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FRAGRANCE

A LECTURE BY

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FRAGRANCE.

AMONG all the harmonies of nature, those which afford the most universal delight, which are appreciated and enjoyed by the most lowly as well as the most refined, are the accords of fragrance, the harmonies of sweet odors. That these harmonies are governed by laws as fixed and beautiful as those that rule the play of colors in the prism, or the vibrations of sound and the musical scale, is a thought that suggests itself to the inquiring mind. Yet while the latter have been the subject of profound study for ages, and have engaged the earnest thought and experiment of the artist and the man of science, but little has been done to discover the principles and from them to deduce the laws which govern the actions and the relations of those intangible, ethereal odors that affect, pleasurably or offensively, the olfactory nerve; that fill the air we breathe; that give their peculiar savor to the fruits, the viands, the beverages we consume; that form an ever present feature of our daily life.

Perfumes are derived from a great variety of sources, which were arranged by Mr. Eugene Rimmel, of London, many years since in groups of ten different kinds in the vegetable world, and one in the animal kingdom, which I will briefly enumerate:

1st. Leaves of flowers, as Rose, Violet, Jessamine, Orange Flower, and many a score beside.

2d. Herbs, as Lavender, Rosemary, Thyme, Sweet Marjoram, Peppermint and others.

3d. Leaves of trees and plants, such as the Lemon Verbena, Citronella, Ginger-grass, and the Bitter Orange tree, whose green leaf yields the oil of Petit-Grain, a useful constituent of Cologne water.

4th. The skin of fruits like the Lemon, Orange, Bergamot, Limette and Cedrat.

5th. Spices, as Cinnamon, Cloves, Mace, Nutmeg and Pimento.

6th. Woods such as Sandalwood, Cedar, Rosewood and Rhodium, and the bark of roots, as Sassafras and Sarsaparilla.

7th. Roots, as Orris-root and Vitivert.

8th. Seeds, as Aniseed, Caraway and Celery.

9th. Resins and gums, as Balsam of Peru and Tolu, Myrrh, Benzoin, Styrax, Camphor and other gums.

10th. Fruits and nuts, as Vanilla, Bitter Almonds, and Tonquin Beans.

The chief animal perfumes are Musk, Civet and Ambergris.

The Orange tree furnishes four different perfumes, all highly fragrant: first, the oil of Neroli, or Orange Flower, distilled from the petal of the Orange blossom; then Orange Flower water, next the oil of Petit Grain, from the green leaf of the tree, and last, the oil of Orange, expressed from the peel of the ripened fruit. These are all indispensable for the production of the finest quality of Cologne water.

The three elements of floral beauty are color, form and fragrance. The flower which combines these elements in the highest degree is the Rose, which has been regarded, from all time, as the type of all that was most delightful to the smell and most charming to the eye. Its perfume combines, in various and harmonious proportions, with a greater variety and numbers of odors than any other elementary fragrance, and may, perhaps, prove to be the key-note of the future gamut of odors.

Next in value is the Orange Flower. Its scent is powerful, pervasive, and universally pleasing to the cultivated sense. It may fitly represent the fifth or dominant of the scale.

For the third, or mediant, we might select the Vanilla, and so on to the formation of the perfect scale.

As yet, however, science has thrown but little

light upon this theme, and we must be content with mere conjectures which, if time shall prove them unsound, may yet serve as guide-posts on the true road to a knowledge of what is now only an interesting, mysterious and perplexing problem.

In the domain of sounds there are some discords so harsh as to shock even the dullest ear. So, in the realm of odors, we sometimes experience sensations of displeasure and disgust that cause even the bluntest nature to revolt against them. All these arise from violations of the great law of harmony, which governs the universe and rules the spheres.

On the other hand, a combination, in true accord, of pure, sweet sounds, a harmonious blending of the rich, fresh odors of the living world in garden, orchard and in grove, bring never-failing delight to the highest organs of our being; they soothe and refresh the wearied body and the exhausted mind; they bring happiness to the humble, and the most refined pleasure to the man of culture and the votary of art.

