

# Natural materials and the practicing perfumer

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How does a perfumer view his raw materials? Like most long-lasting, intimate associations, the relationship finally settles down fairly amicably to a workable arrangement, blending the contented placidity of familiarity with occasional bursts of outraged irritation. Some of our materials are old friends, tried and true. We know their qualities almost too well; their top-notes, chief characteristic odor, dry-outs, price, availability, market stability, behavior in various bases, both from a color and an odor standpoint, blending ability, and so forth.

Others are exciting new acquaintances. They have novel and inspiring odors at competitive prices. Our imaginations are fired and we can't wait to get them back to the lab to test them in different blends and at different concentrations, to find out if they live up to their original promise.

## Naturals and synthetics; the perfumer's attitude

You will notice that so far I have not distinguished between natural materials and synthetics. This is deliberate, because I want to emphasize that, for all practical purposes, perfumers are not really interested in whether a material is natural or not. Observers of our profession often wonder why we use so many synthetics in modern perfumes. They wonder: Why are modern perfumes not "natural"? They equate natural with *good* and synthetic has, for them, a pejorative connotation, at least subconsciously.

For perfumers, this differentiation is simply irrelevant. All we need are good materials. Their natural or synthetic origin is academic. Having said this, I don't want to give the impression that we don't know and love natural materials. Despite many years and millions of dollars spent on research into the natural raw materials used in perfumery, synthetic reconstructions of most naturals still lack that certain something which the perfumer searches for in raw materials. Yes, we certainly use cleverly constructed synthetic versions of many of our raw materials, but usually to extend the natural oil or absolute, not to replace it.

Some naturals are comparatively easy to copy, and synthetic versions of them are widely used. Examples of these are wintergreen, bergamot, and ylang. Most perfumers will have synthetic reconstructions of these

and other oils in their repertoires, and will use them for extending the natural material in the final blend. Other oils have proved very difficult to copy, or the final price of the copy is as high or higher than the original. Vetiver, patchouli, and sandalwood are examples of these, with patchouli the outstanding example of a natural oil, used in large quantities in our industry, for which there is at present no satisfactory extender.

## The future of naturals

No, the use of natural materials in perfumery seems assured for a very long time to come. Naturals have a smoothness, a richness, a strength, and often a beauty of odor which, when skillfully blended with synthetics, produces perfumes of outstanding quality that are simply unobtainable in any other way. Also, for various reasons naturals are likely to become more competitive in price in the future.

First, synthetics will go up in price more rapidly than naturals, because most synthetics are based on fossil fuels, such as coal or oil. These limited, non-renewable resources will go up in price as they become scarcer, and so will the chemicals made from them. Natural perfumery raw materials, from renewable sources, will not suffer from this price inflation.

Second, research and investment in new horticultural and agricultural techniques will produce natural materials of higher quality and yield, and at lower prices, too. It used to be thought that cheap natural raw materials could only be produced in developing countries by people living on subsistence wages. It has been found, however, that increased mechanization of cropping, planting, and other operations, combined with better agricultural techniques, has produced better products at better prices and at the same time has allowed the standard of living of the workers in these industries to rise. Even in the United States, with its comparatively high labor costs, oils such as peppermint, spearmint, and cedarwood are produced at prices that are competitive on world markets. This is largely due to mechanization and good agriculture.

A third factor that will increase the competitiveness of natural raw materials is the increasing government

regulation of the chemical industry. All new chemicals must have their safety proved, and this is now a very expensive process, some say costing around a quarter of a million dollars. When you consider that many perfumery chemicals, delightful and desirable though they may be, are so powerful that their potential sales are unlikely to top 100 kilos per annum, you can see that the future for such chemicals in the present economic climate is very doubtful. Natural materials, on the other hand, have much greater freedom under the law, because all those at present in use will have been registered under the act. The appearance in the industry of a totally new and unregistered natural material would be an unusual event: most of the botanical species from which perfumery raw materials can be made have been known, if not used, in the industry for many years.

### What perfumers want of natural materials

#### *Purity*

What do perfumers look for in natural raw materials? First and foremost, purity. I can't emphasize this too strongly. We like pure materials, and we like to know that they are pure. What is purity? The oil or absolute should come from only one species of plant. It should be extracted by a technique that adds nothing by weight to the final material. For example, in the production of absolutes, solvents are used to extract the odorous material from the botanical substrate. It is important that no residual solvent is left in the absolute, as it can seriously spoil the odor-picture of the material.

A pure material has nothing extraneous added to it. It is not cut, extended, or adulterated in any way. Most perfumers, if they cannot afford to use an oil or absolute in its pure form, will prefer to add extenders or boosters of their own choice when they are designing the final perfume. This gives perfumers a much wider choice of options in their design work than if they were to use an oil or absolute cheapened by cutting by the supplier. The extending of the natural material may be more or less skillfully done by the supplier, but I feel that most perfumers much prefer to be offered a pure material, even if the price is high, so that they can then blend it to suit themselves.

Many oils are in fact offered at a range of prices, the lower-priced ones being extended oils. The supplier can sometimes offer a blend of oil and supporting chemicals specifically designed to sell at the price requested by the customer. There is nothing at all unethical about this, so long as both supplier and purchaser are aware of what is going on, but personally, I would always choose the straight oil or absolute, and then play with it myself to achieve the effects that I want, rather than accept the effects the supplier wants.

#### *Correct labeling*

Correct labeling and naming is another important aspect of raw material production and selection. A good name is a simple name. It gives the botanical source, for example "Vetivert" or "Lavandin Grosso." Sometimes the origin is important—"Seychelles," "Hautes Alpes." If the extraction is done away from the growing area, this should be mentioned. Often leaves or seeds are exported as such and are then distilled or extracted in the essential oil supplier's premises. This might add a term such as "French Distilled" to the name. Next, the type of extraction process should be mentioned, for example "oil," "absolute," "concrete," "resoin." Sometimes the crop year is of importance, as variations in the weather from year to year can produce small differences in the final product. If this is so, then the year should be mentioned in the name. I would not go beyond these simply basics in naming raw materials. Often one meets samples of naturals with extraordinarily complicated names, usually combined with incomprehensible code numbers or specialized words with which the perfumer may not be familiar. On the principle that we fear what we do not know, I feel that this is a self-defeating action on the part of raw material suppliers. They want their products to sell, but the labels on their samples are so complicated that they scare off many perfumers. The chief fear, of course, is that the incomprehensible label designates a blended material, when the perfumer needs a pure one.

