Perfumery: Evolution of Its Techniques—Part I

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T hroughout my professional life I have placed all my enthusiasm, effort and vocation at the service of perfumery and of art. As I present my ideas, the fruit of study and reflexion, I hope to contribute to the enriching dialogue that has characterized these Perfumers' Conventions for more than five years.

Perfumery has evolved and is evolving. But this evolution doesn't mean in any way a break with the past. I don't think that the perfumery of today is better or worse than it was before. The science continues, and those who work in this field continue to strive.

We are enriched by the experience that the perfumers of the past have handed down to us. The mystery that they have enclosed in their fantastic perfumes is like a part of them that will never die. Who hasn't, when studying their perfumes, been impressed by the character of these great people of the past.

The present state of the science comes about by our effort, by a study of these perfumers and their work. By assimilating the experience of the great classics, and by their mastery of the basic new elements at their disposal, new generations of perfumers create this present state, and provide examples for the future.

We can't be concerned here with why it evolves. All the arts evolve, and perfumery can't be any different.

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Neither can we analyze such things as talent, which is innate, or effort which relates to one's sense of vocation or commitment or will power.

The products of natural origin still serve the perfumer very well, and although the tendency to use them on a large scale is diminishing, high class perfumery can't do without them. In recent years the number of natural products has not increased noticeably, since we continue to use practically the same ones. The chief evolution in this field has been determined by the market supply of essential oils and absolutes, which come mainly from African plantations, as they are not profitable to produce in Europe.

The use of these natural products has decreased due to a series of factors, chiefly the excessive rise in prices and the remarkable reconstitutions we now enjoy, some of which are excellent.

We have achieved good reconstitutions of ambergris, and of the essential oils of ambrette, angelica roots, bergamot, cascarilla, costus, geranium, pepper, rose, and ylang-ylang, and of the absolutes of cassie, fleurs d'oranger, orris, hyacynth, jonquil, jasmine, rose, broom and tuberose among others.

It should be noted that at one time the reconstitutions were made in a completely artificial way, but more and more we achieve more perfect scientific results with the noticeable increase of identified and synthesized definite chemical aromatics. Nevertheless, it is important to indicate that the majority of the components are not usually very important, as far as the typical character of the essential oils is concerned. Research is long and complex in order to achieve a good reconstitution.

Innovations in the sector of natural products are few and far between. Among them, though, are the absolute and essential oils of sea weed, bucchu, boldo, eriocephalea, lanyana, marigold, hops, ouhout, river plant, tagétte, American fir, etc. We should point out that most of the new natural products, if we exclude perhaps the sea weed, marigold and tagétte, and American fir balsam, have been commercial failures.

What have determined and still determine the creativity and the innovation in perfumery are the definite chemical aromatics. This statement is not only true today where there are so many substances of great beauty. It was true in the past. Due to the discovery of products like coumarin, vanillin, ethyl vanillin, heliotropin, anisic aldehyde, benzyl acetate, terpineol, phenylethyl alcohol, indole, linalol, linalyl acetate, amyl salicylate, the ionones, the methyl ionones and the nitro musks, the beginning of this century was indeed revolutionary. These products put their seal on an age of perfumery.

It is in feminine perfumery that we can see samples of the innovations that came to light due to these discoveries: Fougère Royal by Houbigant, Jicky by Guerlain, Trèfle Incarnat by Piver, L'Origan by Coty, Habanita by Molinard, and many others.

Little by little new substances were discovered, such as most of the aliphatic aldehydes, methyl heptincarbonate, hydroxy-citronellal, alpha-amylcinnamic aldehyde, quinolines or undecalactone, a line which made possible the appearance of such perfumes as Chanel No. 5, Mitsouko by Guerlain, Arpége by Lanvin, Je reviens by Worth, and others like Replique by Raphael, Ma griffe by Carven, Miss Dior by Dior, Cabochad by Gres, Femme by Rochas, Caleche by Hermès or Fidji by Laroche.

All these substances revolutionized perfumery and its accepted notions in such a way that it is safe to say that with them at the dawn of this century perfumery as we know it today was born. The present development is and will be determined by other chemical substances of more recent discovery, but the type of formulation hasn't changed.

Since the marketing of Fougére Royal in 1882, the development has been spectacular. It has passed through different stages, for example, the vanillin period, the ethyl-vanillin period, the undecalactone and the quinoline periods. This has brought us to the present period, which in female perfumery and to a large extent masculine perfumery is called the methyl-dihydro-jasmonate period or the Hedione period. The magnificent creation of Mr. Edmond Roudnitzka, which was marketed under the name of Eau Sauvage, was the beginning of the present period.

Nevertheless, although this is perhaps the most notable product of the present day, it is not the only one. Research in recent years has been extraordinarily fruitful and it has provided us with some things of uncommon value.

But it is necessary to know how to select the really interesting things. Nothing would be more fatal for the perfumer than to be without a sense of judgment when it comes to choosing the new elements to develop a work.

I would like in the simplest way possible to classify the products that I consider interesting into family groups. We will talk only about the commercial aromatics; otherwise, it would take us too far afield. Since I am interested in a practical division, one that will be easily understood, I will list the following families or groups without aiming for anything like academic perfection.

