

LECTURE TO THE CHELSEA PHYSIC GARDEN

Medicinal Plant Summer School

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"Plants, Perfume and People - possible panaceas or potential problems"

Introduction

Madam President, Ladies, Gentlemen and fellow scientists, I cannot begin to tell you what an honour it is to have been invited to make this presentation to the Chelsea Physic Garden. My talk this morning will concentrate entirely on natural products, with an emphasis on the role of natural odorous plants in herbal medicine. I had thought about calling it "Stink, Scent, Sex and Science", and though I decided to change the title, the content is more or less on this topic.

The use of the essential oils and fragrant materials

Let us now look at the historical background to the development of medicinal plants not only in our own culture, but also throughout the world, and let us pay particular attention to those materials which are fragrant either as essential oils or as herb materials.

There are many odours, which are truly unpleasant, but is this perceived unpleasantness a result of our upbringing, or is it a **genuine** dislike of the odour? Most perfumes have as their base note a real stench, which is responsible for the longevity of the fragrance on the skin. Aldehyde C11 smells of vomit, other notes such as civetone and synthetic musk have a faecal odour.

If we were honest, we would admit that these fragrance notes fascinate the human senses, but I suspect that the association of the odour with something that is dirty or unclean stems from our earliest recollections and the subsequent inhibitions produced by parental influence.

If one goes back in history to virtually any culture, then one will find various animal and bird droppings used quite extensively in medicinal preparations.

Was this because "if it doesn't taste nice or smell nice, then it is bound to be doing you some good" or was it the case that the introduction of this type of

material into the product had some real medicinal effect - say through the presence of enzymes or other active materials, which we do not know about? We will probably never have the answer.

Imagine that we could go back through time and space to visit past civilisations and revisit the very history on which our industry is founded. Better still lets do exactly that. Join me in that trip through time and space and let us drop in and take a snapshot of the herbal world about us - and as our time is so very short we can only take away a small sample of that experience with us, so let us capture the very essence of every visit with those things that amuse or amaze us.

1300 BC

The Egyptians

[SLIDE G19] We leave on our journey back through time and return to the very beginnings of earliest medicinal history. A check on our chronometer shows us to be in the year 1,300 BC

[SLIDE] Sadly, the earliest fragments of papyrus discovered so far, relating to Pharaonic herbalism is probably as late as the second century AD. The Ebers papyrus is the most famous of the medicinal texts, and unfortunately the only published translation by Ebbell in 1937 is sadly lacking in many departments.

[SLIDE] Much of the Egyptian culture centred on the use of essential oils, indeed the Egyptians were huge importers of rare and precious oils from all around the Mediterranean basin, the Far East and from neighbouring countries. Throughout the Bible one finds numerous references to the custom of anointing various parts of the body with oils. There are also many illustrations in papyri, on artefacts and in tomb wall paintings of these undoubtedly expensive and precious oils being both prepared and applied.

[SLIDE G21 & G22] Here is a slide of Tutankhamen's throne, if we look more closely, then we can see the young Queen Ankhesenamen applying oils to his collar.

[SLIDE G23 & G24] In this next slide we see a panel from the gold shrine that surrounded his sarcophagus, again looking more closely one can see that his young queen is again caught in the act of applying oils to the young pharaoh.

[SLIDE] In many illustrations and carvings you will notice the appearance of strange cones on the heads of the people portrayed. These were highly perfumed

unguents of low melting point and as the wearer became warm, so the cone would slowly melt and the fragranced oils would run over them.

[SLIDE] The early Egyptians did not know the art of distillation and so the process of making these cones was extremely complex in order to preserve the more delicate fragrance notes.

[SLIDE] Recipes were so important that they were inscribed in stone on the walls of the temples. One such recipe, or more accurately process, was found on the tomb of a Theban tomb of an unknown unguent maker, who predated Tutankhamen by some 100 years. It was for the manufacture of the very same perfumed cones that I have just mentioned, and, I must say, it demonstrates a large number of perfumery and herbal preparation techniques

[SLIDE] First a man would knock nine bells out of a fragrant piece of wood to make wood chips. These perfumed chips were then macerated in wine, and after a few days the liqueur would be strained off. They had effectively made a hydroalcoholic infusion.