#### *Price*

I would like to move on now to some of the other criteria that perfumers look for when selecting natural raw materials. After purity comes price. Perfumery today is intensely competitive. Perfumers are constantly striving to create perfumes with the mutually exclusive attributes of power, beauty, and low price. Designing a perfume is like juggling. You have to keep all the balls in the air at the same time if you want to create a successful, salable fragrance. This is why the price of natural raw materials is so important to us, but we always look at price and odor-value at the same time. By this I mean that a very expensive absolute may not be so out-priced, when its extreme strength or uniqueness of character, or its beauty, exalting, or rounding-off effect are considered. Absolute of jasmin and rose otto are good examples of this. Though at first their prices seem frightening, it is only by experiment that one discovers how valuable they are in even medium priced perfumes. The opposite is found to be true of certain lower-cost oils. Orange oil can be used in large quantities in perfumes because of its low cost, but it does little to strengthen or beautify the perfumes in which it is used.

Not only do we look for natural materials at competitive prices, but we also hope to have price stability in the materials we select. Many factors mitigate

against this: crop failures; political turmoil in production areas; the cyclical effect of over-production producing low prices, producing under-production, producing high prices, and so on; the difficulty of getting field labor in traditional production areas where other, newer industries pay higher wages. All these tend to produce unstable raw material prices, and have tended to make perfumers avoid naturals to a certain extent in the past. But in the future, I feel this will be less of a factor as production of naturals moves to areas that are climatically and politically more stable, and as improved production methods and planning impinge more heavily on many natural materials. Also, in comparison, the price of petroleum-based synthetics has been anything but stable in recent times.

### *Stability*

After purity and price, the stability of our materials is of great importance. Perfumes are used in a vast number of products nowadays, many of which present perfuming difficulties because the product itself affects the perfume raw materials adversely. In such products as soaps, shampoos, depilatories, and hair straighteners, wide ranges of pH are found, and natural materials may be adversely affected by these conditions. Not only are off-odors produced, but, perhaps more important, discoloration of the product may result, especially after accelerated age-testing, which is now standard in our "pushed-for-time" industry. Oxidation of delicate essential oils or absolutes may occur in many powders, such as talc or laundry detergent. Certain naturals, especially absolutes, are usually dark in color. In functional products this often causes problems of direct discoloration without any reaction with the base taking place.

It is therefore with considerable pleasure that in the last few years, we have seen introduced a range of natural raw materials with much improved color and stability characteristics. These are the molecular distillates. A brief word about this technique of natural raw material production seems appropriate here. The starting materials may be essential oils or absolutes, and these are placed in a still with an odorless solvent such as isopropyl myristate or propylene glycol. The mixed liquids are vaporized almost instantaneously by a flash technique, and on condensation, it is found that the final material contains all the odorous material of its precursor, but with none of the odorless, colored matter. The odorous material in the final product is still dissolved in the original solvent, but usually molecular distillates are found to be approximately equal in strength to their precursors. The big advantage of these new items on the perfumers' palette is their very light color and excellent stability in many different and previously difficult bases. We can now use molecular distillates of myrrh, oakmoss, or patchouli in white soap. Tales, creams, lotions may

now be safely perfumed with natural items that were previously unusable.

The companies involved in the development and production of molecular distillates have opened up a whole new field for naturals, one that I believe enhances the bright future for natural materials. Curiously, although we in America search for and welcome naturals with very light colors, European perfumers often have the opposite problem. In cologne work for the European market, the customer looks for dark, rich-looking perfumes, and the more traditional absolutes and resins are ideal for this work.

### *Availability*

A fourth factor that has to be taken into consideration in the use of naturals is the availability of the item in large enough quantities. When it comes to using new naturals from developing growing areas, such as South Africa or South America, we have to be very careful that our potential sales do not outstrip the usually small supply produced by the new venture. Here we are all caught in a classic "chicken and egg" situation. Growers won't plant large acreages of this new botanical unless they feel fairly certain of selling their final essential oil or absolute, but we perfumers can't afford to risk not having enough material if our perfume sells in a big way, and we therefore hesitate to use the new natural, desirable though it may be from other points of view. There is really no answer to this old and intractable problem, except great commercial courage on the part of growers and patient support from the perfumers who use the products. If the new item has real commercial value, it will grow in volume year by year. We just have to be patient and encouraging and not expect quantum leaps in quantities produced.

### *Safety*

Of course, perfumers and indeed their customers expect that the materials they use will be safe. Over the last few years, it has been discovered that a few of the familiar naturals produced reactions of different types on human skin. The Research Institute for Fragrance Materials (RIFM), an independent research organization financed by the perfumery industry has tested a very large number of perfumery raw materials, both natural and synthetic, for any deleterious action on the skin. Only a small number were found to have harmful effects, and these are no longer used in perfumes. Several oils, for example bergamot, styrax, lemon, opoponax, were found to cause skin reactions in their pure form. Further research has been carried out on these materials and others, and nonreacting versions have been produced, which we can use now with safety. Sometimes, as with bergamot or lemon, this has been achieved by removing the unwanted part of the oil, in this case the psoralens. In other cases, different production tech-

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niques have produced oils or resins that do not harm the skin.

At present, it seems unlikely that we will have to stop using any further major items, though of course research continues. Indeed, we have recovered several natural materials for use, although in slightly different qualities, that we had thought would be lost permanently. I feel that the industry is to be congratulated on its thoroughness in doggedly rooting out those few items that posed a danger, no matter how small, to the public. In this instance self-policing seems to have been the best policy.

### Chemicals from essential oils

So far I have been talking about the use of natural materials directly in perfume compositions, but it should not be forgotten that another very important use of essential oils is the production of perfumery chemicals. Many of our earliest perfumery chemicals were first produced from essential oils. One thinks of geraniol and citronellol from citronella oil, and from these chemicals one can then go on to make hydroxycitronellal, the ionones, and others. Linalool may be made from bois de rose oil, and citral from lemongrass oil or litsea cubeba.

At the time when petroleum and its derivatives were very low-priced, many of these chemicals were more economically made from petrochemical feedstock, but with the sky-rocketing price of crude oil, it looks as if more traditional starting materials may regain their economic importance. For example the rose alcohols and other chemicals can be made from turpentine. This is the largest-volume essential oil in the world, and it is good to know that this low-cost renewable raw material will be available in the future as a starting material for many of our more important chemicals.

Several other important oils are produced mainly because they contain desirable chemicals that can be separated out and purified for use in perfumes. Some that come to mind are cabreuva, from which one can isolate nerolidol; sassafras, ocotea cymbarum, or brown camphor oil for heliotropin production; clove leaf and stem oil or cinnamon leaf oil, out of which eugenol is easily removed, and from thence to isoeugenol; aniseed and star anise for anethole production; caraway or dill for D-carvone; cedarleaf, producing thujone; geranium of course, from which one can isolate the alcohol fraction known as rhodinol; guaiacwood, the acetate of which is most desirable as a warm, woody floralizer; the peppermint oils for menthol and menthone isolation; orris, from which natural irone is still isolated, despite its enormous price; and finally vetivert, the alcohol portion of which is the highly desirable vetiverol, from which one makes the even more precious vetiveryl acetate.

