PHYSIOLOGY

Sense of Smell

Sense of smell actually reveals true savor of foods. It provides enjoyment of flowers, perfumes, fresh-cut hay and burning leaves, and also serves as warning of contamination.

By RUTH and EDWARD BRECHER

➤ "MY, but this tastes good," you remark as you take your first sip of that delicious, piping-hot onion soup, salted, peppered, seasoned with thyme and garnished with Parmesan cheese.

You are wrong, of course. You mean that the soup smells good. Your sense of taste, dependent upon the taste buds distributed along your tongue, tells you only whether a substance is sweet, sour, salty or bitter.

It is your sense of smell that reveals the true savor of the soup—the delicate "flavor notes" that distinguish it from a thousand other foodstuffs.

Try sipping onion soup while pinching your nostrils, or when you have a head cold. The characteristic flavor vanishes. All that is left is a hot, somewhat salty liquid. By means of taste alone, you can barely distinguish between a food you love, such as cinnamon-topped applesauce, and one you detest, say stewed rhubarb.

Nerve-Rich Surfaces

Flavors reach the nose "through the back door": they travel from the mouth down the throat and then up again along the air passages which lead to the nasal cavities. You "smell" when you inhale; you sense flavors when you exhale; otherwise the two processes are the same. Both depend upon your olfactory tracts—the nerve-rich surfaces forming the ceilings of your two nasal cavities.

Each olfactory area is about the size of a postage stamp and located so high in the nasal passages that, during ordinary inhaling, moderately odorous air may pass under it without arousing any smell sensations.

When you see something whose odor you wish to sample, you sniff—and this carries the odor-laden air upward to the olfactory tract. There is no need to sniff while you eat, though. As you chew your food, warm vapors are released from it; the act of swallowing and the related act of exhaling pump these flavor-laden vapors upward toward the nose.

In general, the higher the temperature of a substance, the more molecules are given off, and the more intense is the odor. This basic relationship of aroma to temperature lies at the heart of the science of food preparation. It explains why good cooks insist on serving soups and other tasty dishes piping hot for maximum flavor.

Iced tea and coffee may be refreshing to drink, but they never achieve the full-bodied flavor of hot tea or hot coffee. Indeed, professional coffee tasters insist that hot coffee and iced coffee actually have *different* flavors.

The savor of frozen vegetables, fruits and other food items also depends partly on this flavor-temperature relationship. Green peas, asparagus, strawberries and other garden produce contain a variety of delectable flavor components rapidly lost at room temperatures.

By freezing immediately after picking, many of these flavor molecules can be "locked in." Hence food processors freeze their products as quickly as possible after harvesting.

Subtlest of Senses

In certain respects, smell is the subtlest of our senses. A scientist in his laboratory can, with the help of costly laboratory aids, identify one drop of a chemical mixed with a million drops of something else. But with his unaided nose, the same scientist or anyone else can instantly identify highly odorous mercaptan—the substance responsible for the stench of the skunk—even though each molecule of it is diluted with billions of molecules of air.

Although the gamut of visible colors are produced by combining the three primary colors: red, yellow and blue, odor specialists have been unable to identify the primary smells.

Every natural odor or flavor, most experts believe, is actually a blend of many. In coffee, for instance, chemists have identified more than 50 flavor components and suspect there are many more. Therefore they speak of a "flavor profile," in which each component modifies your reaction to the others.

Flavor in Cooking

A good cook uses this flavor profile instinctively in concocting her tastiest dishes. She adds spices and herbs in quantities too small to be identified individually, yet sufficient to achieve a striking total effect. The goal is to have guests ask, "What did you put into this to make it so delicious?" rather than, "Mmmm . . . Ginger, isn't it?"

Many people are extremely conservative in their flavor preferences. They object to change. Occasionally a food company has notably improved the flavor of a product only to be deluged with complaints that it "doesn't taste right." Most companies therefore introduce flavor changes gradually, in barely noticeable steps over months or years.

Food packagers report also a trend toward mildness or blandness of flavor in foods and beverages. Light coffees, light beers and relatively unflavored breads have seized the market from more highly flavored predecessors.

Our mints are less minty, our Camembert less Camemberty, and such insistent flavors as licorice are rarely met.

Satisfactory Odors

The same nose that guides you in food selection also provides your enjoyment of flowers, perfumes, the odors of a garden on a moist spring day, of fresh-cut hay in the summer or of burning leaves in the fall. It can summon out of the distant past an emotionally satisfying recollection of some early scene. A whiff of a particular perfume may transport a man back to the high-school commencement party and his first girl.

Why are some smells pleasant and some unpleasant? The answer seems to lie partly in the distant past of mankind and partly in our own experience. The stenches of rotting and of excrement are almost universally detested; they are warnings of possible contamination.

The odor of the skunk is nauseating not only to humans but to animals as well. Yet, skunk odor may be thoroughly enjoyed when sufficiently diluted and blended. Flavor experts report that among the many flavor components in beer is a very definite skunky note without which it would not taste like beer.