- -Agrestical: Characterized by minty, camphor, herbaceous-lavender, earthy and leguminouscitronellic notes.
- -Aldehydes: Although all aldehydes have a special scent, and some there are that don't even smell of "aldehyde", I have to mention some products in this category, since it is very well defined among perfumers.
- --Woody: of pungent characteristics (patchouli, cedar, vetiver) santalaceous (sandalwood) and lichenous (oak moss).
- -Animals: with musk, amber, coiraceouscastoreum and fecal notes.
- -Balsams: with vanillic, resinous and coumarinic notes.
- -Citrics: Characterized by lemon, orange, tangerine, lime and the citric part of bergamot which is not linally acetate.

- -Spicy: These form a definite family if we look at them from the perfumer's point of view.
- -Florals: Which will include the notes of the herbaceous flowers, rose, jasmine, carnation, lily of the valley (muguet), and the flowery wood (violet).
- -Fruity: with a scent like melon, etc.
- -Radiants.
- -Greens: which include the properties of grass, flowering greens, metal greens, fruit greens, resinous and violet greens.
- -Roots: These properties are difficult to classify. In some cases they can have wild notes; in others, woody; and in others, empyreumatic notes.

I could list other families, but I won't, since they don't fall under the products I wish to describe.

Agresticals

Within the families of the agrestical, I will speak only about the herbaceous-lavenders and the leguminous citronellic notes.

Agrestical Herbaceous-Lavenders: We had some classic products like the linalyl and the terpenyl acetates, but there are some important innovations that we can cite. Myrcenile, ocymenile and citrile acetates, with fresh scents, somewhat grassy, almost like the citric part of bergamot are of great interest. Thuione has a warm scent, herbaceous, which falls under the subgroup of the camphors.

Linalol oxide, with its somewhat over-sweet scent and earthy, has a scent like spice lavender oil and other wild plants.

Trimethyl cyclohexyl acetate has a clear scent of lavendin—sweet and mentholated. The socalled methyl lavender ketone, with a very intense smell, something like mushroom, is of great use in the fixing process of the fougère and lavender, floral-woody notes.

Finally we could mention lavandoulol and lavandulyl acetate, octen-1-ol-3 and octen-1-ol-3-acetate, methyl dioxaspiro undecane, marketed under the name of Hersage, dihydroterpenyl or menthanyl, and nopyl acetates. These are interesting among the countless substances that one finds in this group.

Within the family of the agrestical, subgroup of leguminous-citronnellic notes whose classic product is citronnellal we can mention several. *Trimethylhexanal*, with a potent dry, grassy smell could be classified in the "aldehydic" family. It would fall somewhere between citronnellal and aldehyde C.8.

Citronnellic acid has a very long lasting grass smell. It is used in fixing floral, woody and geranic notes.

Tetrahydrocitral, with a very powerful lemon character, is very useful in stressing citric top notes. Geranic acid is related to citronnellic acid but finer with very nice shades of the back notes of geranium and rose oils.

Pellargonic acid incredibly has a note similar to citronnellic acid but a little bit more dirty and is extremely useful because of its low price.

Some nitriles such as *geranyl nitrile* have surprising results in soaps and detergents, in imparting the character of lemon freshness. Geranyl nitrile is becoming a chemical widely used in all fields of our profession.

Aldehydes

Within the family of aldehydes where we already had the aliphatic aldehydes C.7,C.8,C.9,C.10,C.11,C.12 L., and C.12 MNA, we are going to mention those that are more and more important in perfumery.

We have the forgotten aldehyde C.13 or n-tridecanal which is present in important bases and is perhaps one of the chemicals more untested. It blends excellently with the floral parts of sandalwood oil and vetiveryl acetate creating accords full of beauty. I've worked a lot with this chemical but to describe it could fill an entire volume.

Cis-4-Heptenal, with an extremely potent scent, when greatly diluted yields a fresh, creamy character. It should be emphasized that this product, together with rose oxide, ocimene epoxide, beta-damascenone and other important aromatics is what gives the peculiar character to one of the specialities that at present is being marketed everywhere.

Trans-2-heptenal, with a fresh, pungent, vegetable-like odor has interesting characteristics when combined with the essential oil of galbanum, geranium and gives special green notes accorded with some pyrazines, specially isohexyl methoxy pyrazine.

Trans-2-nonenal is of a greasy, orris-like, extremely powerful character. It forms the base of some internationally famous products. 9-Decenal is something like undecylenic aldehyde. Trans-2-decenal has an orange, citric scent, very diffusive. Trans-2-undecenal is of a lemon-like characteristic. Trans-2-dodecenal has a very strong tangerine scent. It forms the base of very important specialties like mandarin aldehyde and bigaradial. Trans-2-tridecenal has similar although more interesting qualities. The so-called *citrodial* is of an unusual potency and when extremely diluted, yields the novel quality of musk citrus and fruit, all combined.

And other products like the so-called Myrac Aldehyde, with its greasy, citric, flowery scent, something like lauric aldehyde or the citronnellyl and geranyl oxyacetaldehydes, have interesting metallic flowery notes.

We should indicate that if aliphatic aldehydes are interesting, the 2-alkenals already described are at least the same or even more. Personally I believe a time will come when these unsaturated aldehydes will be indispensable. As a matter of fact some specialities such as mandarin aldehyde, bigaradial, citrophore, citrodial and iranal are proving what I say.

Woody Products

Among the woody family, the classic products were cedryl and vetiveryl acetates, vetiverol, cedrol and others. In this field the research has been and still is, so extensive that it is almost impossible in such a short span of time to summarize the innovations that have taken place over the last few years.