[SLIDE D37 & D36] A slide taken at William Ransoms shows a similar process. Here we have the barrel into which the material to be macerated is to be placed, and here we have a view looking into the vessel on the divided herb, once the infusion has been run off.

To this they would add fat and other fragrant herbs and then form a decoction of the mixture by slow heating. These fragrant herbs obviously yielded their virtues more easily to the oily fat than to the hydroalcoholic wine.

[SLIDE D33] My next slide again taken at Ransoms shows these shallow heating pans, which would not have looked out of place in the unguent maker's facility.

[SLIDE] The mixture was then allowed to cool, so that the fat set and could be skimmed off.

Herbs and spices were then ground and mixed with this fat, which was fashioned into cakes and allowed to stand. Now I can only assume that the herbs they used had volatile oils and esters, which would have, been too sensitive to use a heating process without degrading.

This last step, of allowing plant material to infuse fragrance into fatty materials is known as the technique of enflourage and the final product would today be called pomade.

Finally, the wax was refined by pouring boiling water over the cakes and the fragrant wax skimmed off (leaving all the spice and herb detritus behind), and fashioned into cones ready for use.

I find it quite amazing that they were both familiar with, and proficient in, the techniques of infusion, decoction and enflourage.

[SLIDE] But to find out just how messy this method of perfumery was, we need to look at Psalms Chapter 133 verse 2, where we read "it is like the precious ointment upon the head, that ran down upon the beard, even Aaron's beard; that went down to skirts of his garments.

But did the ancient Pharaohs have an understanding of aromatherapy, or were they using the fragrances purely for the pleasure of their odour? I would like to think that they fully understood the psychological implications of the fragrances that they were using.

[SLIDE] In Psalms Chapter 45 verse 8 we can perhaps find another clue: All thy garments smell of myrrh and aloes, and cassis out of the ivory palaces, whereby they have made thee glad.

We certainly know that the ancient Egyptians used opium poppy seeds (*Papaver somniferum*) for culinary use, but that they were totally unaware of the narcotic properties of its exudate. There is no evidence that they smoked hemp either - so they were not makers of spliffs or drug abusers as far as we can tell from forensic studies!

However, they did have a number of hypnotic incenses, which have been described in the detailed writings of Plutarch and Herodotus, and these were much used in religious ceremonies to create a 'dreamy state of happiness', without being narcotic.

The most legendary of these was 'kyphi', which can be traced at least as far back as the 16th century BC. It was used in fumigation as well as being taken internally, and it served the multiple purpose of aiding communication with the gods, uplifting the spirit, and curing ailments. This incense was also highly regarded as a medicine for treating lung disease, asthma and liver disorders.

The recipe for this preparation is as follows, and I must thank Lise Manniche author of *An Ancient Egyptian Herbal* for her help: -

-oOo-

1. Take 270g of *Acorus calamus* (Sweet Flag); *Andropogon schoenanthus* (aromatic rush); Pistachio resin; cassia; cinnamon(?); mint(?); Aspalathos (?). Grind and sieve. Only the powder is to be used, take 2/5ths of the total.

2. Take 270g each of juniper berries; an unidentified plant; pkr plant; *Cyperus longus*; total 1080g. Grind. Add to this 2250g wine. Leave until the next morning. The herbs will absorb half the wine. The rest to be discarded.

3. Take 1800g raisins and 2250g oasis wine. Grind together well. Remove the rind and pips of the raisins (weighing 1350g). Place the rest (weighing 2700g) in a pot with the herbs and leave for five days.

4. Mix 1200g frankincense and 3000g honey in a vessel. Boil gently until thickened and reduced by 1/5th, the total weight being 3360g. Mix the other ingredients and leave for 5 days

5. Add to this 1143g finely ground myrrh and you will have 10,164g kyphi.

-oOo-

Plutarch says of Kyphi:-

"Without drunkenness it relaxes and loosens the chain-like sorrows and tensions of daily cares. It polishes and purifies like a mirror the faculty which is imagination and receptive to dreams, like the notes of the lyre which the Pythagoreans used before sleep, to charm and heal the emotive and irrational or the soul. For odours often recall the power of perception when it is failing, while often they obscure and calm it since the exhalations penetrate the body by reason of their smooth softness."