Acuteness of Smelling Sense

Do we differ much from one another in our sense of smell? Certainly there is some variation. It is said that women have a more acute sense of smell than men, and that our sense of smell becomes dulled as we grow older—so that we are more likely to enjoy highly flavored foods like anchovies and pickled herring late in life.

However, experts who have run thousands of taste-and-smell panel tests tell us that they are much more impressed by the similarity of smelling ability among people generally than by the differences.

It is widely believed that smoking, and drinking alcoholic beverages, dulls our sense of smell. The evidence is not impressive. Professional coffee tasters smoke at their tasting ritual.

It has also been reported that our sense of smell is most acute when we are hungriest, and loses some of its sharpness after eating. This may result from paying more attention to smells when we are hungry.

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Exposure to a specific strong odor for a few minutes will dull your awareness of that particular odor; hence workers in industrial plants where a foul smell is always present soon lose their sensitivity to it.

However, even after spending an entire day in a beet-sugar factory where a highly objectionable odor is present, workers are still able to distinguish other smells without difficulty.

Some scientists think we are gradually losing our sense of smell. They tell stories of primitive tribesmen whose noses are sensitive enough to be used in tracking game.

But it is equally likely that our sense of smell is only lying dormant, ready to be used effectively whenever we choose to train it. A perfumer, after sniffing a flower carefully, can analyze its fragrance into numerous components and then blend appropriate substances to produce a scent barely distinguishable from the original.

A wine-taster, savoring a fine wine, can sometimes guess from its bouquet not only the type of wine but also the vineyard from which it came and the year in which the grapes were grown.

The extent to which much "nosey" enjoyment can be developed is dramatically illustrated in the experiences of Helen Keller. Blind and deaf, Miss Keller was from an early age far more dependent on her sense of smell than the rest of us. The late Dr. Frederick Tilney once resolved to test her sense of smell on a drive from New York City out to Long Island. Mile after mile, Miss Keller was able to identify her surroundings by smell alone.

"Now we are passing through grassy fields," she said as the car skirted a golf course. "Here are trees," she added, as a wooded grove whizzed past, "and there is a house with an open fire on the hearth."

Dr. Tilney had completely missed the house. Looking back he could see it, a wisp of smoke curling from its chimney.

This article was prepared for SCIENCE NEWS LETTER in cooperation with the *Reader's Digest*. It will appear in the March issue of that magazine.

Science News Letter, February 18, 1956

PHYSICS

Size of Anti-Proton

➤ THE ANTI-PROTON, newly discovered particle of negative matter, is twice the size scientists expected, Dr. Owen Chamberlain of the University of California reported to the American Physical Society meeting in New York.

He said experiments in Berkeley's giant cyclotron confirmed this "unexpected" property. (See SNL, Jan. 14, p. 21 and SNL, Dec. 24, p. 403.)

Dr. Edward Teller, also of the University of California, has predicted the future discovery of two new particles, tiny bits of matter that act as glue to bind atomic hearts together.

He said these yet-undiscovered particles were needed to explain the large effective size of the anti-proton.

More examples of the anti-proton are now being found, Dr. Chamberlain reported, as scientists learn exactly where to place the emulsions on which the negative particles register as stars.

The Berkeley group is collaborating with Dr. Eduordo Amaldi and his co-workers at Rome.

One "spectacular" star, found by Dr. Gerson Goldhaber and associates, is especially important. It has eight prongs, with three protons and five pi mesons, or pions. One pion decays into a mu meson and an electron. (See SNL, May 21, 1955, p. 330.)

Total visibile energy of this star is 1,230 million electron volts. It is important because this is in excess of the rest mass of either the proton or anti-proton, which is 938 million electron volts.

Finding this excess energy gives the best evidence yet that the anti-proton annihilates either a neutron or a proton. It is demonstrated by the fact that the visible energy exceeds that of one particle.

The difference between 1,230 million electron volts and the 1,876 million electron volts of two particles is in neutral particles not visible emerging from the star.

The anti-proton star first reported by Dr. Amaldi's group showed a visible energy of 826 million electron volts.

The negative particle of matter, for which evidence had long been sought, was discovered by precision measurements with counters by a team of Berkeley scientists last year. Besides Dr. Chamberlain, the group included Dr. Emilio Segre, Clyde Wiegand and Thomas Ypsilantis.

Science News Letter, February 18, 1956

CARDIOLOGY

Six Rules for Helping Heart Attack Victim

➤ CALL THE DOCTOR at once if someone is stricken with a heart attack.

This is the first of six rules for how to help in case of a heart attack given by the American Heart Association.

The others are:

"Help the patient take the position that is most comfortable for him. This will probably be halfway between lying and sitting. He usually cannot breathe comfortably if he lies flat.

"Do not attempt to carry or lift the patient without the physician's supervision.

"Loosen tight clothing such as belts and neckties.

"See that the patient does not become chilled, but do not induce sweating with too many blankets.

"Do not give stimulants such as whisky or brandy."

Science News Letter, February 18, 1956

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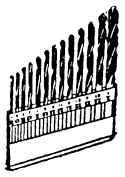

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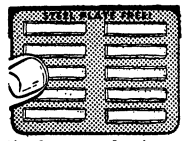

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