As I shall treat this subject mainly in the light of practice, and in its relations to commerce and the arts, I will not dwell longer upon this train of thought save to suggest the lesson which as horticulturists and florists, we may learn from an honest study of the odors of flowers, and to point out some interesting facts which have resulted from chemical research into the odors of plants.

In the preparation of hand bouquets, baskets, table designs and every form of floral grouping, while great attention is paid to the pleasing contrast of color and form, the graceful disposition of leaflet and flower, the well-proportioned outline, and the artistic ensemble, there would seem to be a comparative neglect, perhaps an absolute ignorance, of those principles which govern the harmonies of odors, and of that use of the means at our command, which shall complete and crown the enjoyment properly afforded by these charming combinations of Flora's offspring.

At times the most discordant elements are introduced; flowers yielding a perfume pleasing in itself, and combining happily with others of the same type and family, are placed beside those of a widely different and opposing nature; a harsh contrast ensues, and the result is displeasing to the cultivated sense. Let us study this feature more carefully and let not the true intent of the *nosegay*, to refresh and to delight the sense of smell, be lost sight of; but let fragrance of the highest type, whether simple or composite, be a

distinctive, if not a leading feature in these beautiful decorations of our homes, and in the adornment of our festive scenes.

I have spoken of the Rose as the highest type of fragrance. There are several other odors, mostly quite different from each other in character, which combine harmoniously with the Otto or essential oil of the Rose, and in any desired proportion; such are the odors of Sandalwood, Patchouly, Turkish Geranium, Vitivert, the Rose Geranium of our garden, Rhode-wood, Sweet Brier and some others. The Orange Flower, too, has its kinsmen in the Lilac, Magnolia, Seringa, Daphne, Hawthorne, and many more that will suggest themselves to the experienced lover of flowers.

Of a different class, but nearly related in fragrance, are the Lemon Verbena, the Citronella, Lemon-grass, and the fruits Lemon, Orange, Bergamot, Cedrat and Limette.

In a recently issued book, entitled "Among the Spanish People," the author tells us that the Lemon Verbena is collected and stored for winter use. It is said to form one of the finest stomachics and cordials, and is either made into a decoction and drunk cold with water and sugar, as a tonic, or with the morning and evening cup of tea. A sprig of five or six leaves of it is first put into the cup, and the hot tea poured over it. By using this, it is said, "you will never suffer from flatulence, never be made nervous or old-maidish, never have cholera, summer complaint, or loss of appetite. Besides, the flavor is simply delicious; no one who has once had his Pekoe with it, will ever again drink it without a sprig of Lemon Verbena."

Again the distinctive odor of the Vanilla Bean suggests itself in the Heliotrope, Gum Benzoin and Tonquin Bean; the latter, of very inferior quality, is largely used to adulterate and cheapen the extracts of Vanilla, so largely used in the household, and by cake-bakers and confectioners. The flavoring principle of the Vanilla Bean is called vanilline; in the best quality it is often seen in minute frost-like crystals on the surface of the bean, giving rise, in French, to the name "Vanille givrée," or Frosted Vanilla, and such beans command the highest price.

The Tonka Bean contains another odoriferous principle called Coumarin, which is also the dominant odor in our Sweet Clover and Vernal Grass, and plays a leading part in the composition of the perfume called New Mown Hay.

I have said that the laws which govern the re-

lations and combinations of odors are as yet undeveloped; yet, in the practice of the art of perfumery, some truly delightful harmonies have been produced, the result of a naturally keen and delicate sense of smell, refined by long culture and intelligent devotion to the art.

As the musical composer with only seven simple tones and their five semi-tones for his materials brings forth the grandest combinations of choral harmony, and as the painter, with a few simple, primary pigments, embodies his highest conceptions of beauty on the painted canvas, so does the perfumer, with a few simple, elementary odors, arranged and combined in accordance with a law of beauty unwritten, yet deeply felt, produce an endless and ever varying round of fragrant harmonies. To him the simple, sweet-scented flower is only a vehicle for the communication of odors to the nostril and the brain. By means of the olfactory nerve he analyzes it, as the composer with voice and ear, analyzes a musical score, or the chemist a mineral compound. Like them, too, he composes and combines; and from out his copper still, and the alembic of his brain, there come forth compounds of beauty that seem due to an almost creative power, so wonderfully fragrant, so strikingly resembling the flower they counterfeit.

