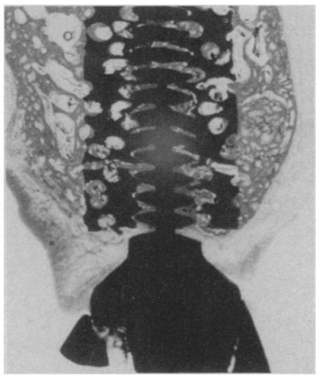
## An anchor to sink one's teeth into


Hamilton

A cylindrical honeycomb-shaped dental implant has proved successful in tests on monkeys. The implant, studied by A. Ian Hamilton and colleagues of the University of Washington in Seattle, was designed to anchor fixed bridges (when teeth are missing at critical points), removable dentures or a free-standing artificial tooth. The decision on whether this implant next will be tested in humans now rests in the hands of the Richland, Wash., Pacific Northwest Laboratories of the Battelle Memorial Institute, which holds the patent on the product. Meanwhile, says Hamilton, "The value of the work is that it provided a controlled study to give a better idea of what needs to be done to make human [dental] implants more successful."

The success of current implants—made mostly of titanium or stainless steel and in rarer instances of ceramic material — "is unpredictable," Hamilton explains. The implants may last 10 or 15 years, or they may fail soon after implantation, he says.

In the controlled animal tests of the new implant—composed of a titanium-aluminum-vanadium alloy—Hamilton and cohorts found they could meet with the most success by extracting a tooth and allowing the jaw to heal for about 3 months before implanting the anchor, rather than implanting the alloy in a fresh-socket site. In fact, 59 of 70 anchors implanted in healed socket sites were successful, Hamilton says. Jaw bone intertwined with the cylindrical honeycomb implant (see X-ray photo) — evidence that such an implant would remain secure and not loosen with time.

Hamilton's research is described in the quarterly JOURNAL OF ORAL IMPLANTOLOGY (Vol. 10, No. 2, 1982).

## Bubbling over trespassers

A liquid concentrate that produces foam when it is exposed to air, expanding at ratios from 20-to-1 to 600-to-1, recently was developed by Peter Rand and colleagues at Sandia National Laboratories in Albuquerque, N.M. The work of the Sandia scientists was aimed primarily at developing a substance that will quickly fill a room in order to disorient and obscure the vision of trespassers of high-security areas — nuclear material storage facilities, for example.

Typical foams, such as those used in firefighting, lose half their bubbly state about 30 minutes after formation. By contrast, half of the new liquid concentrate—composed of 97.8 percent water, 0.8 percent surfactant (soldium lauryl sulfate or alpha olefin sulfonate), 0.2 percent polyacrylic acid-type polymer, 0.2 percent stabilizer (n-dodecyl alcohol) and 1 percent solvent (water-soluble alcohols such as n-butanol and n-propanol)—still remains foamy 6 hours after formation. The U.S. Department of Energy has filed for a patent on the new foam.

## Chemical count

The six millionth known chemical recently was officially recorded by the American Chemical Society's Chemical Abstracts Service, which since 1965 has kept track of all substances reported in journals and patents worldwide. Number 6 million, 2-cyclohexyl-3-methyl-4-(pentylamino)-2-cyclopentene-1-one, is a derivative of a chemical used in the production of industrial materials and pharmaceuticals. CAS officials estimate that chemicals recorded in the literature from 1920 to 1964 would add another 1.3 million to their list.

## Bacterial tests for mutagenicity

Tests using bacterial and mammalian tissue culture cells rather than tests on living mice are a strong enough basis for deciding whether a chemical causes mutations, concludes a National Research Council committee. In a report released in February by the Committee on Chemical Environmental Mutagens, these tests were judged "sufficiently reliable for most regulatory and manufacturing decisions."

Because of the great expense of using live mice for testing, the committee recommends a "two-tier system" beginning by exposing *Salmonella* bacteria and tissue cultures of mice and Chinese hamster cells to suspected mutagens. If any one of these tests were positive, the investigator would then perform tests with Drosophilia — fruit flies — to look for lethal mutations. If these were also positive, the substance could be declared mutagenic. If the results were unclear, the investigator would then look at any carcinogenicity studies that exist, since mutation-causing chemicals are often carcinogens as well. Only then, according to the report, should the investigator resort to live mice studies. Completely negative mutagenic effects at any one level would be grounds for declaring the chemical a non-mutagen. Positive results at any level indicate the chemical is a mutagen, but the more expensive advanced studies, they believe, could be eliminated for a large number of cases where the results are clearly negative. This program would step up the pace of testing, according to the report.

The committee was chaired by James F. Crow of the University of Wisconsin at Madison's department of genetics. The report, entitled "Identifying and Estimating the Genetic Impact of Chemical Mutagens," was prepared for the Environmental Protection Agency.

## A snort-full of carcinogens

Persons should think twice before taking a sniff of nasal decongestant, a whiff of perfume, a puff of a cigarette or a toot of that expensive white powder at a Beverly Hills party, according to recent research. Substances in all of the above might be breaking down into formaldehyde, a nasal irritant and known nasal carcinogen.

Alan R. Dahl and William M. Hadley of the Inhalation Toxicology Research Institute at the Lovelace Biomedical and Environmental Research Institute in Albuquerque, N.M., exposed rats to some common drugs and household chemicals. The substances they tested include cocaine, nicotine, nasal decongestants, flavoring and fragrant essences, solvents and air pollutants. In the February TOXICOLOGY AND APPLIED PHARMACOLOGY, they report that one of the highest rates of formaldehyde formation in the nasal tissue of rats was observed in those exposed to cocaine. Nicotine also metabolized to formaldehyde, but not as strongly. Other substances that did include four nasal decongestants and one of the three air pollutants they tested, diesel exhaust. Two of nine essences and several of the solvents produced some as well. In all, 18 substances metabolized to the carcinogenic formaldehyde in nasal tissue.

## Fungi absorbs nuclear wastes

The fungus *Penicilium digitatum* can absorb uranium from solutions of uranyl chloride. Biopolymers such as cellulose, long-chained molecules in the fungal wall, seem to be the active agent in this process, according to a team of researchers from the University of Hawaii at Manoa and from Israel. They also discovered that the fungi don't even have to be alive to absorb—boiling the fungal mass in water actually increased its uranium uptake. In their Jan. 21 paper in SCIENCE, they write that this discovery will have significance for "waste-water decontamination and metals recovery."