It is difficult for the woody chemical aromatics to have a sharply defined characteristic smell if we consider the separate woody essential oils. It is for this reason that under the name of pungent woody substances, I include the products that exhibit shades of cedarwood, patchouli and vetiver oils in their scent.

Pungent Woody. Cyclododecyl methyl ether, called palisandin, has an odor of cedarwood and musk with undertones of ambrette seed oil. Cyclododecyl ethyl ether is closer to vetiver oil and more interesting than the aforementioned. Cyclododecyl methyl allyl ether of the three is the closest to vetiver.

Methyl cyclododecyl methyl ether, called Madrox, in my opinion is less interesting than the preceding ones. It has shades of musk and amber.

Alpha-cedrene epoxide approximates to a part of the precious dry characteristics of patchouli oil.

Methyl cedryl ketone commercially is referred to as Vertofix. Although one can see many products on the market that have a warm aroma of precious wood suggestive of musk, this is a product of great value, a classic aromatic, both in industrial and in high class perfumery. Its only defect is a lack of vitality which the experienced perfumer knows how to correct. It blends well with the other woody products that we mentioned, with the irones, the methylionones and the ionones, especially with allyl ionone or isopropylionone being the key of important bases. The combination of Vertofix, methylionone, allyl ionone and cedrenes has produced one of the most well known bases that exists in this woody family.

What is called *Mahagonate* comes close to some shades present in patchouli oil and possesses some subcharacteristics of the spices and some of the flowers. It's a shame that the product doesn't have a little more strength.

Cedryl methyl ether, called Cedramber is extraordinary and has a bright quality between amber and patchouli. This is one of my favourite aromatics, and it can be used in luxury perfumery as well as to give vitality to the qualities of Vertofix, as in functional perfumery, where it confers an uncommon character and fixes marvellously well the floral-aldehydic notes of undecylenic and cyclamen aldehydes, lilial, lyral and others.

Isolongifolanone and isolongifolanyl acetate are strong fresh and radiant products of an immense olfactory value. These two fragrances are absolutely necessary in the perfumer's choice of materials, since they give an exceptional vitality to combinations. Besides playing a role in the basic note of the perfume they also give character to the top note.

What is called *Timberol* is another one of the gems that we possess, which cannot be defined unless we heighten our artistic sensibilities. A radiant, dusty product of the woody family, it harmonizes well with everything it brings and gives character, elegance and class to the composition, along with some well-known musk chemicals.

The scent of tetra methyl tricyclo undecane epoxide, commercialized under the name of Romanal, reminds one of some back note of some agrestical oils such as rosemary and lavender. I mean the woody back smell of these odors as being dry and slightly camphoraceous.

The so-called *patchouli epoxide* is not widely marketed. Present in the patchouli oil it has completely revolutionary woody characteristics. It is absent in 99% of all laboratories.

Trimethylcyclodecatriene epoxide, called Cedroxide, has a powdery note, intensely woody, very delicate strong and long lasting.

What is called *Rhubofix* has a very particular fresh, woody and spicy note which is found in important parts of the odor of vetiver oil and influences the character of a perfume.

Octahydrotetramethylnaphtalene, marketed

under the name of Iso E Super, is present in many of the masculine and feminine perfumes known worldwide. It gives a woody character with some important "velvet" shades. It is brilliant and harmonizes with all kinds of notes, especially the coiraceous-quinolines, amber and castoreum.

Let me mention finally what is called *Maderol* or *Boisomiel* whose aroma imparts a strong character of wood and honey in small dosages of about 1 to 2% in a perfume.

I have mentioned only some of these products, all of them very important although there are many others.

In the woody family subgroup of sandalwood odors we will mention the well known hydroxy tridecyl tricyclo tridecane so called Sandela, Santalex TNK, Sandeol, or Sandenol, commercial products which are mixtures of stereoisomers. They impart an odor of sandalwood which is related to alpha-santalol and develops slowly upon evaporation.

What commercially is called Santalol are enriched high boiling fractions of sandalwood oil and mainly mixtures of alpha-santalol, bergamottol, cis-beta-santalol etc. whose extreme delicacy confers an elegance only possible in products of high class perfumery.

Sandalwood notes are confused among many perfumers. In my opinion only two are the valuable notes of the exotic oil. The first one is a very strong milky oriental note which is imparted mainly by bergamottol, and the second is a floral-radiant one which is extremely valuable imparted mainly by cis-beta-santalol. These are the most important chemicals in the natural oils. Alpha-santalol has a more weak, less floral and more resinous odor related to sandela and in my opinion its value is more as a fixative than olfactory.

The woody family, subgroup of *lichenous* notes have few developments, the most important of all is the so-called *Evernyl*, *Mousse Metra* or *Veramoss*. It is a product of universal use in high class perfumery as well as in functional perfumery. Essentially we can recall the cases of Calandre or Polo. The odor is noticeable in very small quantities.

Animal Products

The family of the animal products is perhaps the one that has been the cause of the greatest beauty for the chemical aromatics. I will speak only of the amber and musk chemicals.

Amber must be mentioned as one of the most important aromatics, which is absolutely necessary to be familiar with, although, if we wanted a

complete list it would require a special lecture for it.

We have methyl dodecahydro trimethyl naphto furan so-called Ambrox or Ambroxan. Of all the surprising products that exist, this one perhaps incorporates the most beauty. It has been identified as one of the most noble ingredients of natural ambergris and it imparts an outstanding, extremely powerful, radiant note typical of amber. It is universally used either directly or in a form of bases which include it as the well-known Fixateur 404.

