Cyclamates banned

In the bitter battle over sweets, a 20-year-old sweetener was finally undone

By February 1 all cyclamate-sweetened foods will be off grocery shelves.

For years a battle of steadily growing intensity has raged around the safety of cyclamates.

The artificial sweetener has been around since 1950, but only in the last decade has it become the staple of a $1 billion a year diet business (SN: 10/26/68, p. 428). With increasing frequency in the last 10 years scientists supported by the cyclamate-threatened sugar industry have turned up evidence that cyclamates cause diarrhea in children who drink much artificially sweetened pop and punch, that they block the action of certain antibiotics and that they are potentially dangerous to diabetics taking oral anti-diabetes drugs (SN: 12/7/68, p. 571).

With equal conviction, scientists backed by Abbott Laboratories, the Chicago based drug house that produces the bulk of cyclamates to the tune of $14 million a year in profits, reported that their studies showed no evidence of harm.

Meanwhile, various National Academy of Sciences panels looked into the matter, recommending maximum safe daily consumption, and the Food and Drug Administration issued a series of reports indicating that it had the issue under consideration and would act if signs of a serious threat materialized.

Last week, Health, Education and and Welfare Secretary Robert H. Finch, whose department includes the FDA, said that such evidence was at last in hand and categorically banned cyclamates from supermarket shelves.

And with that, Abbott abandoned its fight for its yearly $14 million (only about four percent of its total business) and placidly concurred with the secretary's action. In fact, the company claims, it was itself responsible for the demise of cyclamates.

The issue, scientifically, was no longer diarrhea or interference with drug metabolism. It was cancer. And it was no longer a matter of choice. It was suddenly a matter of law.

The key is the Delaney amendment, passed in the 1950's, which declares that no agent that causes cancer in any animal can be added to food. It says nothing about dose levels. Nor does it require proof from human experiments. Therefore, when scientists working under Abbott sponsorship discovered bladder tumors in rats fed enormous daily doses of cyclamate for two years, the battle, which in the past had pitted the industry against any suggestion of regulation, was suddenly over.

Abbott contends that the whole thing happened with lightening speed. For two years, an Abbott official recounts, investigators at the Food and Drug Research Laboratories, a private Long Island firm, had been feeding groups of rats doses of cyclamates, ranging around 500, 1,000 and 2,500 milligrams daily, to test for their effects on reproduction, fertility and on unborn fetuses. Consistently, he says, the findings were "clean." However, when the animals were sacrificed at the end of the study and tissues examined pathologically, bladder tumors showed up.

According to the account, this information was reported to company scientists by phone two weeks ago and last week Abbott researchers flew to Long Island to see for themselves.

From there, in quick succession, the damning slides were shown to investigators at the National Cancer Institute and then at the FDA. On Thursday and Friday a six-man academy panel, headed by pharmacologist Julius Coons of Jefferson Medical Colege in Philadelphia, convened, reviewed the data and urged the subsequent cyclamate ban. It was announced on Saturday.

The bladder tumors appeared in those animals fed the largest daily dose of

HEW

Finch: Following a "prudent course."

cyclamates, 2,500 milligrams per kilogram of body weight. For human beings—based on the average 154-pound or 70-kilogram adult—it means an individual would have to consume either 3,500 Sucaryl tablets or 350 bottles of diet cola a day to reach a similar dose level.

"That," says Dr. Frank R. Blood of Vanderbilt University and a member of the NAS panel, "is 100 times to 120 times greater than even high cyclamate users could consume. We recommend the cyclamate ban because of the law, not because there is any reason to believe that it causes cancer in man."

Both Dr. Blood and Dr. James Miller of the University of Wisconsin, another panel member, expressed surprise at the bladder cancer finding.

"There was nothing to lead us to suspect cyclamates would cause cancer," Dr. Blood says. Dr. Miller explains that while there are certain types of chemicals, classed according to their molecular structure, that are known cancer-producers, cyclamates are unlike any of these.

"It was quite impossible to look at its structure and suspect it as a carcinogen," he comments. "Nor is there any reason to believe that any chemical, given continually in such large doses, will produce tumors. That assumption is a fallacy." Nor are there other food additives, he says, which are structurally like cyclamates.

Nevertheless, FDA is now expected to launch investigations of other food additives on what is called the GRAS (Generally Regarded As Safe) list. There are hundreds of them, including monosodium glutamate, also the object of recent controversy (SN: 10/4, p. 295), and saccharin, the sweetening agent used in combination with cyclamates.

It is uncertain at this point just which ones will be singled out for study, though Sen. Warren Magnuson (D-Wash.) has said he will try to provide FDA funds for such investigations.

Sen. Magnuson, a strong advocate of consumer rights and a member of the Senate subcommittee that oversees HEW appropriations, recently defended an FDA scientist, who had reported adverse findings from cyclamates studied in chick embryos, when she came under attack by HEW head Finch. Dr. Jacqueline Verrett reported last month that when chick embryos were fed normal doses of cyclamates, deformities appeared in 15 percent of the animals. Finch criticized her for taking her evidence directly to the news media, though she may well have informed FDA Commissioner Dr. Herbert L. Ley Jr. of her results in a neglected memo in December. More recently, another FDA scientist, Dr. Marvin Legator, reported on cyclamate-damaged chromosomes from tissue cultures (SN: 10/4, p. 306). These reports prompted Dr. Ley to call for a new NAS review, originally scheduled for completion by late November.

