

# PERFUMER & FLAVORIST

## Creative Contribution of Natural Substances in Present Day Perfumery

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Since the beginning of this century and thanks to chemical discoveries towards the close of the nineteenth century, synthetic substances are being utilized by perfumers and have assumed an ever-increasing importance in the formulation of perfumes. Synthetic compounds are not used in place of the natural ones, except in some instances, but rather in order to impart a certain creativeness, imagination and novelty to blends which, up until the end of the last century, had been composed exclusively of natural products. Thus, it is altogether appropriate to speak of *the creative contribution* of synthetic compounds to perfume-making in the twentieth century. Those perfumes that have distinguished the industry since the beginning of this century must be mentioned.

Trèfle Incarnat (L.T. Piver)  
Quelques Fleurs (Houbigant)  
Shalimar (Guerlain)  
Chanel 5 (Chanel)  
L'Origan (Coty)  
Mitsouko (Guerlain)  
Crêpe de Chine (Milot)  
Narcisse Noir (Caron)  
Arpège (Lanvin)  
Bandit (Piguet)

## Creative Contribution

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and more recently

Ma Griffe (Carven)  
Air du Temps (Ricci)  
Miss Dior (Dior)  
Madame Rochas (Rochas)  
Calèche (Hermès)  
Cabochard (Grès)  
Eau Sauvage (Dior)  
Calandre (Rabanne)  
Fidji (LaRoche)

It must be remarked that the originality of these perfumes is due in part to their synthetic admixture in the form of amyl salicylate, vanillin and ethyl vanillin, methyl-nonyl-acetaldehyde, the quinolines, the aliphatic aldehydes, the ethers, anisic aldehyde, undeca-lactone, methyl jasmone, the damascones and damascenone.

Modern perfumery is characterized by a greater input of human genius than was true in the past. In order to define what modern perfume actually is, I shall borrow from the great Provençal author, Jean Giono, the words which he wrote on the subject of certain perfumes: "The gods create the scents; men manufacture perfumes . . . Perfume is the scent plus the man."

Perfumers—those specialists that we are—have long understood the importance of fragrant chemical substances in perfumery; however, the uninitiated laity are still astonished, and to some extent shocked, to hear us speak about the use of chemical compounds in the perfumes that they buy.

The better to "detraumatize" the victims of such shock, I avail myself of a simple and easily visualized metaphor: The perfume-bearing plant is a miniature chemical factory which, as it grows, produces fragrant compounds with generic names such as terpenes, alcohols, esters, ethers, lactones, aldehydes, ketones, etc. . . . All of this the plant accomplishes with the complicity of the sun, the atmosphere, irrigation, natural enzymes, nutrient elements supplied by the soil and by fertilizers. And I go on to say that the plant, by mixing together knowledgeably those fragrant compounds that it produces by way of natural synthesis, creates itself the perfume of the rose, of the jasmine, of the lily of the valley or of the hyacinth. Because nature makes such good use of the chemical substances it produces, and because nature shows the path to follow, why then should not perfumers do so as well to the limit of their capabilities? In the realm of technology there are many disciplines that derive both their knowledge and their know-how from nature, and perfumery is one of these disciplines.

At the present time, perfumery has become such a vast industry worldwide that it is difficult to imagine perfumes in which natural substances would be in larger amounts than synthetic ones, because the worldwide output of natural substances would simply not suffice to this end. From a reading of the current literature in the trade, it will be apparent that the available natural substances would only cover one quarter, or at most one third, of world requirements.