Ethyl dodecahydro trimethyl naphto furan, whose stereoisomers are marketed under the name of Grisalva, has characteristics similar to the aforementioned, although is weaker and in my opinion it has a somewhat synthetic undertone.

Homo cyclo geraniol imparts the so often sought after marine metalic note of natural ambergris tincture.

The so-called Ambrarome absolute is a special blend of cistus-labdanum absolute with strong and fecal animal notes. It is widely used and forms part of incredibly beautiful bases of great elegance such as the so-called Fixomusc and Ambrophore.

What is called *Dynamone* employs some bases made with this product such as Ambrogène, Grisambrène or Grisambria. This is a product which is formed by the high boiling fractions of cistus-labdanum oils and is extremely long lasting.

Musk Chemicals

The musk chemicals will be divided into three degrees of quality. In the first I will include Muscone, Exaltone Exaltolide, Civettone and Ambrettolide.

Methylcyclopentadecanone, so-called Muscone, is the chemical aromatic present in natural musk, and it has a smooth, brilliant aroma, not overly animal-like and very beautiful. It is perceptable in very small amounts and its fixation is so extreme that it seems incredible. Although it doesn't substitute completely for the natural product, it is equal to it on the lasting properties. We can consider it outstanding and it imparts a great elegance. It is the main ingredient of the well known base Musk Tonkin reconstituted, a product of a great beauty, more animalic than muscone.

Cyclopentadecanone, so-called Exaltone, has a warm aroma that equals or in the opinion of some, surpasses Muscone. Personally I would say that it is as good as muscone, but it is different. The powerful musk odor is more animal-like than muscone but the fixation capacity is the same. It is one of the most beautiful chemicals we have.

Cyclopentadecanolide, so-called Exaltolide, is also well known by other names. It is a product with a musk, animal-like odor with an extremely uniform fixation. It should be emphasized that according to statistical data obtained on a certain occasion, there exist people who don't smell any of these substances.

Although Exaltolide is widely used and is an excellent chemical, I prefer the above described chemical as the most beautiful in the musky family. Exaltolide is not as deep a musky note as the other.

Cycloheptadecen-9-one, so-called Civettone, is a more musky product than many others although it is present in civet absolute, and it imparts an elegance difficult to describe, which sets high class perfumery apart from all the others.

Cyclohexadecen-7-olide, commercially called Ambrettolide or Moschus Lacton, is another of the best chemicals we have. It is present in excellent perfumes such as Fidji or Oscar de la Renta pour femme.

All of these chemicals amplify the odor of the perfume and if the cost makes it possible I prefer mixtures of both in all high class perfumes because by using them all together, the radiation is even more beautiful and perceptible for more people. They could all be listed in the family of the radiants but because the deserved respect of the time-honored musk deer tincture and the thorough animal-like note of some of them, I have included them here. I will form the second group of musky chemicals with the following ones. 10-Oxadecanolide, so-called oxalide, has a smooth note completely musky, whose odor has a great quality, although it doesn't match the ones of the previous group. 11-Oxahexadecanolide, so-called Musk R-1, has an excellent musk odor with shades of ambrette seed absolute. 12-Oxahexadecanolide, so-called Hibiscolide, has a clean, musky odor.

These chemicals have a quality much better than those of the third group which consists of *Galaxolide, Traseolide, Tonalide, Ethylen Brassilate and Musk D.T.I.* All these chemical aromatics have musky odors, perhaps less smooth than the preceding ones, but they impart an excellent odor to masculine as well as feminine perfumes and they give cleanliness and substantivity to functional perfumery.

We should emphasize the importance of the last chemicals whose relatively cheap price make their uses possible at a level of 10 and 12% in compounds. In general the musky products of these three groups enhance, homogenize, enrich and fix the perfumes. They exert an influence over the other components which is just as important as their own odor.

Balsams

In the balsamic family where the classic components are vanillin, ethyl vanillin and coumarin, there are few innovations. Let me mention the derivatives of coumarin like *hexa hydrocoumarin, octahydrocoumarin* and other lactones like gamma-hepta and octalactones.

Among the resinous ones let me mention oximene, but I will have something more to say in the very important chapter on the resinous greens.

Citrics

The citric family is full of new things. We have already mentioned some of these in the aldehyde group. Let's emphasize *trans-2-dodecenal* and *trans-2-tridecenal*, which I have already described.

Alpha-sinensal, present in orange, and mandarin, has a capital interest for the perfumer who seeks creativity in any formulations. It is one of the best citric chemicals that we have.

2,6 Dodecadienal has a deep citric odor, the clearest of all the ones mentioned. The citric odor of mandarin-orange produces effects more natural perhaps than that of 2-Dodecenal, which is more metalic.

The so-called *Nootkatone*, a compound present in the essential oils of lemon, orange, grapefruit and mandarin then is important in the formulation of citric back notes. This one and the other products mentioned, although they can be considered as fixatives, influence and modify the compound as it emerges.

To conclude, let's mention some bases, such as *mandarin aldehyde*, and *bigaradial*, which are interesting products.

Spicy Products

The spicy family, whose classic products are eugenol, methyleugenol, cinnamic aldehyde, cuminic aldehyde and others, has a few innovations that we can mention. The so-called *livescone* and *dihydrolivescone*, with a strong odor, reminds one of the note of the essential oils of celery and levistico. This product is important in the amber, woody, chypre, and oriental perfumes, where it imparts a special, new character.