In the wake of these events, the major soft drink companies and other manufacturers of diet foods are quickly changing over to diet products that contain no cyclamates. Many expect to have their new products on the market within a few weeks. Apparently the cyclamate ban did not come as a complete surprise, although the cancer-based abruptness of it probably did.

And several firms, including the pharmaceutical manufacturer G. D. Searle and Co., report they are working on new artificial sweeteners to substitute for cyclamates, though it is unlikely FDA will pass any soon.

Meanwhile, Abbott is negotiating with the FDA to salvage some of its cyclamate business, saying it will cooperate with FDA in the "development of appropriate new regulations," that will make cyclamate products available to persons who need sugar-free food. □

WOBBLE IN THE CRAB

Pulsar may have a planet

Stars with companions, double and even triple stars, are fairly common in the universe, but only four stars are known to have planet-sized companions (SN: 5/26, p. 398). The known companions are all rather large bodies, between Jupiter and the sun in size.

Now a pulsar seems to have a companion the size of the earth.

The presence of dark companions is determined by observing minute back-and-forth fluctuations in the motion of the star. Only if the companion is quite large is its gravity strong enough to cause enough motion of the star to be seen on photographic plates. But with a pulsar there is another way.

"With a pulsar," says Prof. Thomas Gold of Cornell University, "we have this enormous ability to detect a very slight motion." It's done by watching for minute variations in the pulse repetition rate.

A group of Cornell radio astronomers led by Prof. Gold, Drs. D. W. Richards, G. H Pettengill, C. C. Counselman and J. R. Rankin, have found a periodic three-month variation in the repetition rate of pulsar CP 0532 in the Crab nebula. This can be interpreted as a Doppler shift caused by a back-and-forth motion of the source. If it is so interpreted, says Prof. Gold, "then it would be a motion with an amplitude of 200 kilometers."

If it is such a motion, says Prof. Gold, then a companion the size of the earth revolving around the pulsar at a distance equal to a quarter of the earth-sun distance could cause it.

Another group of astronomers at Princeton University, led by Dr. R. B. Partridge, have been watching CP 0532 optically and checking its repetition rate against an atomic clock (see p. 375), and similar aberrations have been found in other pulsars.

"We haven't analyzed our data looking for wobble," says Dr. Partridge. "We're going to look right away."

DELBRUCK, HERSHEY, LURIA

Biology Nobelists

When a virus invades a cell, it leaves behind its outer, protein coat, infecting the cell only with pure genetic material. The attacking virus works its way into the cell's genetic machinery, and metabolic changes ensue as virus and cell interact.

Within 30 minutes of the time a virus strikes a bacterium, some 100 progeny viruses form, destroying the original bacterium as they break through its cell membrane. Further, it is possible for two viruses to infect a cell simultaneously, with resultant mutations in their DNA and the eventual birth of hybrid progeny viruses. Such hybrids yield information about the detailed genetic structure of viruses.

This basic knowledge, available today in any biology text, came from studies in the 1940's of bacteriophages, simple viruses possessing only a few genes and a unique capacity to infect only bacteria. It formed the backbone of the investigations in the 1950's that led James Watson and Francis Crick to the helical structure of DNA, and helped Arthur Kornberg to identify an enzyme, DNA polymerase, as the molecule responsible for DNA copying. This year, the three scientists who built that foundation of knowledge shared the Nobel Prize in Physiology or Medicine "for their discoveries concerning the replication mechanism and genetic structure of viruses."

The $73,000 Prize went to Dr. Max Delbruck of the California Institute of Technology in Pasadena, Dr. Alfred Day Hershey, director of genetic research at Carnegie Institution in Cold Spring Harbor, L.I., and Dr. Salvador Luria of the Massachusetts Institute of Technology in Cambridge. While generally working independently, the three scientists then, and now, met informally to discuss their mutual interest in bacteriophages, forming the nucleus of what was called the Phage Group.

Dr. Delbruck, born in Berlin 63 years ago, came to the United States in 1937 (supported by a Rockefeller grant), where he began his phage work at Vanderbilt University with the development of the plague technique for purifying viruses. In the 1940's he met Dr. Luria, a 57-year-old native of Turin, Italy, when both were on the faculty of Indiana University. For a time they worked together, constructing a mathematical model of phage reproduction and exploring the interactions between phage and bacterium. Dr. Hershey, who became friendly with the other two at about that time, was teaching then at the University of Wisconsin. Born in 1908 in Owosso, Mich., he is the only American-born member of this year's Nobel trio.

Health, Education and Welfare Secretary Robert H. Finch lauded the three Prize-winners, citing the fact that grants from the National Institutes of Health have supported all three Nobel