CHEMISTRY

Our Perfumed World

Wide use of perfume made possible by inexpensive synthetic odors; fragrance of a few flowers never captured in nature has been duplicated.

By MARTHA MORROW

See Front Cover

➤ WE LIVE in a perfumed world. All soap, even the cheapest type of laundry soap, is perfumed to kill the fatty odor of the soap itself. Hair tonic, tooth paste, bath powder and baby oil are scented. Shaving cream and vanishing cream incorporate a not-too-powerful fragrance. Perfume may compose as much as 2% of a girl's lipstick, not only to impart a pleasant fragrance, but to cover up the odor of one of the chief ingredients of lipstick, castor oil.

The fresh smell of the out-of-doors is brought into an air-conditioned building through perfume.

The typical odor that warns of escaping gas is man-made. The obnoxious odor that is characteristic of toxic gas was created by the perfume industry so that a man's nose would tell him of the presence of the colorless, tasteless gas before he was overcome by it.

Unpleasant odors in fabrics are covered up by perfume. The smell of synthetic rubber must be changed if a rubber toy is to find favor with its young owner. Medicine is made more palatable by giving it a pleasant flavor, which in the last analysis means a pleasant scent.

Synthetics Indispensable

There are few industries today that do not use the raw materials of perfume or materials that have been perfumed. But perfume could not meet such a widespread demand were it not for the new fragrant materials made possible by modern science. Synthetics are indispensable to every perfume manufacturer.

It takes 33,000 pounds of violet leaves (with 2,000 flowers for each pound of leaves) to yield a pound of the natural oil that imparts the odor. Natural oil of violet leaf remains a treasured material for fine perfumery, but modern chemistry has produced several substances having a violet-type odor.

A ton of roses is needed to obtain ten ounces of the fragrance-imparting oil. Today a somewhat similar odor can be produced in the laboratory. The modern perfumer will tell you that both are equally important to him, the attar of rose and the synthetic.

No satisfactory way has ever been found of extracting the natural oil from lilacs, like those in the staff photograph on the cover of this SCIENCE NEWS LETTER, thus that illusive scent can not be gotten from nature. But synthetic lilac, an exquisite reproduction of this favorite scent, today is available to everyone. Similarly, though a natural lily-of-the-valley oil has been extracted, the perfume having that odor is commercially available only through the use of synthetics.

What are the synthetics that go to make up this violet, lilac, rose or lily-of-the-valley? Each odor does not consist of a single chemical, but rather of a group mixed together in careful proportions. The single chemicals in the group may or may not have the odor of the flower, but the group as a blend can capture it beautifully.

For violet, for instance, there is ionone, one of the first perfume synthetics ever made. Ionone is made from a chemical called citral which is found in Indian lemongrass oil. For the lilac odor, one of the most common ingredients is terpineol, made from materials found in the Southern pine tree.

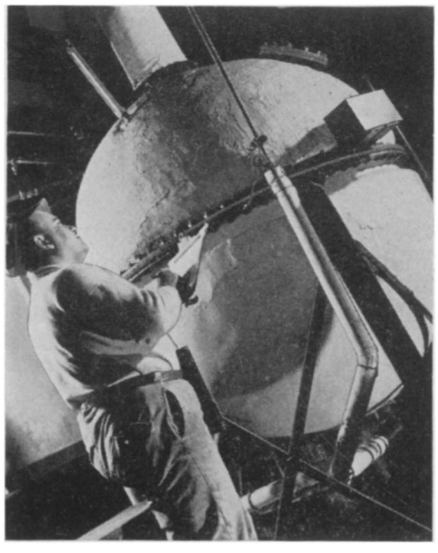
For the rose odor, the perfumer chooses phenyl ethyl alcohol, which, though found in the rose, is made synthetically from coaltar derivatives. For the lily-of-the-valley, one of the most precious odors is hydroxycitronellal, itself not known in nature, but made from materials found in the well-known mosquito repellent, oil of citronella. These are but a few of several hundred synthetics which the perfumer is constantly using.

Every time you smell a gardenia, you are smelling not the flower, but the oil contained in it. It is this oil, that you have probably never seen or felt, which must be extracted. The oil that gives fragrance to a shrub or tree is sometimes found in the petals, sometimes in the seeds, and often hidden in the bark. The natural oil contained in the petals of a flower is the most precious. Orris, resembling violet in fragrance, comes from a root. Oil is gotten from the peel of the fruit of an orange tree. Cinnamon oil comes from the leaf and the bark.

A few communities throughout the world are outstanding centers for these essential oils. In these localities certain flowers, grown in profusion, are most fragrant, for the odor varies under different climatic conditions just as fruit from some areas is more tasty than from others.

The town of Grasse, in southern France, is renowned among perfumers for its jasmin, tuberose, jonquil, rose, carnation and less delicate but nonetheless popular oil of lavender. A little isle off the coast of Madagascar, called Reunion, supplies the world with such important oils as geranium, ylang ylang and vetivert.

