NUTRITION BATTLE

Tempest in a cornflakes bowl

When antihunger crusader Robert B. Choate took on Tony the Tiger a few weeks ago, he trod on a $700-million-dollar American corn. The cereal industry each year sells 1.6 billion packages of the breakfast food of champions, tigers and other cartoon characters who promise brawn and bounce on the Saturday morning TV screen.

But Tony the Tiger has been getting along on "empty calories," Choate told the nation via newspaper headlines and TV cameras focused on an otherwise obscure hearing called by Sen. Frank E. Moss (D–Utah). Moss is chairman of a commerce subcommittee seeking relief for the embattled consumer. Choate charged that 40 of 60 cereals "fatten but fail to prevent malnutrition."

Both Moss and Choate, a wealthy one-man lobby for food for the poor who helped organize President Nixon's conference on this subject (SN: 1/10, p. 37), are disturbed by one of those unforeseen small booby traps of social reform. Food stamps are at last available to most poor families. But their first step in the supermarket is toward the glistening packages of the status breakfast foods—cornflakes, Rice Krispies, Wheaties. Because their kids want to be like everybody else, poor Mexican-American families are giving up tortillas and poor black families no longer eat hominy grits.

Choate supported his statement with a bar chart showing how much of each of nine nutrients (protein, iron, calcium and six vitamins) is in each of 60 cereals. Cereals were ranked by the total amount of all nine food elements. While the method had the flaw of giving a vitamin the same weight as protein (if ranked by protein content alone, the order would be different), the ranking nevertheless turned up the matter that Choate finds most shocking: Tony the Tiger's breakfast and other cereals advertised on children's TV are all in the low-nutrient half of the chart. The high-nutrient cereals are chiefly advertised to adults.

The Cereal Institute, which refuses to reveal its annual budget, and W. K. Kellogg Co., inventor of dry, packaged cereal, brought two eminent nutritionists to Washington to refute Choate. Harvard's Dr. Frederick J. Stare testified that breakfast cereals are good foods, "especially with milk." Columbia's Dr. William H. Sebrell said that Choate's method of evaluation led to what he called dangerous conclusions.

Moss declared himself unimpressed by the academic experts' testimony and brought on a nutritionist who has never been a paid consultant to the cereal industry. Said Cornell's Dr. Michael Latham, whose chief interest is feeding the virtually starving populations of underdeveloped countries:

"Old-fashioned cooked rice, hominy, and homemade tortillas are richer in protein and other nutrients than any packaged cereal, at half the price."

The uncertainty that besets the consumer as he strolls through alluring supermarkets shelves was increased by news from the Food and Drug Administration, which is mulling over a possible new ruling. If it makes up its mind, FDA may ask some manufacturers to reduce too-high amounts of vitamins and minerals they have added to cereals. Others may be asked to increase too-low amounts. But the question of how much should be added is still unanswered.

FDA's traditional stance—additives should be limited to those nutrients removed in processing food—is running into new thinking. The White House conference urged food fortification.

While some customers returned Choate's low-rated cereals to their supermarkets, beleaguered producers of pop, crackle and whizz got one cheer-up. There is something in cereals that may just possibly protect lungs against air pollution, said Jeffrey Roehm of the Battelle Memorial Institute this week at the 3rd International Congress of Food Science meeting in Washington, D.C. The "something" is antioxidants, added to keep cereals fresh. The fresheners (butylated hydroxyanisole, butylated hydroxytoluene and vitamin E) inhibit free radicals, unstable compounds that help make biochemistry go by the combining of free electrons they carry. Some think an excess of free radicals occurs with aging. Roehm thinks air pollution may produce an excess of free radicals in the lungs, aging them. Thus antioxidants (if they reach lung cells in sufficient amounts) could help reverse pollution effects.