### Byproducts

No survey of the chemicals produced from essential oils would be complete without mention of some of the byproducts of these processes. After absolutes are made from concretes, one is left with a spent wax, and after deterpenation of essential oils, the terpenes are left as a more or less useful byproduct. These materials have always posed two problems for the practicing perfumer. First, they are only available in limited quantities. The quantity of terpenes available is governed strictly by the amount of terpeneless oil processed. Nobody is going to make unrequired terpeneless oil just because the terpenes are desirable, or if they did, then the terpenes would be the product, not the byproduct, and would command a commensurate price.

Second, as terpenes and spent waxes are byproducts, little attention is paid to their odor quality, and they often vary widely from batch to batch; this of course makes their use difficult for perfumers, who obviously must guarantee odor consistency of their perfumes. Some terpenes are, however, produced in large enough quantities to be considered articles of commerce, and we can use lemon, orange, and perhaps lime terpenes fairly safely, without too much worry, so long as vast quantities are not required. For other terpenes, and especially spent waxes, great skill and care must be exercised by the perfumer who uses them. They are usually attractive products at good prices, and are often snapped up and used internally by the company that makes them, never being offered on the market. The trick is to use them up in selling products, but not to run out.

### Terpeneless oils

Having arrived at terpeneless oils by way of the back door, as it were, we should look at these materials and see how the perfumer uses them. In general, we use these items where the perfume will be used in an oxidizing medium, or where solubility in low-grade alcohol is required. Terpenes are fairly liable to oxidation, and this renders many essential oils, especially the citrus oils, unsuitable for incorporation in perfumes for tales or laundry detergents, for example. The use of a terpeneless oil will often avoid this problem of odor instability. The terpene part of the essential oil is the least soluble part in alcohol-water mixtures; indeed, this is the basis for the technique of terpene separation. Again the answer is to use a terpeneless oil. As with all raw materials, only experimentation will show the correct quantity to use, but as a rough guide, one can try the same value of terpeneless oil in the blend as of normal oil. In other words a dosage of 10 parts of a normal oil costing \$10.00 per pound could be replaced by a dose of 2 parts of a terpeneless oil at \$50.00 per pound.

## Kinds of natural materials

I would like now to look at some of our natural materials individually. We will look at them to see where they are used, in what types of perfumes they play an important part, why they are preferred over other materials, any problems that may crop up in their use, and we will try to see what sort of future these materials may have.

## Citrus notes

### *Fruit oils*

I think we can conveniently start with the citrus group. First we will examine the fruit oils, of which there are six used in large quantities in perfumery; orange, lemon, bergamot, grapefruit, mandarin, and lime. Orange oils vary greatly in price depending upon whether they are byproducts of orange juice manufacture, such as sweet orange from Florida or California, or whether the fruit has been grown specifically for oil production, such as bitter orange, Valencia, or French Guinea. In sweet orange oils, we look for a juiciness and a fresh but not too powerful orange odor. Usually the paler-colored oils are more useful than the really dark ones, because of potential discoloration. These sweet oils, being byproducts, are sold at very low prices, and we can afford to use them in large quantities in perfumes for household products, deodorants, and so forth.

They blend well into classic Jean Maria Farina cologne types, and with lavender or other materials, to make perfumes in the Brut or Jean Naté families. As the sweet oils are byproducts, odor and color consistency have to be carefully monitored, and another problem that sometimes occurs is the presence of dissolved wax in the orange oil. This may not precipitate out in the drum, but it can cause problems of clouding when the orange oil is blended into the finished perfume.

Sweet orange oil may be used to produce reasonably-priced versions of the historical perfumes; Hungary Water by blending with other citrus oils, rosemary, and lavender, and Eau de Portugal, where orange oil is combined with bergamot and lemon to form a classic cologne, and then animal notes are added. Attractive, if old fashioned, men's perfumes can be made in this way, so sweet orange is not restricted to low-cost perfumes only. Another classical type where orange is important is Florida Water, in which a cologne base is combined with the warmth of cinnamon, clove, and nutmeg, and the refreshing character of lavender.

The bitter orange oils are not used in the same way as the sweet. They are much more expensive, but this is compensated for by their much greater strength. Bitter orange oil adds a sharp, bitter note to many perfume types, including cologne-perfumes. It blends well with aldehydes, and I often use a small

quantity to add a natural note to the aldehyde part of my perfumes. It has a noticeable effect in perfumes at low dosages, down to 0.1%, and it can be used to improve the class of blends of other citrus oils when they are used in classic colognes or chypres. I also like it in combination with cinnamon in men's perfumes, but this has to be done carefully, or else the effect becomes too spicy and "cake-like." Bitter orange oil contains psoralens, so it may not be used at more than a comparatively low percentage in the final product. If this goes on the skin a better answer is to use a psoralen-free oil, which most of the manufacturers can now provide. Psoralens are also present in lemon and bergamot oils, and these oils are therefore used in the same way: one must either restrict the quantity in perfume, or use a psoralen or bergaptene-free grade.

French Guinea orange oil occupies the middle ground between the sweet and bitter oils. It is used where a more sophisticated note is required than can be obtained with sweet orange oil.

Lemon oil is of great importance in many perfume types. It is surprising how much lemon oil you can add to a perfume without turning the blend too fruity. Perfumers are rather fussy about lemon oils. The preferred type is the Italian, which seems to have more of a delicate florality than the oils from other producing regions, such as California, Arizona, or Argentina. At the moment there is a world shortage of this oil, so prices are quite high. Lemon, with the other citrus oils, is vital in colognes of all types and in chypres. Lemon oil is definitely a top-note material and it adds a refreshing, cooling quality to an enormous range of perfume types. It blends well with the green notes of galbanum, and the florality of muguet can be tempered with lemon oil.

Bergamot oil, though not by any means the highest volume oil of the citrus family, is the most important one for perfumery work. Again, it is essential in classic colognes, and it forms the top-note in many chypre types, where it combines perfectly with oakmoss and aldehydes. It also features importantly in orientals of the Shalimar family. Fougères such as Canoe also benefit from its addition. The word that best expresses what perfumers seek in bergamot is *richness*. The oil should be deep and full but at the same time light and refreshing. Again, Italian oil is the standard to which we work, but some excellent oils are now seen from Guinea in West Africa. A good oil should display a faint orange-blossom note, much finer than can be obtained by the use of methyl anthranilate or methyl methyl, so called di methyl anthranilate. A good bergamot oil is not cheap, and often it is necessary to blend it with linalool and linalyl acetate to achieve an affordable perfume, but it is the bergamot oil that is the workhorse of the blend. Bergamot oil contains psoralens, so we usually work with bergaptene-free bergamot oil.