Dihydrocuminic aldehyde or perilla, with a fresh, spicy note, is not exploited by the perfumers and in my judgment is interesting. Cinnamil nitrile has a clear odor of cinnamon, much more stable than cinnamic aldehyde.

To finish, let us mention the so-called Sigaride and Sylvestone—one develops a spicy, tobacco note, and the other brings to mind the spicy cuminic note. They are products whose study could prove very interesting.

Florals

The floral family contains some very important innovations. Let us divide it into the herbaceous florals, rose, jasmine, carnation, muguet, and violet. It should be noted that the flowers such as hyacinth, reseda and gardenia are to be classified as floral-green.

The herbaceous florals, whose chief compounds is linalol, have been developed.

Let us mention *dimethylheptanol*, called Dimetol, which has a sweet, fresh, herbaceous, floral odor, that smooths the top note of perfumes that are too harsh. It has an important use in high class perfumes but also in soaps and detergents, where it reinforces the top note. The blend of Dimetol, adoxal, lilial, maderol, and ambrox is very interesting.

Tetrahydrolinalol, tetrahydromyrcenol, and myrcenol are very interesting products in detergents and fabric softeners since they reinforce the floral notes and modify them in a very modern way.

Alo-ocymenol, called Muguol, is perhaps more floral and less herbaceous-citric than the previous ones, but it too has very good effects. Its stability is poor in some media.

Let us mention especially *dihydromyrcenol*, which strongly imparts a fresh-lime-citric-herbaceous-floral note, very interesting in florals of all types. It blends extraordinarily well with Triplal, Isocyclocitral and Adoxal.

The rose florals have been augmented with various products destined to influence greatly the perfumery of the future. Rose oxide, nerol oxide, the so-called rose furan and p-menten-9-al all have been identified in the essential oil of Bulgarian rose. The first two impart a geraniumrose character, while the last two have a lemonrose odor.

Rose oxide is another one of the aromatic compounds of great beauty. Its use in high quality perfumes is evident, and it imparts a diffusive, metalic rose note of great aromatic value. It vitalizes intensely all the floral and aldehyde notes. Its odor is inspiring every kind of perfume, and within its rose note it holds a kind of mystery that it is impossible for me to describe.

Nerol oxide is something like rose oxide, but less rosy and more pyrazinic. The odor it gives off is more like hyacinth-honeysuckle. It is less dif-

fusive and has more body than the preceding.

Rose furan and p-menthen-9-al have a very potent odor of lemon-rose, characteristic of certain shades of the Bulgarian rose oil, to which these shades are imparted. They are new products, which, indeed, are going to be important in the creativity of the future. I believe that these four products should form part of the repertoire of many perfumers.

Within the jasmine florals group I would like to describe six products of great interest: dihydrojasmone, cis-jasmone, cis-jasmone lactone, jasmo lactone, methyl-dihydrojasmonate, and the socalled Jessate.

Dihydrojasmone has a warm, frutal odor, somewhat waxy, which imparts a naturalness to every kind of floral perfume. Cis-jasmone has a warm, spicy, frutal odor that harmonizes to an extreme with products such as Helional, imparting an excellent freshness and naturalness. Cisjasmone lactone has a greasy, floral note of such a quality that perhaps we could include it within the ten aromatics of greatest beauty.

Jasmo-lactone has a greasy, floral, frutal odor, with notes typical of the jasmine petals. It is also important as an aromatic compound, as it modifies in a substantial way the fruity, floral bases.

Methyl dihydrojasmonate, called Hedione, is the compound which without a doubt has most influenced modern perfumery, and has allowed the great artists to develop their ideas with inspiration. It was used for the first time in Eau Sauvage and in Diorissimo and it has become famous because it gives to compositions a delicate, fresh, smooth radiant, warm, elegant character that blends well with all kinds of perfumes from the floral-citrics to the woody, chypre and oriental.

I want to repeat that this chemical has put its seal with such force on the present, that perfumery has finally come into its era; perhaps in all of history there have only been a few chemicals that have exerted such an influence in so many ways; and if we exclude vanillin, ethyl vanillin, and coumarin, which are the key of the opoponax bases, it is safe to say that this chemical has created its period of influence.

Hedione has by no means been exploited, and I am sure that it will continue to be used for a long time as an absolutely necessary element in our elaborations.

The so-called *Jessate* is the last chemical in this group that I wish to mention and it is interesting because it imparts a thoroughly smooth jasmine note which is very economical.

Among the carnation florals I am going to mention some chemicals which although spicy have a strong floral character.

Dimethyloctadienilacetal or acetaldehyde, called commercially Elintaal, is something exciting and its odor of countless shades gives absolutely original blends when it is mixed with floral notes.

Let us mention also the so-called *Dianthox*, which is perhaps the clearest spicy-floral product of the present, with an odor that very faithfully reproduces several important aspects of the carnation flower, as well as the chemical called *Carnotheme*.

Within the features of lily of the valley and muguet we will include *trimethylundecadienal*, called Oncidal, which is another extraordinary aromatic, as much for the smoothness that it gives to compositions as for its superb olfactory quality.