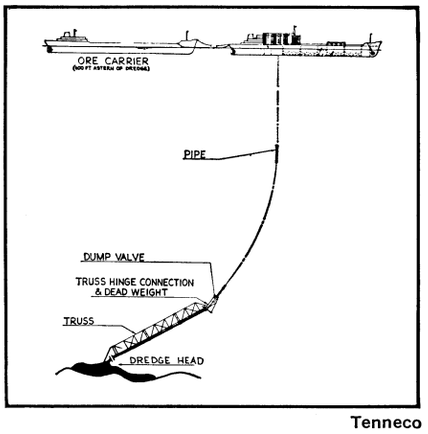
Moss says he got what he wanted out of his hearings. The Federal Trade Commission, looking into concentrated ownership in the cereal industry (three companies produce 85 percent of output), says it will review advertising.

All the huffing and puffing, at a volume near that of the big guns at Battle Creek that puff up Johnny's breakfast flakes, added up to one fact. Nutrition for the rich is different from nutrition for the poor. Food stamps ought not to be spent for a crisp crackle. But for the rich and overfed, cereal-with-milk may be better than the cholesterol in a breakfast egg.

Only nonliberated mothers know the heart of the matter. Ready-to-eats are a self-operating breakfast. While the kids happily munch cornflakes, probing for toys and eyeing the Big Screen, everybody else can sleep late on Saturday mornings. □

OCEAN MINING

Vacuuming the Atlantic floor



Tenneco

Deep-ocean vacuuming for profit.

While man has clawed for centuries into the earth's surface to extract metal ores, nature has been steadily converting run-off wastes into high metal concentrates and storing them in her seas.

Some deposits are found on the ocean floor in the form of solid lumps or nodules. They soon may serve to replenish dwindling supplies of manganese, copper, cobalt and nickel as surface mines are depleted.

Manganese nodules have been found in nearly every ocean area (SN: 1/18/69, p. 62), but large concentrations frequently lie at great depths.

How they are formed is still uncertain. The most prevalent notion is that they are electrochemically deposited around some nonmetallic nucleus, such as a grain of sand, a rock or a fish tooth. They generally measure 3 to 5 inches in diameter but specimens of irregular shape have been found measuring a foot or more across.

The metallic content of the nodules can vary considerably. Among the best found are those in the Pacific Ocean, about 1,000 miles west-southwest of the California coast, which show a yield of 25 to 35 percent in manganese. In comparison, raw ore mines on land produce 46 to 50 percent manganese. But the nodules also contain other valuable metals: cobalt to 1.5 percent, copper to 1.6 percent and nickel to 1.8 percent.

The ocean's supply of nodules appears limitless. The problem, of course, is that so far the cost of retrieving them has not been competitive with surface mining techniques. But the time may be nearing—some estimate by the mid-1970's—when the undersea reserve will become a necessity.

To harvest this wealth of material economically, a new method for lifting large quantities of the nodules to a surface ship was required. One may now be near at hand.

This week an experimental operation was concluded seeking to prove that a new system for retrieving the nodules can be commercially attractive. The effort is the first large field test of a $10 million research and development investment by Deepsea Ventures Inc., a subsidiary of Tenneco Inc. Preliminary results are highly encouraging.

The Deepsea Miner, a seagoing test platform for the dredging equipment, left Charleston, S.C., late in July for a point some 150 miles east of Jacksonville, Fla., in the Atlantic. There, the crew assembled a prototype lift system and lowered it to Blake Plateau, more than 3,000 feet below.

Resembling a giant vacuum cleaner, the dredge head was slowly drawn over the ocean bottom and tons of muck and nodules poured into the ship.

"Success of the venture is astounding," stated a radio report from the ship last week. Engineering chief Raymond Kaufman reported also that the hydraulic mechanism, designed for a 400-ton-a-day lift rate, was raising material four times faster than planned. In fact, the operating speed had to be lowered because the material delivery was exceeding the ore separator capacity.

Tenneco

The target: Manganese nodules.

The Atlantic site was selected for convenience, not for the metal content in the nodules, which is low. After separation, engineering and production measurements are made and the nodules are returned to the sea.

The vessel was to return to Charleston late this week and test results were to be evaluated soon after, according to Tenneco. If the Deepsea Ventures' concept is proved commercially practical, a new industry will come into being.

