change.

**In its first report** after six years of investigation, the Cooperative Commission on the Study of Alcoholism concludes that alcohol is here to stay and that Americans had better integrate it more deeply into family life if they are going to learn how to control it; the solutions to alcoholism are apt to be wet, not dry. The Commission went on to recommend that alcohol be used in a family setting and that the legal drinking age be lowered to 18.

Such action, according to the Commission, would help rob alcohol of its special place in American life. The likely result would be more tolerance and less emotion about alcohol plus better drinking habits.

The 21-member Commission, composed of leading authorities on alcoholism, did its work with a \$1 million grant from the National Institute of

Mental Health. Though none of its recommendations have been endorsed by the Government, there are strong links between the Commission and NIMH.

Dr. Thomas F. A. Plaut, who wrote this first report, is assistant chief of the new National Center for Prevention and Control of Alcoholism at NIMH. And recently, NIMH, in a report of its own (SN: 10/21) made many of the same points on drinking habits as the Commission made, without its recommendations.

The report's main point is that alcoholism is strongly tied to cultural origin. Anglo-Saxons and the Irish roots produce high rates of alcoholism, while those of Jewish and Italian origin are relatively free of alcoholism. This is roughly the case with these cultural groups whether in the United States or their country of origin.

The Jewish and Italian groups integrate alcohol, specifically wine, into meals and religious rituals. Alongside this tolerance for alcohol and familiarity with it, there is strong disapproval of drunkenness.

**By contrast**, the Commission points out, Anglo-Saxons are plagued by conflicts over alcohol.

Rather than using alcohol during meals, Anglo-Saxons and Irish use alcohol to have fun or escape, all the while feeling uneasy about it, following the dictates of the old Puritan ethic.

The upshot is that people feel vaguely uncomfortable and guilty about drinking, young people drink out of rebellion and everyone hides the problem in the nearest family closet.

Most Americans are not going to suddenly adopt Jewish and Italian habits, says Dr. Plaut. Nevertheless, there are trends in the United States toward moderation that can be encouraged.

People now drink more in homes and private clubs than in bars. When men and women drink together, the result is usually greater moderation, says Dr. Plaut. Secondly, there is a striking increase in wine drinking.

**Per capita consumption** of whisky is only about half what it was in 1850 and has remained substantially unchanged since the turn of the century.

To encourage these trends, the Commission recommends that wine and beer advertisers tie in their products with food and family settings.

At the same time, the Commission feels that lowering the legal drinking age and instituting more consistent alcohol laws among the states and localities would minimize irresponsible drinking.

**Predictably**, the Commission recommendations prompted a range of opinions from cautious hedging to endorsement to condemnation within Protestant groups last week.

## For animal feed first

Single cell protein—the concentrated food stuff derived from such organisms as bacteria, yeasts, algae and fungi—can contribute to assuaging the world's hunger by acting first as an additive to animal feed. In this role it will replace more familiar forms of protein, and make them available for human use.

Eventually, single cell protein will itself become part of human diets, but the process will take a great deal of time. The purely technical problems of ensuring a safe, palatable form of SCP represent no more than half the battle; selling the product to the hungry who desperately need it will require sophisticated market campaigns backed by social studies of underdeveloped societies.

**These conclusions** emerge from a conference on the food product at the Massachusetts Institute of Technology, attended by scientists from more than 20 countries.

The use of SCP as a dietary supplement is not new; food yeast was eaten extensively in Germany and Great Britain during the two World Wars. It fell into disuse, however, as soon as the acute need diminished—it didn't taste good and was expensive. But today, colorless, odorless SCP can be produced at prices competitive with other forms of concentrated protein, such as soya and fish flour.

Much attention is now focussing on the use of petroleum fractions as the forage in SCP production. Pilot plants are operating in the Soviet Union, France and Scotland, and are moving past the planning stage in Taiwan, Communist China, India, Czechoslovakia and the United States. This process has great relevance to today's prob-

lems; many oil fields lie in just those parts of the world which support protein-poor populations.

**Proteins** from hydrocarbons have lived under the suspicion that they might cause cancer; toxicological research was featured prominently at the conference. A. A. Pokrovsky, director of the Institute of Nutrition of the Soviet Academy of Medical Sciences and G. H. Evans, manager of British Petroleum's Biological Research Division, both reported multi-generation trials on farm animals, using hydrocarbon-derived protein as a component of the feed. So far, these indicate that SCP is entirely safe as an additive for animal feed. The Russians have also tested the foodstuff successfully on monkeys.

Both scientists emphasized that they intend to use SCP primarily in animal feeds, although they expect the experience gained in this way to have value when the products are fed to humans.

So far, this stage has not been reached. And according to Sanford A. Miller, associate professor of nutritional biochemistry at MIT, present animal tests are rare and dubious in nature. Tests are carried out predominantly with healthy animals, neglecting the fact that the foods will eventually supplement the diets of the malnourished and sick.

In view of the market pressures, concentrated protein will probably have the best chance of acceptance as a food additive, rather than a food itself. In fact this applies to all new forms of protein, for the conference served to emphasize that no individual new source of food will nourish all the world's hungry. ♦

### PLANT GENETICS

## The new shape of agriculture

If scientists who spoke at a meeting at the National Academy of Sciences last week are right, world food production is headed not for a crisis but for a dramatic upward swing in the next few decades.

"Biological limits in productivity have not as yet been achieved with a single commodity," Dr. Sylvan H. Wittwer told the Agricultural Research Institute meeting at the Academy. "Major breakthroughs can be immediate and extraordinary in many areas within the near future," said the Michigan State University scientist. "But these will only open new vistas for further exploration which are now beyond our vision and

comprehension."

Though traditional methods of agricultural management—irrigation, fertilization as well as pest control—continue to play a vital role in high productivity, the future shape of agriculture may be changed by changing the shape of plants by either genetic or chemical means.

Umbrella-shaped soybean plants will be bred into pyramids and slender corn stalks will look like Christmas trees—their leaves horizontal at the bottom and vertical at the top, with cone-shaped cobs. The idea is to expose as much leaf surface as possible to sunlight to capture a maximum of solar