Cis-dihydro shiseol, commercialized under the name of Mayol, is a somewhat grassy, smooth, floral odor which suggests the sensation of freshness that you feel when you smell flowers like muget and nard. It is a much more interestinga product than hydroxicitronellal, which also blends well with the floral and citric notes. The effects that are achieved when it is combined with hedione are very important. They give place to certain blends, full of beauty and naturalness.

Let us mention also some other more classical products, which have given rise to some spectacular results in the last few years, such as *lilial*, *lyral*, *cyclamen aldehyde*, *bourgenal*, and perhaps *dupical*, which of them all is the one that smells most profoundly of muguet.

Lilial and lyral are used in countless perfumes. Let us mention for example Eau Cendrée, Azzaro pour homme, Rabanne of Paco Rabanne, and Cialenga. The effect of products such as lilial, lyral, bourgeonal and dupical is very important in the field of detergents and toilet soaps, together with the so-called esters of verdol. All of these products are in their heyday.

The violet florals, which are determined by the ionones and the methylionones haven't changed very much, except for the extension of these same aromatics with products such as dimethylionone and others.

It is worthwhile to single out the extraordinary product in this group: 2,6-nonadienol. Its odor is indescribable and its influence can be impressive in all kinds of notes.

Fruity Products

We will divide the fruity family, taking into account the products I want to mention among the melon-fruity and various other fruity notes. The melon-fruity are playing a decisive role in the current evolution of perfumery. Let us men-

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tion *cis*-6-*nonenol*, with an absolutely natural and intense melon character, which could lead to important innovations in the future.

Moreover, dimethyl heptenal, called Melonal, has a very interesting fresh, tart odor of melon. It should be treated with care, since its effects are very intense. Ethyl-alpha-dimethyl hydrocynamic aldehyde, called Floralozone, has a character like lilial but much more fruity and less floral. It imparts an unusual body in perfumes for fabric softeners, where it enhances the whole perfume in a very surprising way. It is interesting in rose-muguet blends with a top note of rose oxide.

Dihydrobenzoxepinone commercially is called watermelon ketone. This product is of fundamental interest, especially in Eaux de Toilette Fraiches where it imparts a uniform freshness that accompanies the composition from beginning to end. On the other hand there are few chemical aromatics that are diffusive and long lasting at the same time. This product is perhaps the most radical of all the ones that possess these characteristics.

We will finish this group with the so-called *Helional*. A product with a fresh melon fruity odor, it is endowed with a great fixing power. It is a product that has a decisive influence in perfumes such as Diorella and Dior Dior where together with Hedione and other compounds the perfumer happily obtains an exceptional naturalness. Its blends with cis-jasmone, dihydrojasmone, the alcohol C-9, C-10 and C-11 are very important. It is another product that is strongly influencing the evolution of perfumery in the present day.

Other important notes are the esthers of cyclopentenilacetic acid, especially cyclopentenil acetate of cyclohexenile, which has a very interesting natural note of pineapple. Phydroxyphenyl-butanone, or Frambinon crystalized, and p-methyoxy-phenylbutanone, or Frambinon methylether, are also important. These last mentioned have a character very close to raspberry.

Radiants

The family of the radiants is composed of products that strengthen, blend with, enhance, amplify, and have an influence over the other elements in a composition. Let us mention here the products we have already discussed: muscone, exaltone, exaltolide, civetone, ambretolide, timberol and hedione. We are going to dwell on the following products, which, in my opinion, are brand new and thoroughly interesting, isodamasconel, alpha-damascone, beta-damascone, betadamascenone and the irones.

Most of these products have intense fruity rose odors but beta-damascenone, with its chemical formula 2,6,6 trimethyl-trans-crotonylcyclohexadiene 1,3, is perhaps the most revolutionary of this family of products. Present in the essential oil of Bulgarian rose as a minor component, its effects are of the greatest importance in determining the final odor of the natural product. Even in minimal doses, its effects are indescribable. It imparts a freshness, naturalness, radiance, intensity, broadness, uniformity, and a character to any perfume. We could almost say that it imparts the very subjective feeling of a perfume, wherever it is used. I am completely convinced that beta-damascenone will be one of the greatest aromatic compounds of the 80s and its incorporation into the great perfumes is assured.

The irones are well known by everybody. Their power to radiate and to embellish are enormous. We should indicate that by themselves they don't necessarily have the odor of the absolute oil of orris. The natural absolute oil is a mixture of various isomers, the most important of which are the alpha, beta, and gamma irones. Mixed just in the same proportions as is contained in the absolute oil of iris, they smell intensely of it. Rarely do you find an isomer in the pure state on the market, for commercial products are already mixtures of these three very important isomers.

Let us mention as interesting, although totally different, the so-called *alpha-irone* and *Irone V*. Their odor is different because their isomeric composition varies enormously. In general, alpha-irone has an odor very close to alphaionone, although its richness is a thousand times superior. Beta-irone is more spectacular. In any case the irones are classic products of unequal beauty, and when they have been well used, they give an uncommon elegance. Their effect on woody notes and on the herbal-floral notes is indescribable.

Greens

Finally I will mention the important family of the greens, divided into grass, floral green, metal green, fruity green, resinous green and violet green.

Within the notes of grassy green we will include *cis-3-hexenol* and its esters, especially the acetate, *formate*, *propionate* and *isobutyrate*. They are very powerful products, which, well used, impart a great naturalness to the compositions, or to be more exact, a very interesting natural freshness. Also important are butyrate, 2-methylbutyrate and tiglate which are more fruity, and benzoate and salycilate which are more floral and which are often used for their fixing properties of the other more volatile notes of the family.