After what I have said, emphasizing somewhat the rôle of synthetic substances in perfumery, you must certainly not conclude that natural ingredients have lost their credibility and that their rôle in formulations has become negligible. Precisely because it behooves one to be realistic in modern perfumery, let us say in all good faith that, although the quantitative significance of natural ingredients in formulation has been subject to economic considerations, their qualitative significance in the sphere of creativity is limitless. There is more and more room for naturally occurring substances of high aromatic yield, to impart personality, to "naturalize" fragrances lacking in floralcy and "naturalness," and to soften the overly aggressive character of certain new synthetic compounds being utilized by perfumers. The famous French saying—"Drive out nature, and it will return at full gallop"—is perfectly applicable whenever an attempt is made to exclude natural products altogether from a formula, because one perceives very quickly that an admixture of natural products, however slight it may be, reveals itself as mandatory for the balance and beauty of the perfume. Even floral absolutes in 1% or 0.1% solutions, added in trace amounts to concentrates, still exert an astonishing effect esthetically, and all the more so with maceration. Since we are here at the very heart of the matter, I would like to speak to you about a number of natural substances I customarily work within my laboratory. These are either intensely aromatic natural substances or substances with a "naturalizing" effect.

### **Incolore Absolute of Maté (*Ilex paraguayensis*)**

This absolute is prepared from dried maté leaves, the product of a large evergreen shrub which thrives in the south of Brazil and in Paraguay. It is a shrub of the holly family. For centuries the Indians have been using the leaves of maté which they gather in the forest and which they infuse in boiling water so as to make a tea. The Jesuits were the first to undertake the large-scale cultivation of maté.

Because absolute of maté has a very dark color, distillation is performed with a cosolvent,

thereby yielding incolore absolute of maté. This incolore absolute of maté is a remarkable substance that serves to "naturalize" floral bases. A lily-of-the-valley base quickly takes on a natural character, following an admixture of between 0.8% and 1.5%. Compounds of jasmine can also be enhanced with a modest admixture of this incolore absolute.

Tobacco specialty bases for inclusion in formulae for male toiletries are enhanced by admixtures of up to 25% of incolore absolute of maté. The harsh character of black-tobacco absolute, as utilized in tobacco specialties, is softened by incolore absolute of maté which contributes a faint suggestion of honey, gingerbread and dried fruits, occasionally perceived as background nuances in Virginia tobaccos and in pipe tobaccos.

### **Incolore Absolute of Cocoa (*Theobroma cacao* L.)**

The cocoa tree is native to the basins of the Amazon and Orinoco rivers. It is generally believed that cocoa has been known for the past four-thousand years. The pods of the cocoa tree contain from twenty-five to fifty beans each, of a white or lavender coloration, encased in a white or pink mucilaginous pulp. In pre-Colombian times the cocoa bean was already being used as a food and in beverages by the Mayas and the Aztecs. The Aztecs would roast the beans, and with hot water, vanilla and spices they would prepare a beverage which they called xocoatl. In 1502, in the course of his fourth voyage, Christopher Columbus collected and brought back cocoa beans to Spain. Later Hernán Cortés, at the time of his meeting with the Aztec emperor Moctezuma in Tenochtitlán (today known as Mexico City), had occasion to enjoy this famous drink. Hernán Cortés presented a supply of cocoa beans to King Charles I of Spain (better known as the Emperor Charles V) and cocoa or chocolate became a fashionable drink among the Spanish nobility. The naturalist Linnaeus, who devised a classification of plants, was so fascinated by the history of the cocoa tree that he did not hesitate to give it the wonderful name of *Theobroma*, which is to say, "the food of the gods."

Incolore absolute of cocoa is obtained from the roasted cocoa bean. This substance is interesting by virtue of its "naturalizing" action, and it harmonizes nicely with the notes of flowers grown from bulbs such as the jonquil, hyacinth, narcissus and tuberose. It is also particularly effective in rose compounds and very valuable for modifying and sweetening the notes of tobacco, leather and animal scents. Admixtures of from 1% to 2% are recommended for these several uses.

### **Essential Oil of Marigold (*Tagetes minuta* L.)**

We have a variety of marigold which grows abundantly in South Africa. This particular marigold was introduced accidentally at the turn of the century during the Boer War in South Africa. The Boers were carrying out a scorched-earth policy against the British troops, the result of which was to deprive the latter's cavalry of their indispensable fodder. The British then imported massive quantities of fodder from Argentina, and marigold seeds were thus introduced into the country. The marigold went on to proliferate to such an extent that it later began to interfere with agriculture. The Boers referred to this plant as the khakibos, "khaki bush", inasmuch as the word "khaki" alluded to the dusty color of the field uniforms of the British soldiers.