Interestingly, bergamot oil was a chief ingredient in

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the perfume of one of the world's original, large-selling skin creams. This was long before bergamot oil's photosensitizing action was understood, but there were very few reactions from the cream itself. It is good that our industry should be so conscientious in removing the last trace of doubt about the safety of our products.

Grapefruit oil is another byproduct oil, obtainable at very reasonable prices. Its bitter, characteristic note is not desirable in all types of perfumes, but it will add an appealing top-note, such as in Smitty, for example, if not overdone. Along with sweet orange oil, grapefruit oil is extremely useful in those household or deodorant perfumes where its lack of stability to oxidation is not a disadvantage.

Mandarin oil, which is rarely distinguished from tangerine oil in use by the practicing perfumer, must always be used as fresh as possible. Old oils rapidly develop a most unpleasant fishy, amine-like odor, very much a top note, which can ruin a delicate perfume. Though this oil is much more important to the flavorist than to the perfumer, we do make use of it to modify citrus top-notes in classic colognes, and it may be used with discretion in men's perfumes, where its sweetness can help counteract the astringency of lime or lemon.

Lime is the last citrus fruit oil to be considered. There are really two lime oils as far as use is concerned: the distilled oil and the cold-pressed or "ecuelled" oil. Most laypeople are familiar with the distilled oil, as it is the base of lime flavors. Its peculiar almost pine-like note is especially valuable in men's colognes, although it can be used with discretion in cologne blends. The distilled oil seems to have more in common with fresh lime fruits than the cold-pressed oil, surprisingly. Most perfumers prefer the odor of the cold-pressed oil, which the layperson might mistake for lemon oil, but which has a delicate coolness and masculine vigor all its own. Of great value in men's colognes, especially in the European type, this is an oil which deserves closer examination and more use.

Before leaving the citrus-fruit oils, it should be mentioned that they all share the disadvantage of susceptibility to oxidation. They are not really suitable for inclusion in perfumes for talc, powdered makeup, or any other powdered products, and in line-extension work it demands all the skills at a perfumer's command, to create really close approximations to these citrus oils that are also stable in oxidative media.

### *Blossom oils*

Although citrus fruit oils are the most important products from this family of trees, the orange tree displays even greater versatility because from it three more valuable materials are obtained. From the blossoms comes neroli oil and orange flower absolute, and

from the leaves and twigs, petitgrain oil is distilled. Neroli oil, though high in price, is unrivaled as the floral note in classic Jean Maria Farina colognes, such as 4711. Its fresh, floral beauty is worth every penny in high quality perfumery.

Orange flower absolute, though made from the same botanical material as neroli oil, smells amazingly different. It is much heavier than neroli in aroma, and finds a place as a middle-note or even a fixative floralizer in high class compounds. It works especially well in oriental types, where the orange-blossom note blends with patchouli and the ionones, as in Oscar De La Renta for example. The difference in aroma between neroli and orange flower absolute is, I suppose, the classic example of how two different extraction techniques of the same botanical, namely steam distillation for neroli and solvent extraction for orange flower absolute, can produce two totally different perfumery raw materials. Most people new to these materials would fail to associate them at all.

### *Leaf and twig oils*

Petitgrain oil, most of which comes from Paraguay, is a very versatile, reasonably priced oil, used in large quantities in soap perfumery. It adds a green, almost metallic bite to many perfumes, and is valuable in fougères, where it combines with lavender notes to produce an almost floral effect. A large percentage of petitgrain oil is deterpenated, and the resulting terpeneless petitgrain oil shows many advantages over the complete oil. The terpenes are certainly harsh and woody, and their removal produces an oil that can blend successfully into colognes or other light, refreshing perfume types, and still be not too expensive. A higher quality petitgrain oil is produced in the south of France, and this is itself a very desirable product, but even more interesting is petitgrain sur fleurs d'oranger, or petitgrain oil redistilled over orange flowers. This fine oil can replace the much more expensive neroli oil in many cases where price is a major consideration.

### **Rosey notes**

Though there is no botanical correspondence among members of this next group, I think we can conveniently look at the materials displaying rose notes under one heading. We should start, of course, with those members derived from roses themselves. These are the essential oils known as otto of rose, from *rosa damascena*, and rose absolutes, which can be made from *damascena*, but more importantly are extracted from *rosa centifolia*.

### *Rose otto*

Rose otto, both Turkish and Bulgarian, imparts incomparable rosey notes to the perfumes in which it is used. Although very high-priced, rose otto can be used successfully in even medium cost perfumes be-

cause of its immense strength. It can make a worthwhile contribution at dosages as low as one part per 10,000, where its price becomes less frightening. It blends beautifully with jasmin to produce Joy-types and similar intensely floral perfumes such as *Quelques Fleurs*, *L'Air Du Temps* or *Fidji*.

### *Rose absolute*

Rose absolute is much less sharp than the otto, with a more honey-like character. Also an excellent floralizer, it seems to show less enhancing strength than the otto, but it has its part to play in the construction of floral middle-notes in extrait perfumes.

### *Geranium oil*

Rose notes may also be added to blends by the use of geranium oil. This oil is grown in many parts of the world, but always the same botanical species is grown, so it is interesting to compare oils from different regions, most of which are quite distinctive in character and can be typed by experienced perfumers.

The differences in odors caused purely by soil and climatic conditions are quite startling. For most purposes, the most desirable oil is the Bourbon from Reunion. This has an almost harsh, sulphur-like note caused by the presence of dimethyl sulphide and other sulphur compounds. Egyptian geranium is also a useful oil. It has a straw-like note to it, quite characteristic. Oils from Morocco or East Africa also have quite distinctive characteristic notes, less powerful, but somehow more rosey.

Geranium oil is used in an enormous number of perfume types, from the support of rose notes in extraits to soaps, where it is invaluable as a heavy floralizer. It blends beautifully with patchouli to form the heart of many oriental types. When selecting geranium oils, we look for strength and fresh rosey-ness. A clean odor is required, with no note of rotting vegetation, which is sometimes present, indicating an oil distilled from plants that have been harvested too long before production. Old oils are also undesirable because the fine sulphur top-note is usually lost.

### *Palmarosa oil*

Palmarosa oil can be classified with the rosey oils, and its rose notes are very useful in soap-perfumery, though unfortunately it is getting rather expensive these days. Though from a quite different botanical source, its odor has definite similarities to geranium. I like to use it where I can not afford geranium as a floralising middle note, in combination with geraniol, phenylethyl alcohol, or linalool. As with so many naturals, palmarosa oil produces a naturalness in blends far beyond either the value or quantity added.

### *Bois de rose*

Bois de rose is a valuable source of linalool, as I have previously mentioned, but it is also used in soap

and other perfumes for its peculiar top-note, at once rosey, woody, and even a little green. A useful pepperiness is also noticeable. Bois de rose oil is a good example of an oil which became less useful when cheap, synthetic linalool was available. Now that those days are over we may see a resurgence of interest in Bois de rose.