Trans-2-hexenol and the esters generally impart a more sophisticated and strawberry-fruity character to the compositions and the acetals called *leaf acetal* and *leaf alcohol acetal* are more stable in some media although they are not used as enthusiastically.

Finally I would like to mention as very important dimethyl-cyclohexenilcarboxaldehyde, called Triplal, and trimethylcyclohexenilcarboxaldehude, called Isocyclocitral. These two products have been transformed recently into classic aromatics because of their amazing effects which combine natural grassy notes with marinex notes. The use of these aromatics is massive both in high class perfumery, as well as in industrial perfumery, where they have contributed to the modernization of the classic pine notes, which for a whole generation formed the typical perfumes of the bath gels. The use of Triplal has modified these notes as well as others in such a way that we can say they are strongly influencing the evolution of present day perfumery.

There are a great number of bases created with these chemicals, such as the so-called Agrumen, Zestaroma, Agrumal, and others. A very interesting one is Zestodial, where they combine the notes of Triplal, ocimene-epoxide and docecadienal, and which is striking because of its radical newness.

Among the floral greens there are a number of innovations. Let us recall the classical products of this group: *phenylacetic aldehyde* and its dimethylacetal, *hydratropic aldehyde* and its dimethylacetal, and others. It is enough to mention that phenylacetic aldehyde continues to be one of the most up to date products, since it is used intensely. It is the agent responsible for the grassy note in such important perfumes as Calandre and Amazone, although in this last mentioned, only partially. It is used together with its dimethylacetal and other green notes.

The products that I want to mention in this group are trimethylundecilenic aldehyde, called Adoxal or Farenal, and which some people don't object to consider simply as floral. Personally, I find that this product communicates a freshness without equal and an especial liveliness. Although it has been around for some time, they recently began to use it intensely, and that's why I mention it as a relative innovation. Its effects are noteworthy in combination with products such as dihydromyrcenol, triplal, dimetol, the ionones, the irones, ambros, and lilial.

Phenoxyacetic aldehyde, called Cortex, has an intense sweet, grassy, floral odor, and which strengthens and refreshes the back notes very effectively. Phenylaketone has been used in different hyacinth bases, like the so-called Hyacinthia.

Finally, there are many others, but I only want to mention some bases, such as, the so-called Cortexal, Folial, Florizia, Deltia, and the already mentioned Hyacinthia, which fill this chapter with an exceptional beauty.

The green metalic notes have given rise to some very interesting compounds, as for example, the diverse alkoxy-pyrazines, secbutylmetoxypyrazine, present in the essential oil of galbanum and responsible for the metalic note, and isobutylmetoxipirazine, present in the essential oil of petitgrain. This substance is really important in the odor of this essential oil, and gives it all of its fresh, green, metalic note, together with other pyrazines.

Let us mention the so-called Ourtivert, the ethyl ester of a not very common acid, which, though found widely in nature, is a product of extraordinary effects, which should be tested in each case. It gives off a very interesting note of metalic freshness, something like nettles.

Isobutylphenylethylcarbinyl acetate, marketed under the name, Corps Rhubarbe, is a product with a strong and expansive odor with overtones at once metalic and resinous. It embellishes extraordinarily well the wild plant compositions where clary sage is present. Important blends are elaborated using such bases as the so-called Marjoliane, Marjalia, Mediterranis and Provençalis. We will finish with this series by mentioning the so-called Stemore, which smells essentially between galbanum and fig leaves absolute.

Let us also remember the classic product of the series, stiralil acetate, which is heavily used.

Within the green, resinous notes, let us mention as innovations undecatriene, ocimene epoxide, and the so-called Chrysantal.

Undecatriene, 1,3,5 is a green, greasy, resinous, intense, expansive product of an uncommon strength. It is directly responsible for the green odor of the essential oil of galbanum. This product is not only important in reconstituting the natural essence, but it also has extraordinary effects in perfumery, used just as it is in a strong solution, or in very small quantities. It is very unstable, and it's worth mentioning the base Galbia, where it is found in interesting amounts.

Ocimene epoxide is another of the most interesting compounds used. Its fresh, strong, green, resinous odor, with marine overtones, makes this one of the best aromatics that we have today. We should study its effects on the rose notes, such as rose oxide and rose furan, together with products such as adoxal and cis-4-heptenal, or with the typical radiant notes isodamascenone, beta-damascenone, beta-lonone, and the irones, where we achieve impressive effects.

The so-called *Chrysantal* is a difficult product to define, with earthy and menthol aspects. Nevertheless, its odor is profoundly resinous, and its application is very interesting.

The green-frutal notes, such as dibutyl sulfide, are the so-called Corps Maracuya, and phenylpropionic aldehyde. To finish with the family of the greens, let us mention the green-violet notes, where we will mention 2.6-nonadienal, with a very strong odor of the absolute of violet leaves, and which, together with the corresponding alcohol, 2,6-nonadienol (which is more floral) and its dimethylacetal, forms universally famous bases, such as the so-called parmantheme and Vert Violettal. I believe we could take a great deal more advantage of these aromatics and their bases if we exploited them a little more. Let us mention finally dimethylacetal of trans-2noninal, methyl nonilenate, and perhaps cis-3hexenule heptincarbonate which is important. The classic notes of this series are methyl heptincarbonate and methyl octincarbonate.

