

ON  
THE  
TRAIL OF  
THE

Perfect

# Potato Chip

Science  
aids munchers  
in their quest for  
the absolute crunch

BY GARY MARSHALL

If potato chips had nicotine, we'd all be doomed. As it is, they are addicting enough, those crispy fried spuds full of oil, salt and an occasional nutrient. But while the initial liking of potato chips was accidental (chips were invented in Saratoga Springs, N.Y., in 1853 by hotel chef George Crum, who was a member of the Stockbridge Indian tribe, or perhaps by Aunt Katy Weeks, who assisted Crum in the kitchen), the subsequent success of the industry is anything but an accident.

Potato chips are about the last things that come to mind when you think about scientific studies. But the crispy little devils have been probed, dissected and analyzed. In quest of the perfect chip, scientists test for the right potato, the right oil, the right container and even the right flavoring. In Japan, for instance, you can buy seaweed-flavored potato chips.

There also are sophisticated marketing surveys to back up the laboratory stuff. Jules Powell of the U.S. Department of Agriculture points out there is a direct correlation between consumption of processed potatoes (chips or frozen fries) and the number of women in the work force.

The more working women, the more processed potatoes get munched. There's a big mar-

ket for the chip companies to fight over.

According to Larry Burch, executive vice president of the Potato Chip/Snack Food Association (PC/SFA), the average American eats 4.1 pounds of chips each year, outselling corn chips 3 to 1. That's a one-ounce bag every six days for every man, woman and child in the country.

Of all the potatoes grown in the United States, 11% goes to chips. That's 3.9 billion pounds of potatoes each year and sales were up 4.6% last year. That's a gross of \$1.7 billion and, Burch says, the future looks just as good.

"We are an industry that does quite well in times of recession. When people are pinched for money, they stay home, watch TV, mix with the family and eat snacks. Bad times for other industries are pretty decent for the chip industry."

The chip industry has come a long way since the days of small businessmen in horse-drawn carriages dropping off chips door to door. In Cleveland, chips were first sold by William Tappenden, in 1895, and delivered by his 12-year-old daughter.

Today, the industry has gone big time, complete with congressional lobbyists and law-

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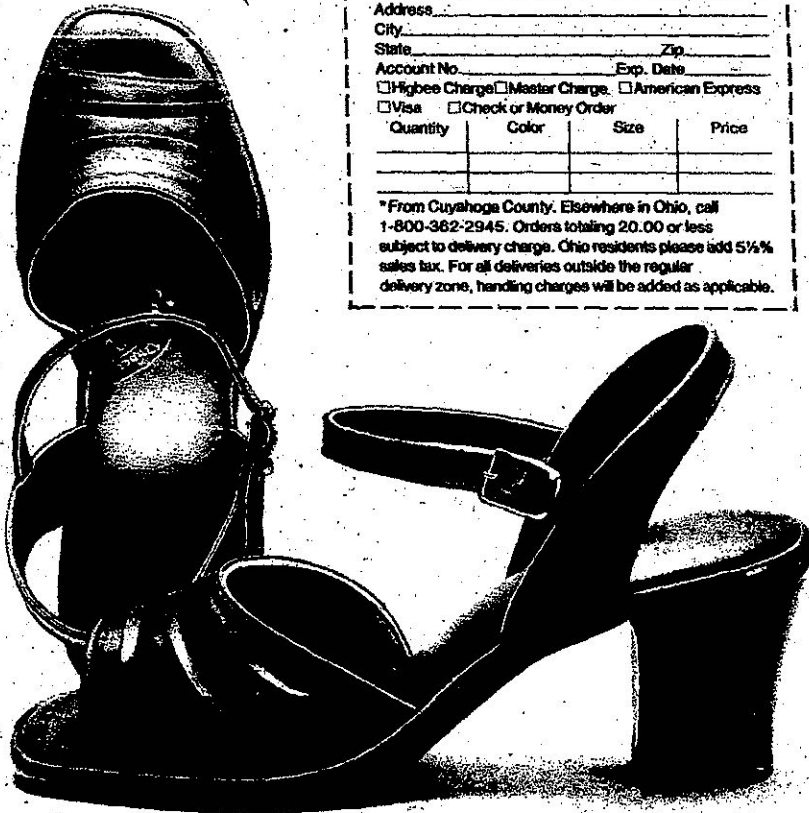
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## CHIPS CONTINUED

suits. The headquarters of the trade association, (PC/SFA) moved from Euclid two years ago to Washington, D.C. It now has a staff of 10 people.