## Woody oils

Bois de rose has woody notes, which moves us on to a consideration of some of the woody materials used in perfumery.

### *Sandalwood oil*

Preeminent amongst these is sandalwood oil which, despite high and fluctuating prices, is still the material of choice for sweet, sophisticated woody notes. Because of price, sandalwood oil is almost restricted to cologne-perfumes, where it helps build the background support for many florals and other types such as *Tatiana*, *Cie*, *Quadrille*, *Calvin Klein*, or *Jovan Sport Scent for Women*. Sandalwood forms an important part of oriental complexes, and it even blends attractively with muguet, where it adds background and body. If sandalwood has a fault, it is its lack of strength. Fairly large quantities are required for an adequate effect, and this is of course expensive. When we examine sandalwood oils, we look for smoothness above everything. Harsh, terpeney, or even burnt notes are to be avoided.

A cheaper alternative to the East Indian sandalwood oil is West Australian sandalwood, which comes from a slightly different tree. Like East Indian sandalwood, it is an excellent fixative, and its dry-out is very similar to East Indian. But the Australian oil has a different, though pleasant, top-note, greener and slightly camphoraceous, so you cannot replace East Indian with Australian. It is just a different oil, which has its own place on the perfumers' palette.

### *Amyris oil*

Also in the sandalwood odor family is amyris oil. This used to be known as West Indian sandalwood oil, but this name is now out of favor. Definitely woody, with some sandalwood character and an excellent fixative, amyris oil has a soapy, almost rubbery top-note, which needs careful blending if the final effect is not to smell cheap. I like amyris in lower-priced items as an improver for the synthetic sandalwood chemicals. It also helps to sweeten cedarwood, and other woody notes.

### *Cedarwood oil*

Cedarwood is the largest woody note by volume, and this is another oil which is used not only as such in compounds, but is the starting material for a whole range of woody chemicals and specialties. The main alcohol, cedrol, is less harsh than the oil, though not

particularly powerful. Cedryl acetate is a great favorite as it blends well with the violet-orris notes of the ionones, and also can extend vetiveryl acetate unobtrusively, thus also bringing it into use in men's perfumes. Cedarwood oil is a low-cost item, and the temptation is to overdose it to make bargain perfumes. This does not work, as the woodiness produces soapy, cheap-smelling odors.

The two chief cedarwood oils used in this country are Texas and Virginian oils, with the Virginian being smoother and soapier, and the Texas rather harsher and more terpeney. In Europe one often finds Kenyan oils, which resemble Virginia oil closely enough for similar use in new compounds. Kenya cedarwood oil is the most pencil-like of the cedarwoods. Quite different in character is the Atlas or Moroccan cedarwood oil. Its peculiar note is definitely woody, but not at all like the other cedarwood oils. It is excellent in men's perfumes, especially in combination with ciste and cedarleaf.

### *Guaiacwood oil*

Before moving from the woody naturals, I would like to make brief mention of two more woody oils which lend themselves to wide application in our work. Guaiacwood oil is one of our few solid essential oils, solidifying to a crystalline mass after distillation. Its reasonable price makes it very useful in soap and household perfumes, where its floral-woody character, sometimes with a faint kipper-like, smoked note, can be used to add a smooth back-note to all types of woody and floral perfumes. Many people find its character is like a green tea; delicate and delicious. The acetate is somewhat finer, though with lighter, almost fruity notes, very nice with vetivert or patchouli.

### *Gurjum balsam*

Gurjum balsam, from which an oil can be easily distilled, is another versatile woody note, with a pleasant but rather nondescript odor, slightly peppery, with a linalool-nerolidol nuance to it. Its excellent price allows one to use it extensively as a filler, to add body and fixation to perfumes, without any particularly noticeable note. It is much better to use a material like gurjum, rather than just a diluent in a perfume. Diluents tend to rob strength even more than one might imagine from the mathematics, while extenders with pleasant but mild odors retain the needed strength at the cost required.

### **Pine notes**

I like to think of the pine group of raw materials as being allied to the woody notes. Pine notes vary from the sophistication and quality of juniper to the household disinfectant notes of pine stump oil. This last oil is irreversibly associated in the public's mind with Pinesol and other disinfectant products, which is a

pity, because small touches can be used with advantage in other types, such as lime notes. However, pine stump oil will probably always be relegated to the lower end of the quality spectrum. It is our major source of terpineol, which, if pure, has no pineyness left about it, only a delicate, lilac-like floralecy.

### *Pine needle oils*

Pine needle oils, of which there are a considerable variety, are a totally different story. Ranging from the raspberry-jam-like Siberian pine needle oil, to the fishy, aldehydic, but at the same time pleasant pumilionis pine oil, they offer a range of delicate and sometimes unusual top-notes, some of which can find their way into even high quality extrait perfumes. Absolute of fir balsam is a highly valuable material of extreme strength which I like to use in herbal types and in the reconstruction of Christmas-tree notes. It has a very dark color, which is a disadvantage, but molecular distillates are available that overcome this difficulty. Altogether, this is a highly recommended material, deserving more experimentation among perfumers. It is important in Rigauds' Cypres, a popular European line.

Juniperberry is an excellent oil for top-notes, especially in modern masculine types. On casual examination, it seems little more than a fruity pine-needle oil, but in use it has a very different effect, adding a clean, distinctively rigorous note that is very difficult to copy synthetically. The associations with gin are obvious but probably subliminal if the addition of juniper is done deftly. Juniperberry is especially attractive in combination with labdanum materials, and it is now reserved for the costlier perfumes because, though the oil is expensive, tiny quantities of it are not effective.

Before leaving the pine-needle odor family, we should also look at cypress oil and laurel oil. Cypress is an excellent modifier for pine-needle or amber types of perfume, where it adds a certain green smoothness at a reasonable price. This is another oil mainly used in men's colognes and aftershaves. Laurel oil could be said to lie between the pine-needles and the eucalyptus oils in character. It does well in masculine types and with aldehydes.

### *Mastic*

The last two materials that I want to consider in this piney group are mastic and the more important olibanum, also called incense. Mastic is a resinous, balsamic material. The resin is used and also the oil from it, for a warm, woody, almost varnish-like note, which can help in lavenders and other fougères.

### *Olibanum*

Many perfumers see similarities between mastic and olibanum, and blends of the two are interesting. Olibanum is one of our more important raw materials.



Both the resin and the oil are used. Anyone who knows a Catholic church will not fail to recognize this material, though if it is recognizable in a finished compound it is overdosed. This surprisingly versatile material finds use in a multitude of odor types. It helps the citrus notes of colognes, and has a surprisingly floral effect in rose or jasmine complexes. The resin is excellent in perfumes for talcs or facepowders, and it is part of the classic oriental complexes, such as Opium or Shalimar. Although turpentine-like, this is a much more sophisticated, less crude material, one known and used extensively in any perfume laboratory.