In conclusion, what remains to be done, is to single out the sociological dimension of our profession, its motivation, and the way it interacts with society.

The perfumer is an artist, and the artist should create beauty. Beauty, however, can exist and be intepreted in many different ways. Throughout history, in painting, sculpture, music, literature, as well as in perfumery, there have been great artists, who have influenced society by the movements they have created.

Among perfumers there exists an impulse to be creative. In our profession creativity can only be achieved by the person who possesses a certain talent, sensibility and culture; by the person who understands how the techniques of combining substances work, and by the person who has at hand some good sources of basic, new products. There are some who have all of these qualities, and who will, for that reason, be able to assimilate the message of our predecessors, and give it new forms.

Like Edmond Roudnitzka, one of the greatest perfumers of all times, I don't believe that the perfumer is just a "nose." The true perfumer is a human being, a mind and a philosopher who tries to express a sensibility, and who gives it to us to know and to appreciate.

The artist always aspires to a world beyond the sensible which reason can never really delineate, a world that finds expression in certain spiritual ideals. This idealistic yearning of the artist often comes in conflict with a world that never rises to the level of this aspiration.

How can we reconcile the purest values of the creative artist, namely the spiritual, the esthetical, the metaphysical or the ethical, with the realism necessary to understand society? How can we harmonize the conclusions drawn from an analysis of society, with the subjective and idealistic vision, which is a projection of the artist's spirit on reality? The solution is twofold: a balance on the one hand, and a sensitiveness on the other.

The artist should be able to make it understood that true progress will come when society assimilates art. The great challenge we face at the end of this century is the attainment of a world which will be based on the ability to perceive the emotive and poetic value of things; that true civilization will be realized by a refinement of sensibility. And just as has been stated on many occasions, the human ideal is nothing but a question of sensibility.

The perfumer should create beauty, a beauty that is accepted by society. The very substance of humanity, its most beautiful expression, is in art.

True creation will be that which awakens all to a greater sensibility and a higher spirituality, not that which renders them insensitive by reason of its arrogance, or without understanding by reason of its complexity.

The meaning of our profession is to heighten awareness by means of created beauty; and for this we need the backing of the marketing industry, whose purpose, along with seeing that a product is sold, should be to see that it is sold by means of constructive advertising that improves the culture. The marketing industry should also be an instrument of creativity.

In this way we can complement one another within the framework of society, and sharing common concerns we can contribute insofar as we can to the advancement of humanity, not only in its technical and material aspects, but also in the spiritual; so that art will permeate unquestionably all of society.

To struggle in the service of art is to struggle for humanity and it, above all, should urge us on, and should motivate us in our profession.

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Suppliers

Adoxal-Givaudan Agrumal-Rossyl Agrumen aldehyde---H&R Ambrarome—Synarome Ambrogene—RBD Ambrophore-Firmenich Ambrox-Firmenich Ambroxan-Henke! Bergamottol (Captive) Bigaradial-Rossyl Bolsomiel (Captive) Bourgenal-Naarden Carnotheme - Dragoco Cedramber --- IFF Cedroxyde—Firmenich Chrysantal—Naarden Citrodial-Rossyl Citrophore—Firmenich Civettone-Firmenich Corps Maracuya (Captive) Corps rhubarbe --Firmenich Cortex aldehyde-IFF Cortexal-Firmenich Deltia-Rossyl Dianthox---H&R Dihydrolivescone RBD Dimetol-Givaudan Dupical-Naarden Dynamone-RBD Elintal-Naarden Evernvl-RBD Exaltolide Firmenich Exaltone -Firmenich Farenal-H&R Fixateur 404—Firmenich Fixomusc-Firmenich Floralozone-IFF Florizia-Firmenich Folial-Firmenich Frambinon-Dragoco, IFF Galaxolide-IFF Galbia-Rossyl Grisalva-IFF Grisambrene-Firmenich Grisambria-Rossyl Hedione—Firmenich Helional—IFF Hersage—PPF Hibiscolide-RBD Hyacinthia----Rossyl Iranai-Rossyl Irone V-RBD

Iso E Super-IFF Isocyclocitral-IFF Jessate-Naarden Lilial-Givaudan Livescone---RBD Lyral---IFF Maderol (Captive) Madrox-Givaudan Mahagonate-Dragoco Mandarin aldehyde Firmenich Marinex-Rossyl Marjalia-Rossyl Marioliane-de Laire Mediterranis-Rossyl Melonai---Dragoco Moschus lacton-IFF Mousse Metra-Florasynth Muguol-IFF Muscone-Firmenich Musk DTI-Firmenich Musk R-1-Naarden Myrac aldehyde—IFF Oncidal-Dragoco Ourtivert-Rossyl Oxalide-Takasago Palisandin-H&R Parmantheme—Firmenich Patchouly epoxyde (Captive) Perilla aldehyde-Caro Trading Phenylaketone (Captive) Provencalis-Firmenich Rhubofix—Firmenich Romanai—Dragoco Sandela-Givaudan Sandenol-China National Sandeol-Soda Aromatic Santalex TNK-Takasago Sigaride—RBD Stemore—Givaudan Sylvestone---RBD Timberol-Dragoco Tonalide-PFW Traseolide--Naarden Triplal-IFF Veramoss-IFF Verdol-IFF Vert Violettal---Rossyl Vertofix-IFF Zestaroma--Rossvi Zestodial-Rossyl

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