Even though chips are a big business, many small companies still make them, Burch says. The fragile chips are hard to ship outside of a 200-mile radius.

That's why almost every major city has its own locally owned potato chip factory. Burch estimates that there are more than 200 brands in the United States, but 90 of them hold 95% of the market.

Most of the companies got into the business before high technology mechanization became popular, however. It costs roughly \$250 million to start a large-scale chip factory today.

Burch says there are 18 potato chip brands in Ohio alone, not counting the national brands (like Frito-Lay), the supermarket brands, the natural brands (the brands with no preservatives — and an occasional peel — you find in health food stores) or the ones which come from just across state lines (like Mr. Bee, from Parkersburg, W. Va., which holds a strong popularity in southeastern Ohio).

Some of the brands probably are familiar to you: Dan Dee, from Cleveland; Flaherty's or Salem's from Akron; Thomason's from Elyria, or Kline's from Bolivar.

You may have seen a Buckeye bag, from Columbus. Buckeye started from scratch in 1968 and now does more than \$100 million a year in sales, according to reports published in Chipper Snacker, a trade magazine published in Hanover, Pa.

Some brands may not be so familiar. Ever had a Husman's or a Grippo's from Cincinnati? How about a Carroll's from Chillicothe or a Conn's from Zanesville? Ever had a Jones' from Mansfield, or a Ballreich's from Tiffin?

A lot of things make the chips taste different. Mike-Sells, out of Dayton, has a distinctive taste because its chips are cooked in 100% peanut oil. But it can be more than the oil — there are lots

of reasons Wise (Columbus), Herr's (Chillicothe) or Snyder's (Berlin, Pa.) don't taste the same.

Ways of storing or peeling the potato can make a big difference in taste of the chip. For instance, you rarely will find a chip made from an Idaho potato. Aside from being expensive, Idaho potatoes are kept in cold storage. That's why they are so firm.

But anytime a potato is stored below 52 degrees, a chemical change takes place

A lot of things make the chips taste different ... A good potato is especially important if you are using a cheap oil — logical enough, since a chip is 35% oil.

that causes the potato to taste slightly sweet and to turn dark brown when fried — they just don't look right. But scientists, dealing with storage temperatures, have found a way to trick the potato into thinking it's spring. At Dan Dee they raise the potatoes five degrees a week until they reach room temperature. The gradual heating avoids the sugar problem.

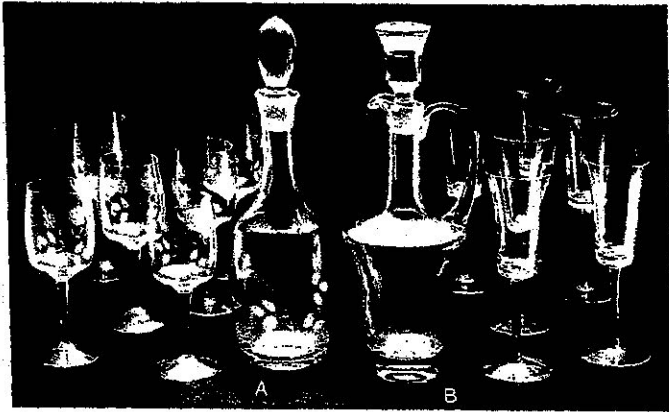
Dan Lopatt, general manager at Dan Dee, said the company follows the growing season up the East Coast from Florida while buying its potatoes. By late summer, most of the potatoes used for chips come from Ohio, as Ohio has a reputation for being a good state for potatoes.