To him the apparently simple odor of the Heliotrope resolves itself into the elementary odors of the Rose, Jessamine, Orange Flower, Vanilla Bean, Orris-root, Balsam of Peru, Clove, Cinnamon and Bitter Almond; by a skillful combination of these odors in their due proportion, the fragrance of the flower is imitated to perfection.

In like manner the sweet and delicate scent of the Mignonette (a French name for My Little Darling) suggests the perfumes of the Sicily Orange peel, Acacia, Tuberose, Jessamine, Violet, Vanilla, Gum Storax and Orris Root.

In this way the perfumer with his pallet (if I may use the phrase) of simple, elementary odors, reproduces all the fragrant combinations of the world of flowers, and adds to them other harmonies, purely ideal, which "like a thing of beauty are a joy forever."

Much interest was excited, some thirty years ago, by the lectures given before the Royal Horticultural Society of London, by Mr. Eugene Rimmel and Dr. Septimus Piesse, on the materials and processes of the perfumer's art, illustrated by the plants producing them, the apparatus employed and the method adopted for obtaining and refining their essential principles or elementary odors.

The animal world, too, was represented in the

curious, powerfully-scented tumor of the Musk Deer, the resinous exudation of the Civet Cat, and the granular hemorrhoid of the Sperm Whale, known as Ambergris.

But the chief interest of these lectures was in their descriptions of the flower farms of Southern France, which are the principal sources of supply of the finer odors used in the perfumer's art throughout the world.

I visited the prominent seats of these manufactures and made careful examination of the leading establishments, and will now give you the chief results of my inquiries and observations in 1853. At that time I was an entire novice in horticulture and was interested only in a commercial way in

THE FLOWER FARMS OF FRANCE.

The growing of plants and flowers for use in perfumery, medicine and culinary art, is a most important branch of horticultural industry in that part of France bordering upon the Gulf of Lyons and the Mediterranean Sea, and especially in the southern portions of the Departments of Var and Nice. There are extensive establishments in Nismes, Montpellier, Morbihan, Nice and some then just founded across the sea in Algeria.

But the great centre of this branch of industry is the town of Grasse, about 75 miles E. N. E. of Marseilles, a few miles inland, its seaport Cannes, the former winter residence of the late Lord Brougham, and its neighboring seaport, Nice. There are over 70 factories in Grasse—which is a flourishing town of over 12,000 inhabitants—and they give employment in the various departments of field and in-door labor to fully 5,000 persons. In Cannes and Nice there 30 more factories of the same class.

Many manufacturers grow their own plants and flowers, others buy them daily in the market, and still others are supplied by contract. The latter system prevails among the best houses. Contracts are made at a fixed price for a term of years, for the total product of a farm. The average price, stated in American currency and weight, was about as follows per pound—

Rose leaves.....	4 to 5 cents.
Jessamine leaves.....	.20 to .25 "
Orange Flower leaves.....	.25 "
Acacia buds.....	.30 to .40 "
Tuberose leaves.....	.50 "
Violet leaves.....	.40 to .60 "

The latter are grown in the shade of groves near Nice.

These are the principal garden flowers used in Grasse. A great breadth of land is devoted to Lavender, Rosemary, Thyme, Sweet Marjoram,

Cherry Laurel, Sage, Balm, and other medicinal and culinary plants, which are sold at much lower rates than the products of the flowers above-named. The preparations from all these plants and flowers divide themselves into four classes; Essential Oils, Distilled Waters, Floral Pomades and Oils, and Dried Leaves and Flowers.

The great bulk of Essential Oils produced consists of Lavender, Rosemary, Thyme, Sage, Spike Lavender and Sweet Marjoram. The most valuable products, of any amount, are the Essential Oils of Neroli and Petit Grain. The Neroli is the result of the distillation of Orange Flower water from the flower petals of the Bigarade, or Bitter Orange Tree; the sweet or Sicily Orange yields an inferior oil. Petit Grain is distilled from the green leaf of the tree.