Essential oil of marigold is an oil that requires storage in a cool place, protected from both air and light. I always use it in solution because I thereby achieve better preservation of this sensitive essential oil. Essential oil of marigold has a great aromatic potency in formulations, especially for the purpose of modifying and embellishing the fruit-like initial notes in colognes and perfumes. Its dosage is very exacting because, if improperly utilized, the essential oil of marigold can impart a fruity character reminiscent of apples, precisely when it is not desired, depending on the substances with which it is mixed. Essential oil of marigold harmonizes nicely with synthetic substances such as triplal, allyl-amyl-glycolate, damascenone and hedione, all of which are quite prevalent in present-day perfumes. The chypres and the tabacs are notes for which the essential oil of marigold is effective.

### **Incolore Absolute of Hay**

A hay that is extremely powerful and remarkably effective is obtained by means of molecular distillation. There are so many species of hay, botanically speaking, that I would be at a loss to tell you the name of this variety which I use; but you need only know that it is a hay that is harvested in the hinterland of Grasse. Nowadays the peasants of that region are producing a hay that makes a fine fodder, thanks to the use of fertilizer; but, for this very reason, the perfume-related yield is less. Most fortunately, however, the aromatic quality has not suffered from this fact—on the contrary. With incolore absolute of hay in low doses, it is possible to develop interesting nuances in fougère and tobaccos of all types. In aldehydic floral notes, trace amounts of incolore absolute of hay in conjunction with labdanum and with incense are strongly recommended.

### **Incolore Absolute of Pepper (*Piper nigrum* L.)**

Pepper is one of the best known spices and probably one of the oldest to be used by man. The early seafarers of Portugal, the Netherlands, France and England, in the service of the various East Indies companies, contributed greatly to popularizing the use of pepper in the diet. In ancient times the peppercorn was a unit of currency; and at the time of the conquest of Caesarea in Palestine in the twelfth century, the victorious soldiers received two pounds of pepper each as a bonus. In the middle ages, it was even said that pepper served for the payment of rent and taxes, and occasionally it was included in the dowery of young women about to marry. The spice trade, including the pepper trade, contributed to the prosperity enjoyed by the ports of Alexandria, Genoa and Venice.

Pepper comes from the berries of a genus of climbing plant which can reach ten meters in length and which is induced to grow on supporting structures—which are occasionally trees. Incolore absolute of pepper, as referred to here, is the product of molecular distillation of black pepper from Madagascar.

Just as they do in gastronomy, spices occupy a choice place in perfumery. Along the shelves of the perfumer's laboratory, look at the labels of the bottles and you will see cinnamon, nutmeg, ginger, cloves, pimento, bay leaf, and others without forgetting pepper. In perfumery, whereas the spices which I have just mentioned, with the exception of pepper, are recognizable by their characteristic notes when they are present in a formulation, this is not the case with pepper. Incolore absolute of pepper has an exalting effect in perfume: its presence is not recognizable as such, but its action is very much present. In order to exalt and to accentuate rose compounds, incolore absolute of pepper has no equal. In all those compounds in which the ylang-ylang note is of importance, incolore absolute of pepper is necessarily present in trace amounts, to impart a certain warmth and to prolong the effect of the ylang-ylang. One should not hesitate to use incolore absolute of pepper as an exalting agent in a goodly number of floral perfumes, be they single florals or sophisticated. It goes without saying that incolore absolute of pepper has a rôle to play in those fragrances known as "Orientales". In summary, incolore absolute of pepper is not to be used for its scent, but rather and very much more for its exalting effect.

### **Butaflor Absolute of Ginger (*Zingiber officinalis*)**

In my opinion, essential oil of ginger does not reproduce the lovely aroma of the ginger

root—an aroma that is spicy, while nevertheless possessing a cool citrus quality. By contrast, absolute of ginger, obtained by butane-gas extraction of ginger rhizomes from Cochin in the south of India, emits an aroma that is faithfully reminiscent of the raw material.