### **Eucalyptus and camphor notes**

#### *Eucalyptus*

Oil of eucalyptus is invaluable in cheap, medicinal types and household blends of many types. Its chief constituent, eucalyptol, also called cineole, is often removed and used as a chemical, but in many lower-cost perfumes the complete oil is entirely satisfactory, and its top-note effect is much appreciated at these prices. By eucalyptus I mean eucalyptus globulus. There are many different eucalyptus oils from different species, and an examination of these will demonstrate the enormous variety of oils that plants of related species can produce. Eucalyptus citriodora, for example, is a useful source of citral, and is now being extracted for hydroxycitronellal production.

#### *White camphor oil*

A similar oil to eucalyptus is known as white camphor oil. When camphor wood is distilled, careful cuts are made, and, along with the camphor itself, two other oils are separated: brown camphor oil, with a high safrole content, from which heliotropin is made, and white camphor oil, which smells fairly similar to eucalyptus oil, and is used in much the same way.

#### *Oil of cardamom*

Oil of cardamom fits loosely into the eucalyptus picture, though one is paying for much more than eucalyptol in its high price. At once spicy and camphoraceous, cardamom is a very important flavor material, but it also has its part to play in perfumes, where it displays a useful reinforcing character in rose notes. This oil, seemingly so simple, shows very well how natural oils usually behave in a totally superior way to even cleverly-done synthetic versions.

### **Spicy oils**

Some materials that I have classified as woody have definite spicy notes, and I want to look now at some spicy materials, and how they are used in our work. The adverb that comes to mind is *sparingly*. Spicy oils are certainly valuable raw materials, but we have to be cautious. Here, perhaps more than any where else,

overdosing can be disastrous; you end up with a flavor, not a perfume at all. Spicy oils encompass all those with hot, oriental notes that have more or less of the notes of cinnamon, pepper, or clove. We all know a spicy oil when we smell it, but definition is a more difficult task.

#### *Clove oils*

In perfumery we use three clove oils for most purposes. The finest is the bud oil, which should have an almost metallic astringency to it. It must not be burnt or green or fishy. Clove bud oil helps enormously to enhance the value of a eugenol or isoeugenol addition in a perfume, so it is excellent in carnation types, such as L'Air Du Temps, and also in many orientals. It is surprisingly effective in many floral types, such as ylang or red roses. Clove bud absolute should also be mentioned. This fine product finds its way into many floral or spicy blends, though its price is a hindrance.

Clove stems, after the buds are harvested, are distilled extensively in Zanzibar, and this comparatively low-cost oil is excellent for household products, deodorants, and even for soap-perfumes, but here discoloration can be a factor, so care has to be taken. Clove leaf oil, mainly from Madagascar, is also a valuable lower-cost spicy oil, though its greener harsher note is less appreciated. Both clove stem and clove leaf oils are used extensively for eugenol isolation, from which isoeugenol or vanillin can then be made.

#### *Cinnamon oil*

Cinnamon is one of our favorite spices, the preferred oil being from the bark, but unfortunately we may no longer use this oil, as it has been found to produce skin reactions. Much ingenuity has been exerted in replacing this oil with synthetics. It's a pity that so far we have no satisfactory quenching agent for cinnamon bark oil. Cinnamon leaf oil is a very poor substitute for the bark, but it does have its own uses, with its rather more clove-like character. One uses cinnamon leaf in a similar way to clove leaf oil.

#### *Cassia oil*

Another lost oil is cassia, also a producer of skin reactions. I used to love the almost honey-like spiciness of this bark oil, but alas no more. It is strange to think that cinnamon bark oil and cassia oil are forbidden to the perfumer in even the tiniest quantities where the perfume might touch the skin, but the flavorist has no such ban, and both materials are GRAS, generally recognized as safe, in foodstuffs at any reasonable dose-rate.

Incidentally, to clear up some nomenclature difficulties here, I have just mentioned *cassia*; a spicy oil distilled from the bark of an oriental tree. Another material is absolute of *cassie*; produced from a species of mimosa. This rare but beautiful absolute is used in high-class perfumes where its variation on the

mimosa theme is much appreciated. A third material, black currant in English, is known as *cassis* in French. French is used a great deal in our industry, so *cassia*, *cassie* and *cassis* are all frequently met with. It is not surprising how often misunderstandings occur.

### *Pepper oil*

Pepper oil is a great favorite. Its delicious spiciness helps in many masculine types and just a spot in rose perfumes, especially rosebud types, is surprisingly effective. This oil has to be used at the right time. If it is too fresh it will have an unpleasant, almost nauseating top-note, what we call a "still" odor, so the freshly-distilled oil is better if left in open vessels to air for a while. If pepper oil is too old, it loses its rounded spiciness and becomes dull and lifeless. An oleoresin is also made from pepper, which captures more of the pungency, but it is often difficult to use in perfumes because its solubility in most perfumery raw materials is poor, and also its color is quite dark.

### *Schinus Molle oil*

An interesting oil with which one can create pepper-like effects at a fraction of the cost is *Schinus Molle* oil. This material started life as an adulterant for pepper oil, but it is much better to buy pure black pepper oil, use it where possible unless the price is too high, and also use *Schinus Molle* oil in other places where pepper oil cannot be afforded.

### *Ginger oil*

I've always felt vaguely disappointed in ginger oil. Though it has its uses, especially in spicy men's lines, ginger oil has very little of the pungency of the original stem ginger. It seems that the pungent principles in spices such as ginger or pepper are not distilled over during steam distillation, so the final oils do not show the complete picture of the original spice. Again, ginger oleoresin is much truer to nature, but is practically confined to flavor work.

### *Gingergrass oil*

Gingergrass oil, on the other hand, deserves more popularity among perfumers. It does possess gingery notes, albeit blended with green and grassy odors, so it can be used for spicy effects. It is definitely worth experimenting with, but it is rare in this country, and it may be necessary to search for a source. On the whole, the ginger character is a problem for perfumers. It is tricky to achieve a true ginger character in one's blends. That spicy pungency always seems to be missing.

### *Nutmeg oil*

Nutmeg oil is well known and quite distinctive, but it is surprisingly useful in applications in all types of perfumes, from florals to aldehydics to spices to masculine blends. Here the pungency seems to distill

into the oil quite successfully. Incidentally, it is amusing to learn that one gets better yields of oil from worm-eaten nutmegs than from first quality nuts. This is because the worms prefer the fixed-oil-containing part of the nutmeg, leaving the essential-oil part alone for later distillation by we more appreciative humans.