A good potato is especially important if you are using a cheap oil — logical enough, since a chip is 35% oil. If your potato chip bag says "vegetable oil or shortening" it means the chips were fried in the best

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# ANNIVERSARY SALE

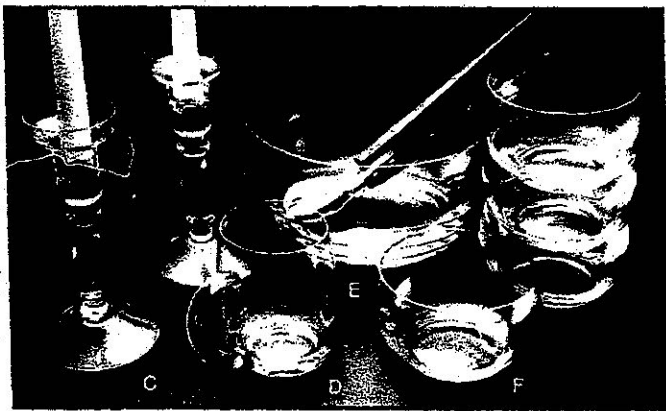
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## CHIPS CONTINUED FROM PAGE 38

quality oil they could afford at the time.

There are many different kinds of oil, and, like wine, each has its own subtle flavor. You have to concentrate on what you're tasting because, according to Dr. Wilbur Gould, chairman of the Food Technology Department at Ohio State University (considered by people in the industry to be the world's leading expert on chips), the differences are so subtle most people can't detect them.

Peanut oil adds a nifty taste, and a greasy smell when you open the bag. Safflower oil, an excellent polyunsaturate, is the first-round draft choice for most natural-style chips. It adds a certain nuttiness to the chip.

For the past few years, the U.S. Food and Drug Administration has been investigating the use of cheap oils and their effect on the quality of the chip. It's part of the government's review of general nutritional guidelines.

Cottonseed and palm oils are the cheapest and most widely used, while sunflower or corn oils are the most rarely used because they make a blah chip.

Soybean oil is becoming steadily more popular, but don't expect to find it listed on the side of the package. It's a fine oil, but it's usually lumped in the "vegetable oil" class.

For the past few years, the U.S. Food and Drug Administration has been investigating the use of cheap oils and their effect on the quality of the chip. It's part of the government's review of general nutritional guidelines. Legislation now under development by Sen. George McGovern, D-South Dakota, would require the companies to list the specific type of oil used. The idea is to give the consumer better nutritional

information on each package.

But Burch says the nutritional differences among oils are minor and the labeling law would be terribly inflationary.

Since only a few companies use just one kind of oil, the other manufacturers would be forced to store more bags to cover whatever oil they used that day. Burch says, "most companies can't afford to give up the bargain blends."

Industry lobbyists, including those who represent firms that only use peanut oil, oppose the measure.

The idea of lobbyists and lawyers for potato chip companies came to a head shortly after Procter & Gamble introduced Pringle's. According to Lopatt, P&G is considered one of the best corporations in the country for marketing strategy and it spent more than \$200 million in developing, testing and marketing the chip.

Studies by P&G showed consumers wanted uniform chips in a resealable container. Pringle's, made out of potato flour, was P&G's answer.

The other chip manufacturers howled. They said taking dehydrated potatoes, frying them into a potato chip shape and then calling them chips was like wrapping ground beef around a T-shaped bone and calling it a T-bone steak. They stuck to the Webster definition of a potato chip -- "a thin slice of raw, white potato fried crisp in deep fat."

Sound trivial? It wasn't. The battle between the traditional-chip interests and firms using the potato flour process has been in and out of the courts since 1969. Even though no suit was filed against P&G, the case became known as the Pringle's case since the sales of Pringle's surged to command 25% of the chip market.

The original suit, filed against another firm, arose when the FDA changed its definition of the potato chip, Burch says, and it was no longer necessary to label a chip as being made with fresh or raw potatoes.

Later it changed its labeling requirements so that any package that said "potato chips" on it had to include "made from dehydrated potatoes" if they were made with potato flour.

Although the labeling change wasn't the primary reason, Pringle's sales started declining shortly after the change was announced. The newfangled chips now command only 3% of the market and there is some speculation P&G soon may pull them off the market.