Absolute of ginger is an excellent substance for prolonging the freshness effect of the citrus notes in a formula, in which it ensures a bonding between the head notes and the body of a cologne or a perfume. It harmonizes particularly well with lime by way of its own spicy character and by attractively modifying the alpha-terpineol character of the essential oil of lime. Butaflor absolute of ginger also harmonizes very nicely with patchouli woody blends by contributing warmth and strength. It is in the field of men's toiletries that I have the most experience involving the use of butaflor absolute of ginger, and in levels from 0.3% to 1%.

### **Incolore Galbanum (*Ferula galbaniflua*)**

This substance, obtained from a gum originating in Iran and prepared by distillation with a cosolvent, is a raw material that has carved out a blazing career for itself in modern perfumery. When I was a young apprentice perfumer, I had a soft spot for the scent of galbanum. I found in it a green fragrance of natural vegetation, both interesting and modern, and used it very frequently in my experiments. My co-workers regarded my infatuation with this raw material as being a bit excessive. It must be said that back in those days galbanum had still not acquired its letters-patent of nobility.

In one perfume which has since been discontinued and which, I believe, was called "Grande Epoque", made by the House of Raucour-Renoir (Place Vendôme in Paris), I used to admire the

manner in which galbanum was utilized so judiciously. It was thus that my infatuation with galbanum was born. One person who knew how to handle galbanum efficiently was Germaine Cellier, who created Vent Vert-Balmain and some great successes at the House of Piguet. Since the end of the second world war, how many perfumes, for women as well as for men, have owed a part of their personality to touches of galbanum! In fact, galbanum is among those effective substances of high aromatic yield, even in low doses, of which perfumers are in need.

### Incolore Coffee

From a concentrate of coffee beans that have been roasted and distilled with a cosolvent, we obtain incolore coffee which has the agreeable aromatic characteristics of coffee. Subjected to olfactory trial, this substance does not seem to be particularly potent in comparison to other incolore absolutes; however, this is merely an impression because, when it is utilized in formulations, its excellent yield is noted and it is all too easy to exceed the ideal dosage, unless care is taken. Levels from 1% to 2% in jasmine compounds heighten the initial floral volume, which is also true for narcissus, jonquil, tuberose and gardenia notes and for leather and chypres notes.

### Conclusion

I could mention yet other natural materials of high aromatic yield that are likely to interest the perfumer. I hope I have succeeded in convincing you that natural substances still have a future awaiting them, and especially those natural substances of high performance which exhibit great added value and which are the result of new distillation or extraction techniques.

The discovery and availability of a new natural raw material, insofar as plausible, will be very exceptional in any event. I am a believer, rather, in the discovery of new extraction and distillation techniques, to be applied to natural materials already known and normally available, because each new process makes it possible to achieve a fresh approach to the fragrance of natural ingredients.

We are already knowledgeable about the processes of maceration, enfleurage, extraction with benzene and hexane hydrocarbons and with butane gas, and about the processes involving CO<sub>2</sub> in the supercritical state, molecular distillation, hydrodiffusion and so on.

Advances in the extraction and distillation of natural substances are linked to technological advances in the areas of equipment and of chemistry. The prohibitive cost of researching,

developing, testing and adopting new chemical molecules argues in favor of the natural substances, and I believe that I am not deceiving myself when I say that the rate of launching new chemical molecules will undergo a progressive slackening. Thus it is necessary to encourage investigators to improve their techniques for the extraction of natural substances and to impel their research towards new technologies.

We are entering the era of biotechnology, and on either a short- or a medium-term basis, I hope to see a multiplication of the discoveries that are applied to perfumery. Applications of the use of microorganisms already exist, for example, to prepare substances with the odor of amber or of patchouli, which could thus be regarded as natural substances.

A number of natural lactones have been created by means of microbial degradation. I began by calling to mind the creative contribution of the synthetic substances before discussing the natural substances. When I enumerated synthetic substances that were responsible for imparting creativity to the great perfumes since the beginning of this century, I could also just as well have enumerated natural substances that were responsible for creativity in those very same perfumes. This is a way of telling you that the minds of the perfumers do not discriminate between synthetic and natural substances—all are raw material that make up their palette which is the tool of their trade.

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