A few essential oils are produced in America. Oil of peppermint comes from Michigan. Pine oil is produced in conjunction with our Southern turpentine



MAKING PERFUME—One of a battery of vacuum stills that isolates from a crude chemical substance, such as coal tar, the usable perfume component is shown at the du Pont plant, New Brunswick, N. J. The fragrance being created here is aubepine, a characteristic odor of hawthorn.

industry. Oil of spearmint, some natural wintergreen, the ancient cedarwood and rank wormwood are also secured in the United States. Citrus oils are extracted from our lemons and oranges. But the natural oils produced in this country, though important, do not include any of the gems of the perfume industry.

Natural oils may be extracted in several ways. Steam distillation, the cheapest of the methods, is used in extracting a wide variety of oils that come from all parts of plants that are grown in many parts of the world. It is used for sandalwood that comes from a tree; vetivert, that comes from roots; and patchouli, that comes from leaves.

The roots, leaves or twigs are boiled in water. Steam blown through the mixture carriers the vaporized oil to a condenser where the water and oil are condensed as liquids. Because the oil is not miscible with water, it can easily be removed. But many of the most delicate and expensive flowers cannot be treated in this way, as heat and water change their character and destroy their value.

A process that has changed little in the past few centuries is that of enfleurage. Flowers brought fresh to the factory are placed by hand, a few hours after being picked, on glass trays coated with fat, primarily lard. The petals are allowed to remain in contact with the fat for about a day, during which time the odorous constituent is absorbed from the flowers. The fat is then washed with alcohol or benzene to separate the perfume from it. This hand process still is used extensively in France to recover the perfume from jasmin and tuberose.

One of the oldest processes for the extraction of oil is maceration. It consists of immersing the flower in warm fats or oils. For this purpose, the ancients used olive oil and other vegetable oils, but today, where this process is used at all, animal fats are employed.

A volatile solvent such as petroleum ether or benzene is used to extract the natural oils from such flowers as orange blossoms and mimosa and is also used for the jasmin. By a series of processes the natural oil is transferred from the flower to the solvent, which is then evaporated, leaving the perfume oil.

Such odors as oil of lemon and other citrus products are extracted simply by pressing on the peel, a process known to the industry as expression.

A thorough description of these processes and of other aspects of perfume and odor is found in Edward Sagarin's recent book, "The Science and Art of Perfumery."

Three types of ingredients are used in the making of perfumes. Odoriferous components such as natural oils and synthetics supply the main part of the perfume odor, and impart the pleasing fragrance. A large variety is usually employed, perhaps a score or two in a single perfume. Then there is the diluting agent, a specially prepared alcohol. This may either be produced by fermenting molasses or grain, or it may be created synthetically. The fixative blends the many odors into one and gives the perfume its lasting quality. Good perfume will keep its same fragrance for many hours on the handkerchief or hair, and for many years in a well-sealed bottle.

Until recently the fixatives were exclusively of animal origin and so great was the demand for musk that the male musk deer of Tibet, from whose glands the natural musk grains are extracted, was in danger of being exterminated. A means was recently found, however, of using the tiny glands of muskrats trapped in Louisiana's bayous as a fixative. This new natural musk, made possible through discovery of a way to oxidize the almost odorless musk alcohols and convert them to the extremely odorous musk ketones, has proven an excellent fixative.

A number of musk substitutes has been developed, but while somewhat similar to natural musk in their odor effect, they cannot be said to have the power, strength or depth of natural musk.

A sweet odor alone is not pleasing. To obtain the most liked fragrance, combinations must be chosen from the four types of odors—sweet, acid, burnt, and the unpleasant group known as goat odors. Some of the most valued substances for perfumes, such as civet obtained from the civet cat of Ethiopia, are extremely evil-smelling. These materials have been of special importance lately because most of the perfumes popular today contain one or several unpleasant odors, used in small proportions where it becomes a part of a pleasant bouquet.

Perfume experts are continually mixing essential oils and synthetics in minute quantities to create new perfumes that will be subtle and lasting in their fragrance. But the final test for a good perfume lies with the olfactory senses. No machine has yet been invented that can analyze smell—the human nose is still the superior perfume sniffer.

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ASTRONOMY

Sailors Report Seeing Sky Fireworks

➤ THE OLD SAYING that all a sailor sees is the sea is refuted by reports of celestial fireworks received by the U. S. Navy Hydrographic Office.

Sailors have seen a red and yellow meteor flashing through the skies over the Atlantic and another greenish-white fireball with a small tail. A ship's officer in the Caribbean reported a bright greenish-blue meteor.

Even seeing the sea can have its interesting side, too, for a ship in the Pacific off Panama reported sailing through large patches of maroon-colored water.

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