The price of Neroli varies with the season, from \$30 to \$45 the pound, and Petit Grain from \$8 to \$12. These two oils are extensively used in the composition of the highest quality of Cologne water, together with the oils of the skin of the Orange, Lemon and Bergamot, and those of Lavender, Rosemary and Thyme, which should be so proportioned and combined that no one odor shall dominate.

Here the lecturer illustrated his meaning by the exhibition of a sample of "Golden Cologne Water," composed of fifteen ingredients in widely different proportions so harmoniously combined that no one odor was distinctly perceptible, but the resulting fragrance was pure, rich and delightful to the smell.

The Orange Flower water is consumed in immense quantities in France to flavor the "eau sucrée," or sugared water, so universally drunk in the summer season; this, by the way, is the only form in which the Frenchman drinks water at all.

The Bigarade Orange tree also yields a rough-skinned, bitter, inedible fruit, from the rind of which is expressed an inferior oil called "Essence Bigarade," often used to adulterate the finer oils. The tree requires ten years to mature, and twenty to attain perfection, and yields an average of seventeen pounds of flowers per annum.

Rose water is also distilled in great quantity. A result of its distillation is a very minute proportion of Otto of Roses, of the very highest quality; it appears in small greasy-looking drops, floating on the surface of the distilled water, which are carefully skimmed off and filtered. It is stated that in India 50,000 Roses are required to obtain one ounce of the Otto. That produced in Grasse is superior to the famous Kissanlik, or Turkish Otto,

used in this country, and, like it, congeals at ordinary temperature, in beautiful transparent crystals.

I saw, at the renowned factory of Mr. Antoine Chiris, who was, in all things, the leader of his profession, a bottle containing about three pounds, which he valued at \$550, or nearly \$12 the ounce. It is not exported or sold, but the very small quantity produced is reserved for use in unfavorable seasons, or a partial failure of the flower crop, to give strength and finish to the Rose Pomades and Oils. The "Rose de Mai," (*Rosa centifolia provincialis*) or hundred-leaved Rose, is the one universally grown.

Another very costly article, of which less than an ounce had been produced in Grasse at that time, is the Essential Oil of Jessamine. In the year of my visit, 1853, an Algerian chemist obtained a minute quantity which cost him, I was told, at the rate of 17,000 francs the kilogram, about \$100 the ounce. It has since been produced at a cheaper rate, but still much too dear for commercial use.

The wild Arabian Jessamine is grafted on the cultivated plant, and bears for many years, if not winter-killed, yielding from 90 to 150 pounds of flower petals per thousand plants. They are deeply covered in winter, and closely trimmed in spring.

A most important branch in which great rivalry exists, is the preparation of perfumed pomades and oils, which have a two-fold use; first, as bases for the finest kinds of scented pomatums and hair oils, and next as a medium for supplying the floral odors for extracts for the handkerchief and toilet waters. Their preparation is the most curious and interesting feature of the Grasse establishments.

The "*corps de Pomade*," or pomade body, is prepared in the winter season, and composed of 2 parts of fresh leaf lard and 1 part of kidney beef-suet, except for Jessamine and Tuberoses, which is mainly of leaf lard, hardened with veal or mutton suet. These crude fats are finely hashed, washed in several waters—in the first-class factories washed in Rose water—to deprive them of all impurity or unpleasant odor, then melted in a water bath, and stored away in huge tin cans in airy, cool, stone vaults, for use in the season of flowers.

Another pomade called "*corps dur*," or hard body, is made of beef suet only, and is used to make stick pomatums.

For the perfumed oils, the material used is the inodorous, virgin Olive oil, expressed from the olives just before they are fully ripe.