Why did Pringle's fail? Lopatt said it's because P&G's own marketing strategy backfired. Since Pringle's were perfect for parties (crunchy enough to

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## CHIPS CONTINUED

stand up to dip, uniform enough to look nice in a bowl) people bought thousands of packages of Pringle's and put them on their shelves.

But as Lopatt points out, the Pringle's stayed on the shelf. When it was time to pick up a bag of chips before the football game, consumers picked up the local brands. The bottom line, as many consumers saw it, was Pringle's just didn't taste as good as other chips.

The cans were an attempt to solve the long-standing problem of shipping, but it's doubtful they'll catch on in the industry. An Atlanta company, Daddy Crisp, tried shipping regular chips in cans, but they've since gone out of business, and one of the key reasons was the high cost of the cans. Large bulk cans, such as Charles Chips (Mountville, Pa.), are profitable only because they are returnable for deposit.

The Japanese have started making Pringle's-style chips and mixing the batter 50/50 with other ingredients, like seaweed or chicken.

If the thought of a chicken-flavored chip revolts you, think of this — 85% of all chips sold outside of the United States are flavored, as opposed to only 10% here.

In Australia, you can find pork or beef chips; in Europe, tomato chips. Fish-flavored chips also can be found in a few parts of the world.

But no matter where you are in the world, the most important factor in a good chip is freshness. That's one reason local brands taste better than some national brands, and that's why a company like Frito-Lay has 40 plants from coast to coast.

But a fresh chip soon will turn rancid or stale if it's stored in the wrong type

of bag. Everyone knows air and humidity will make a chip lose its crunch. Foil bags have become popular because they keep out air, humidity and sunlight, which also makes a chip go stale.

That's why some chips bought in vending machines taste so bad. They are in see-through bags.

**If the thought of a chicken-flavored chip revolts you, think of this — 85% of all chips sold outside of the United States are flavored, as opposed to only 10% here. In Australia, you can find pork or beef chips**

New Banlight bags look like regular wax bags but keep light off the chip because of a special brown lining. The lining sometimes is made of chocolate, and when you first open the bag you might detect a faint chocolate scent.

**B**ut despite advanced bags, marketing surveys and scientific studies, the general public still sees the potato chip as a junk food.

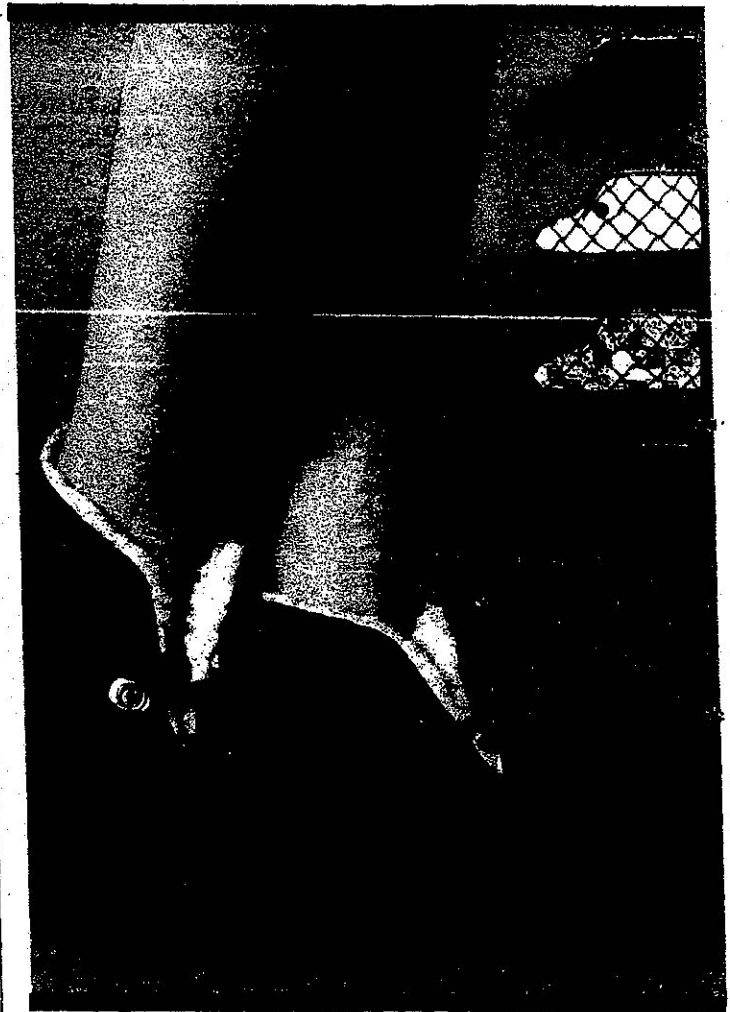
It's kind of a bad rap. According to industry statistics, a standard, one-