### *Pimento berry oil*

Pimento berries are distilled to make a delightfully spicy oil. Pimento is also known as allspice, and this is an excellent name, as the oil has notes reminiscent of most other spices, as well as some individual to itself. Pimento berry oil is practically confined to men's types, spicy blends, and so forth, and it does not seem to help floral notes much, though orientals are assisted. There is also a pimento leaf oil, but it lacks most of the spicy character of the berry oil, though it has its uses in cheaper blends.

### **Herbal notes**

Complementary to the spice grouping, the herbal raw materials have a very important part to play in modern perfumery. By herbal raw materials, I mean those with a more or less noticeable grassy, hay-like, meadow-flower character. The most important herbal material is lavender, and its associates, lavandin and spike lavender.

### *Lavender oil*

Good lavender oil is one of the most enjoyable raw materials that a perfumer has to work with. At once powerful and delicate, we look for an oil with very little dry-out, but with a very refreshing grassy floralcy. Lavender oil is part of the classic Fougere complex, and it blends excellently with the citrus oils, especially bergamot, to produce colognes of all types, such as Jean Nate. Lavender oil is quite expensive, as true lavender plants are difficult to grow and have a rather poor yield. So for most purposes in middle and lower price-range work, perfumers use lavandin oil, which is distilled from a plant cross bred from true lavender and spike lavender.

### *Lavandin oil*

Lavandin oil is not as fine as lavender. It has a slightly camphoraceous note and a green fruitiness which one hopes will not be in one's lavender oil. Lavandin is quite reasonably priced, so one can use it in middle and lower cost blends without too much penalty. It is excellent in detergent powders, where it plays a part in many of today's familiar laundry detergent fragrances. For the past thirty or forty years, the lavandin of choice has come from a hybrid named *Abrialis*, but it seems that after a few decades, hybrids of lavender and spike become genetically tired, producing poorer and poorer plants, with decreased yields of oil. It is necessary, therefore, to go back to

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the original species, lavender and spike, and start a new hybrid.

The one chosen by the industry in the south of France is called Grosso, and this is now gradually replacing the abrialis plant. Lavandin Grosso is slightly different in character to Abrialis, so we have to get used to using the new oil, and we even have to slightly modify some existing perfumes to achieve a consistent olfactory picture. Lavandin, with its naturally high linalool and linalyl acetate content, is easily adulterated, so great care must be taken in selection and quality control.

#### *Absolutes and resoins*

Both lavender and lavandin are processed into absolutes and resoins, as well as oils. Lavender absolute is more like the commonly known garden lavender, and it is used where a true lavender note is useful. Resoin of lavandin is excellent in soaps and other places where a better fixed material than the oils is required. Lavender notes are very refreshing in men's perfumes, such as Jovan for Men or Caron Pour l'Homme. Though pure lavender types are considered very old-fashioned, a really high-class lavender perfume, with lots of good oil and absolute, and a little rose, clary sage and rosemary can be very appealing. Interestingly, Irish Spring depends chiefly on lavender for freshness, with a woody, musky background, but no one calls this product old-fashioned.

#### *Rosemary oil*

Rosemary oil is important, also, and its uses include household perfumes, deodorants, and soaps, all the way up to colognes and the more herbal extracts. It is nice in pine-needle blends, too. In rosemary oil, we look for sweet herbaceous notes, and not too much harsh camphor, eucalyptus or borneol-like character.

#### *Clary sage oil*

Clary sage is a favorite product with many perfumers. It is one of the few botanicals that produce an absolute that is cheaper than the oil. This is because the absolute yield is quite high, but the oil yield is low. Just to be perverse, we perfumers tend to prefer the oil of course. Clary sage has a fascinating, unique odor, quite unlike true sage, in fact I would recommend that one never think of them together; there is no perfumery association. I love clary sage in men's perfumes, where it does great things when blended with the other herbal oils, and with citrus notes such as bergamot. It has odor affinities with ciste labdanum, so blends of these are excellent.

#### *Mentha citrata oil*

If you can not afford clary sage, then look at oil of mentha citrata, more and more of which is being grown in the mint areas of this country. Mentha citrata's top is too green and minty for clary sage, but by

"topping" the oil of its first few percent, an oil can be produced that will function like clary sage but at a much lower price. This means that you can afford to introduce clary-sage-like notes into personal care and toiletry lines, and even household goods.

### *Coriander oil*

Clary sage has a part of its character which is similar to coriander, so let's look at this oil next. Perhaps it isn't strictly herbal. It comes midway between herbs and spices. Coriander has a very distinctive note, so it has to be used carefully. It is excellent in oriental types, and you can use quite a lot with bergamot in a Shalimar type, for instance. I like to blend it with tarragon, and then use this combination in small quantities in some of the sweeter cologne types, such as chypres or mossy notes.

### *Thyme oils*

Thyme oil is a very distinctive herbal, to be used sparingly on occasion. Its definitely medicinal character makes it easy to overdose, and it seems to leap out of the top-note of perfumes when used in aerosols. I have noticed that if you add red thyme oil in barely noticeable quantities to an aerosol fragrance, such as a hair-spray perfume or anti-perspirant, it will leap out of the top-note on spraying, completely ruining the fragrance. Great care is therefore called for when using thyme oils.

## Other floral notes

### *Jasmin*

Before I run out of time, pardon the pun, I want to cover some of the other floral materials that are so important in perfumery, and I'll start with jasmin, the heart of the floral-notes of so many famous perfumes. It is almost impossible to name them all. Jasmin and rose are together the most important florals we have, and we use them separately or in combination in a myriad different ways. Where rose is boosted by other rose-like naturals, jasmin stands alone as a natural, or else it is supported by synthetics.

Jasmin is another excellent example of a material that varies because of growing area, soil, and climatic conditions. The same species and variety is used worldwide to produce jasmin absolute, but absolutes from different areas show remarkable differences in odor, and one chooses the one best suited for the purpose in mind. The French absolute, though only a little is now produced, has the finest general floralecy, with Italian close to it, but lighter, with a more buttery character. Egyptian is also excellent, but rather different again, as it is deeper, more indolic, meatier, more animal. Fine jasmin absolutes now come from Morocco, and have a character more approximate to the Italian. Jasmin absolute ex chassis is now almost

historical, but it has something the others don't have: the odor truest to the living flower. When available, and if price is not a deterrent, jasmin absolute ex chassis is a beautiful material to incorporate in one's blends.

To create the jasmin odor in our fragrances, we now use synthetic jasmin blends for nearly all purposes, but at high and even medium price levels, the addition of a little natural will work wonders, worth every cent of the additional cost. Jasmin has been studied and synthesized perhaps more than any other perfumery raw material, but it still holds preeminence over the synthetics, as witness the large and expanding industry of jasmin growing and absolute production.