The busy season commences with the Rose. There are two processes for impregnating the pomade body and the oil with the odor of the flowers: one is a hot process called infusion, the other is a cold process, termed "enfleurage." The hot process is employed for the strong, fixed odors of the Rose, Orange and Acacia; the cold process for the rich yet delicate and sensitive odors, the Jessamine, Tuberose, Jonquil and all the bulbous plants, which will not endure the application of even a moderate heat without losing their odor.

The hot process by infusion is as follows: About 100 kilograms (220 pounds) of pomade body are put into a tin-planished copper vessel, placed in a copper water-bath, and slowly melted with a gentle heat, just before the dawn; at day-break it is charged with a certain quantity of flowers freshly gathered, which are stirred constantly during the day and night, the mass being only kept warm enough to maintain a semi-fluid state. About midnight it is removed from the fire, poured into strong bags made of fish-cord, and subjected to heavy pressure in large, perforated iron cylinders, standing upright on marble bed-plates, which are gently warmed, to prevent the cooling and hardening of the melted pomade. Next morning fresh flowers are added, and the process is repeated daily until the desired strength of perfume is attained; the scented pomade is then poured into round tin boxes and sealed up for shipment. The oils are worked in the same manner, but when finished each day they are filtered instead of pressed.

The process of "enfleurage" is as follows: Large numbers of "chassis," or sashes, are prepared, about 2½ feet long and 1½ feet wide, the frame being 2 inches wide and 1½ inches thick, holding a stout plate of ground glass and resembling a large school slate. The frames for the oils are about 4 feet long, 2½ feet wide, and thick in proportion; instead of glass they have coarse iron-wire net work. The large factories have several thousands of these frames. Upon each side of the glass the pomade body is thinly spread, and the surface is channeled or furrowed lengthwise and crosswise with a four-tined, square pointed wooden fork, so as to present the utmost surface for the absorption of the odor from the flower leaves, which are thickly and evenly spread all over it. The frames, thus charged with flowers, are piled one upon another, up to the ceiling. The flower leaves thus confined between two layers of pomatum, wither and yield up their fragrance which is absorbed by the two layers

above and below. Daily renewals of the flowers are made, until the proper strength is attained. The perfumed pomade is then scraped off, very gently melted in a water-bath, and canned for shipment like the infused pomades. By a very late invention a netted wire screen, like that used for the oils, is covered with flower petals, then slid in between the glass sashes, and the whole closed in with doors to keep them air-tight.

In preparing the oils, coarse, heavy, spongy cotton cloths, made especially for this purpose at Marseilles, are saturated with virgin Olive oil and spread upon the netted frames; then flowers are thickly strewn upon them, and they are piled on one another like the pomade frames. After several daily renewals and the oiled cloths are sufficiently charged with the odors the scented oil is expressed from the cloths by powerful levers and sealed in large metal cans or bottles for shipment.

The most costly of all the pomades and oils made in Grasse are those of the Violet, which is grown mainly at Nice, about 12 miles distant, under the shade of trees, and yields a pure, delicate and delightful perfume. It was the favorite odor of the Athenians under Pericles, and is now one of the most fashionable scents in use by the Parisian *beau-monde*.

Many hundred-weights of flowers and herbs are dried annually and are used in medicine, in cookery, in the composition of scent-bags, cachous for the breath, fuming pastils for the sick chamber, and kindred compounds of the perfumer's art.

The last, and by no means one of the least important of the processes of which I shall speak, is the distillation of perfumed waters and essential oils, which is done at one operation. To explain it a single example will suffice, that of the orange flower.

The still consists of four principal parts, the *retort*, in which the substances to be distilled are placed and subjected to the action of the fire beneath it—the *worm*, through which the vapors arising from the distillation pass through the *cooler*—by means of which they are condensed again into liquid form, into the *receiver*, when they are ready for use. The retort is partly filled with water and a certain quantity of the petals of the Orange flower are added to it, and left to soak, say over night. The fire is kindled, the scented water is converted into vapor, which passes through the worm, and into the receiver. The cooler is kept supplied with cold water by a funnel through a tube which carries it to the bottom of the cooler and escapes by an overflow at the top.