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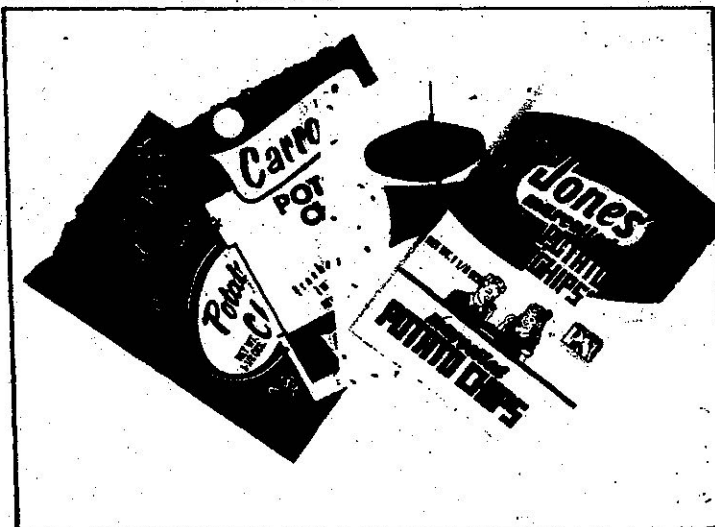
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## CHIPS CONTINUED

ounce bag of chips contains 150 calories, 14 grams of carbohydrates and 10 grams of fat.

That's the bad news. The good news is most people don't get enough of their daily caloric intake from chips to worry about their nutritional value. Most people don't eat chips expecting a solid meal.

Potatoes are pretty good for you, supplying trace minerals among other things. But they also are 80% water. When potatoes are made into chips, all the water leaves and is replaced by oil. Gould said this isn't necessarily bad as oil acts as a lubricant. Chips would be too dry without the high oil content.

But some oils — specifically those high in saturated fats — have been assailed for their effect on our arteries.

Salt, the other key ingredient to a chip, has been attacked for its effect on blood pressure.

Actually, potato chips are somewhat nutritious. A one-ounce bag of chips supplies 2 grams of protein, or 2% of the minimum daily requirement; 10% of the RDA for vitamin C, 2% of the RDA of thiamin, 6% of the RDA of niacin and 4% of the RDA for vitamin B-6, phosphorous and magnesium.

"People really don't eat chips for a complete meal so as a result we don't need to fortify them," Gould said. "They are a good product, absolutely nothing wrong with them. I ate a bag with my lunch today. I still eat them."



Dr. Wilbur Gould — Still looking for that perfect chip.


Such an endorsement carries a lot of weight in potato chip circles. Gould has been researching chips for more than 20 years. His lab at Ohio State includes a mini-potato chip manufacturing plant.

Gould works primarily through the PC/SFA. He makes much of his data available to the government but the bulk of his money comes from private industry.

In the future, Gould sees new methods of cooking which will produce a chip with less oil, less salt and a more uniform flavor.

Gould also sees a rise in

flavored chips, as the United States catches up with the rest of the world. He doesn't expect fortified chips (nutritional additives sprinkled on like barbeque flavoring) since the studies have shown people don't eat chips for a complete meal.

Gould also expects to see more companies using corn with chips, since it's cheaper than potatoes. But he's certain about one thing — Americans will continue to munch away. 

*Gary Marshall, almost an alumnus of Ohio University and a summer intern at The Plain Dealer, collects potato chip bags as a hobby.*



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