Some famous fragrances in which jasmin plays an important role are worth mentioning. First Joy, in which a heart of jasmin and rose are so beautiful that they need little additional adornment. Then Quelques Fleurs, rather more complex. Jasmin is important in L'Air Du Temps and Ariane too. Very modern perfumes also use jasmin: Yendi, Charles of the Ritz, Me!, Adolpho, Amazone. Jasmin always adds warmth and an exalting, almost musk-like effect. The immense complexity of the natural material has so far not been matched by the creations of man.

### *Tuberose*

Next in importance to jasmin and rose, I would put the tuberose note. This floral has had quite a resurgence of late, with a number of new perfumes coming out in the last few years in which a tuberose top-note dominates. One thinks of Tatiana, Pavlova, and Pavilion. Natural tuberose has obvious advantages over the synthetic reconstructions. The natural absolute is much fuller, richer, and more powerful than any synthetic base can be; it is certainly a great deal more than jasmin base plus methyl salicylate, which is what one can simplistically blend to create a cheap approximation. Tuberose is a fairly heavy note, and leads a fashion in perfumes away from the light green notes of the sixties, and on to heavier, more powerful, long-lasting scents of the last decade.

### *Ylang ylang*

Ylang ylang means *flower of flowers* in Malay, and many perfumers would agree with this. Ylang's wonderfully beautiful fragrance is almost a perfume in itself, and it finds way into a multitude of blends. Ylang is essential to the now classic aldehydic perfumes, Chanel V, Arpege, Je Reviens and Rive Gauche. The sweetness of the ylang oil balances the harsh, powerful aldehydes perfectly; in fact, it is difficult to use aldehydes attractively without ylang. Ylang is also very important in the oriental field, and is needed in Tabu or Youth Dew types. Green notes blend well, also, in such types as Vent Vert. The greenness of galbanum, especially, goes most attractively with ylang, and beautiful hyacinth bases may be

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designed.

We generally use four qualities of ylang oil, and then cananga oil. The finest is the extra quality, which is the beginning cut from the distillation, then first, second, and third grades are cut as the distillation proceeds. Finally, the distillation ends with cananga oil, which should officially come from the flowers of a slightly different tree, but nowadays is, as I say, the end cut from ylang distillation. A point that should be remembered when using ylang oil is that it is not completely soluble in even pure ethyl alcohol. It may be necessary to try a terpeneless ylang if this problem occurs.

#### *Other florals*

I will mention other floral materials that we enjoy using in perfumery more briefly. Broom, which many of us still call by its French name *genet*, is a surprisingly powerful absolute, with a deep, rich, honey-like floralecy. Small quantities enrich and raise the quality of many floral types, and it is also excellent in tobacco bases for men's perfumes. Carnation is sometimes helpful for special green-floral effects, but oddly, it doesn't help carnation blends much and is only of moderate interest. A little jonquil absolute is produced, but its very high price and perhaps less unusual notes keep it a low volume item.

Mimosa, on the other hand, is of considerable importance to us. Its distinctive waxy fatty note, at once green and cucumber-like and floral, is very helpful in adding general floral body to medium-priced extrait perfumes. Mimosa has a very good olfactory value. One only needs small quantities to achieve desired effects, and it is not, in fact, a tremendously expensive absolute.

#### *Oakmoss*

No survey would be complete without oakmoss, so often the foundation of a good perfume. This wonderful adaptable back-note material is presented for our use in innumerable different forms. Absolutes, re-soins, oils, concretes, decolorized versions, molecular distillates; they all have their distinctive properties and attributes, and choosing the correct version for a particular job takes all the perfumer's know-how and personal taste. As the years pass, most compounding houses end up with too large a number of oakmosses in use, and this is inefficient for stock-keeping and purchasing, so it is worth any perfumer's while to look very carefully before using a new oakmoss product.

Oakmoss is a fantastic fixative and it is great in chypres, fougères, and aldehydics. Indeed, chypres are classically blends of bergamot and oakmoss with other additions to produce variety. Much research has been done on oakmoss, but the synthetic chemical substitutes are only a pale shadow of the true thing, as witness the enormous amount produced in the south of France.

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## Natural materials

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### *Patchouli oil*

It is hard to imagine perfumery without patchouli oil. This oil, distilled from the leaves of a tropical tree, is used enormously in our industry. It is essential in orientals of the Youth Dew family, and can be used in large quantities in men's fragrances, though personally I feel it is overdone in some of these. Patchouli is rather expensive now at around \$20.00 per pound, but here again, extensive research has so far failed to produce a satisfactory synthetic substitute. Patchouli is also a notorious discoloring oil in many bases, especially white soaps. Traces of iron turn it darker still, so an iron-free oil is often of use, or for very sensitive work, a molecular distillate. I personally like the combination of patchouli and geranium; old-fashioned of course, but providing an excellent rich middle-ground for many functional types. It is the damp-earth, leaf-mold odor that so many find fascinating about patchouli.

### *Galbanum*

Our most valuable green note is galbanum, and we use both the oil and the resin in our work. It is hard to think of a green type, from Vent Vert to Aliage and on that does not owe its green character principally to galbanum. The oil is thankfully very powerful, as its price is now very high. Most of the gum comes from Iran, so we can expect problems with galbanum into the foreseeable future. Galbanum helps green florals immensely, especially hyacinth and muguet.

### *Vetivert oil*

Knowing that I have had to miss many important naturals, I would like to finish with an incomparable and very important oil, namely vetivert. This beautiful, rooty, woody oil should perhaps have been included with the woody group, but personally I feel that woodiness is only a part of the olfactory picture. There is a potato-like note to the oil, not at all unpleasant, and its warmth and fixative tenacity and power, especially in combination with musks, ionones, and coumarin, make it a material of universal value. As I have already mentioned, its alcohol fraction, and the acetate thereof, namely vetiverol and vetiverylacetate, are both materials of high value in extrait cologne work. Nothing of synthetic origin even comes close.

### **Conclusion**

I hope by now that you will have gathered that I am an enthusiast on the subject of naturals. Despite much research, they are still unchallenged, in most cases, by synthetic replacements, and most have an assured future in perfumery. To aid us in our work, suppliers of naturals should give us good, stable prices, if possible; clean, pure oils or absolutes; easily understood names and labels; some indication of

availability; and, dare one ask, prior warning of crop difficulties without automatic notification of price increases.

I would also like to encourage continued research into the chemistry of natural materials. Often fascinating new chemicals can be produced directly by isolation from essential oils, or by further chemical processing of these isolates. Despite legislative difficulties, this work should be continued apace. Our growth and future lies here.

After years in perfumery, the romance is likely to fade for the practicing perfumer. Though the job is still fascinating, the magic disappears under a welter of technicalities and commercial pressures. But a quick visit to the stockroom, with its drums and flasks of wonderful oils or absolutes, gathered with such care and patience from all the corners of the earth, will usually restore enthusiasm and enable busy perfumers to continue their work revitalized and re-inspired, believing that perhaps there is a magic about our business, after all.

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