The Orange Flower water thus obtained has floating upon it drops of an essential oil, of great strength, which is gathered as it accumulates, and is carefully filtered; this is the famous Oil of Neroli, so indispensable in the manufacture of fine Cologne water. In the same way, Rose water and Otto of Roses are distilled.

As many as twenty-four kinds and varieties of essential oils are distilled at Grasse, from flowers, the leaves of trees, herbs, roots, and the bark and wood also of trees. It remains for me only to speak of the perfumes derived from fruits and from animals.

The fruit perfumes are mainly those of the Orange, Lemon and Bergamot; small quantities only are made of Cedrat and Limette. These are not distilled but simply pressed out of the peel or skin of these fruits, and filtered. They are not produced in Grasse but in the Island of Sicily.

The animal perfumes are three in number—Musk, Civet and Ambergris—which play an important part in the composition of many rich perfumes, but like garlic in cookery, should be used with such judgment and in such minute quantities that their presence is not detected or suspected.

The musk is a hairy, glandular sac, or pod as it is called, about 2 inches in diameter, growing upon the abdomen of the male musk deer, filled with a viscid paste of a highly pungent odor. When dried it loses most of its pungency and resembles coarse-grained black snuff. A room has been perceptibly scented by a single grain of it for thirty years, without apparent loss of weight, and specimens known to be one hundred years old, were as strong as the fresh article.

Civet is a resinous exudation obtained from a pouch or sac of the Civet Cat, and in appearance somewhat resembles shoemaker's wax.

Ambergris is found on the shores of Madagascar, Surinam and Java. It is the result of a disease of the liver of the Sperm Whale, and is often found by whalers in the bowels of the animal. Fine grain Musk and gray Ambergris are each worth, at the present time, about \$30 the ounce.

There are many other substances that have a distinctive fragrance, and are used in the art of perfumery—mostly well-known—which my limits will only permit me to name; such as the Bitter Almond, Balsams of Tolu and Peru, Gum Benzoin, Cinnamon, Cloves, Mace, Nutmeg, Orris-root, Tonka Bean, and Vanilla.

To return, for a moment, to Grasse. The flower farms receive the highest garden culture, and great attention is paid to irrigation; in some fields at Cannes there are complete net-works of irrigating tubes substantially laid in cement. A constant warfare is waged upon insects and each plant has its particular borer, grub or bug.

The heat in summer is intense, though tempered by the sea-breeze, and the winter is, at times, as rigorous as at Washington or Richmond.

While visiting this interesting region of flowers, I was often inwardly reminded of the vast and undeveloped field in our own sunny clime, and of the possible future of commercial floriculture in the tropical regions bordering upon our Mediterranean Sea—the Gulf of Mexico. There the wild-wood teems with the fragrant Jessamine and Magnolia; the shaded pastures are redolent of the timid Violet; the gardens load the air with the far-wafted perfume of the Rose, the Orange Flower, and all that is pleasant to the smell. But a blight was upon the people, and all the beauties and graces of nature were darkened by a pall of unrequited labor. It may not be a vain hope, I trust it may be a prediction to be soon fulfilled, that when that fair land shall be fully redeemed from the lethargy, the paralysis of human slavery, when it shall be everywhere fully open to the intelligence and energy of the Northern mind, aided by the free and self-reliant labor of the millions disenfranchised, it shall then become the great flower-garden, not only of America, but of the world.

[The above is a lecture given by the well-known Secretary of the Penn. Horticultural Society, who has occupied that position for twenty-five years, as well as been its Treasurer for thirteen.

The lecture was illustrated by a varied collection of odoriferous plants contributed by the leading florists of Philadelphia, yielding fragrance in petal, calyx, stem, leaf, bark, wood or root. Also by many essential oils distilled therefrom loaned by Messrs. Wright & Sullivant, as well as fragrant pomades from the South of France. An interesting object was a stuffed pair of dwarf Musk Deer and a pod of genuine Musk 25 years old. At the close, each person present received a tiny sample of Extract of Tea Rose, prepared by the Lecturer, as a souvenir of the occasion.

It was very highly appreciated by the intelligent audience that had the pleasure of listening to it.—Ed. G. M.]