To make deep ocean bottom mining commercially attractive, Kaufman estimates that a nodule bed must contain a density minimum of 2.5 pounds per square foot. Beds having such concentrations and extending for hundreds of miles already have been located by the firm. All are in the Pacific at depths of 12,000 to 16,000 feet, he says.

The two-year-old company, located in Gloucester Point, Va., is directed by its president, John E. Flipse, who began studies of the mining method and its potential in 1962. He then was in the Research Department of Newport News Shipbuilding & Dry Dock Co. in Newport News, Va.

In 1968 Tenneco acquired the shipbuilding firm and established Deepsea Ventures as a separate subsidiary. The prototype dredge head and pipe are about half the size required for a commercial system.

The Deepsea Miner is a converted 320-foot cargo ship fully outfitted to assemble and deploy the dredge-lift mechanism. Once at the test site, nearly a full day was required to string and lower the massive suction head, support truss, and more than 3,000 feet of 10-inch pipe assembly.

In operation, a compressed air stream flows down the pipe and into the 16-by-16-foot head. There, a slurry of water, silt and the manganese nodules is forced into the suction pipe and upward to the ship's separator. It was given time, money and a charter to develop the ocean mining concept and a metal extraction plant.

If results of the two-week experimental operation reflect the early success reported, Deepsea Ventures will proceed with plans to build an 800-foot dredging ship. Equipped with a 30-by-30-foot head and a 20-foot diameter pipe, the ship will be designed to operate to 20,000 feet in depth. It will have a capacity for lifting and processing 25,000 tons of manganese nodules a week—worth more than $3 million at today's prices. Tentative target date for the commercial mining venture is 1975. □

NUCLEAR FUEL

Puzzle from South Africa

The adage, "Build a better mousetrap and the world will beat a path to your door," conjures up a picture of streams of eager buyers. It also implies anxious job hunters first in line.

Such a situation may have been the design of South African officials last month with their sudden claims of success in developing a wholly new process for enriching uranium. Nuclear engineers in the United States report no forewarning of the claimed technological breakthrough, nor do they admit having any knowledge of the enrichment process involved.

And they have not been enlightened since. Officials in South Africa have been highly secretive in their public disclosures. Prime Minister B. J. Vorster made the first announcement on July 20, but he offered no details beyond saying that the process is unique and that a pilot plant already is under construction. The Prime Minister also indicated that a full-scale facility will follow whose output would be competitive with Western enriched fuels. Reportedly, the pilot plant is funded at about $70 million.

Dr. A. J. A. Roux, the chairman of South Africa's Atomic Energy Board, later was quoted by Dagbreak, a Johannesburg newspaper: "It is not the gas-diffusion process, as many think. Neither is it the gas-centrifugal system. It is an entirely new principle."

Responses by officials of the U.S. Atomic Energy Commission in Washington, D.C., are mixed. One said he is "skeptical of any previously unknown process that is claimed to be commercially practical," and another declared there is "no attractive process known today" other than gas-diffusion or gas-centrifugal enrichment; but a third disclosed he is "taking their claims at face value."

South Africa, although small, is well-heeled and well-laden with uranium, largely due to its extensive gold-mining operations. But the country has not been known as a leader in the nuclear field and, at least publicly, it has supported only a modest research effort during the past decade.

It does have two research reactors at Pelindaba, near Pretoria, and a 400-megawatt (electric) power station under construction near Capetown is scheduled for completion by 1977.

A hint may have been revealed some six months ago that something was brewing when atomic energy officials there showed new interest in enriched fuel reactors. Previously, says an AEC official, their interest had been in use of natural uranium.

But that gives no clue to the new process. Several processes have been investigated in the past. One is an electromagnetic technique which was tried in the American Manhattan Project during World War II, but was abandoned in favor of gaseous diffusion. Others include thermal diffusion and even chemical separation. None of these proved practical for large-scale production. The West Germans are studying a high-velocity nozzle process, employing a kind of mass separation method, but this is believed still experimental.

An AEC source who considers the South African claims serious expressed doubts that the nation has a present capability to engineer the plant. Although associated with international nuclear activities, he denied knowledge of any recent migration of fuel specialists to South Africa.

But the line may be forming. □