What a wonderful poetic description! Don't you wish that he could have written some of your pack copy?

If one studies Exodus Chapter 30 verses 23 to 25, one can compare this formula to kyphi, and one sees a number of common ingredients, such a myrrh, sweet cinnamon, sweet calamus and cassia.

This recipe was to anoint the altar and the ark. There is also the recipe for a perfume in verses 34 and 35 - Take unto thee sweet spices, stacte, and onycha and galbanum; these sweet spices with pure frankincense: of each shall there be a like weight. And thou shalt make it a perfume, a confection after the art of the apothecary, tempered together, pure and holy.

In the first book of Chronicles Chapter 9 verses 28 to 31 one can find a description of perfume making.

And certain of them had the charge of ministering vessels, that they should bring them in and out by tale. Some of them also were appointed to oversee the vessels, and all the instruments of the sanctuary, and the fine flour, and the wine, and the oil, and the frankincense, and the spices. And some of the sons of the priests made the ointment of the spices. And Mattithiah, one of the Levites, who was the firstborn of Shallum the Korahite, had the set office over the things that were made in the pans.

But we have stayed too long in the land of the fragrant Nile and the Great Pyramids and we must move on, if we are to see more.

800 BC

The Indians

We move north, but not much forward in time to 800 BC, to another fabulous period of antiquity. To a land of fragrant oils and ancient medicine to gods with names like Ganesh, Krishna and Shiva (Shiva the god to whom Yoga and the destruction of disease are ascribed). A land of patchouli, cedarwood, cinnamon and precious spices, of exotic flowers like gardenia and hibiscus and oils of exotic roses, galingale, vetiver and lemon grass, but most of all the luxurious and sensuous jasmine.

[SLIDE G41] But first the story of Jivaka, an ambitious young man whose one desire was to study medicine. He made his way to the land of the five rivers in the Punjab, where he knew that Atreya, a famous physician took on candidates to learn the art of his medicinal skills. For each vacancy there were many times more students willing to fill it.

The first test appeared easy, to simply go out into the jungle and bring back a plant that was medicinally useless.

The first candidate proffered a weed, the second a bunch of prickles, the third a marsh plant. Jivaka eventually came back after two days of searching and empty-handed, he could not find a single plant that did not in some way have a healing virtue. He was, as you might have guessed, the successful candidate.

[SLIDE B25] But back to jasmine, this is the variety that we all know, and I feel sure that many of you will have this variety growing in your gardens, but the perfumery industry use a variety with a much larger flower.

The Egyptians would have also very well known the oil from these flowers, but exceedingly rare apart from in the most privileged of society. The similarity between the Egyptian and Indian medicine in the pre-Christian era in itself is quite staggering.

The name Jasmine or Jessamine is derived from the Persian Yasmin from the Arabic "jas" meaning despair and "min" meaning a lie.

I will spare you the medicinal uses of jasmine, because the most interesting use of Jasmine oil was as an aphrodisiac and perhaps this gives us a clue as to why the Hindus called this plant by the romantic name "Moonlight of the Grove".

Now there are many reasons why a plant may heighten sexual stamina or libido, but jasmine is special. It does not work by irritating the genital tract, stimulating blood flow or by acting as a tonic, nor does it act as a prophylactic or placebo. What it does do, is act to heighten the alpha wave activity in the brain - and when alpha wave activity is increased, then so are the levels of awareness and perception.

One might conclude that the action of this oil is not to physically improve sex, but more to improve the mental stimuli that are required to get things going and, more to the point, keep them going!

1st Century

Rome: Pliny the Elder

We fly forward in time to the first century and to one of the earliest recorders of herbal medicine. We are in Como in northern Italy just in time to witness the birth of Caius Plinius Secundus or Pliny the Elder.

The year is A.D.23, and in A.D.79 he is destined to die during the eruption of Vesuvius, an event graphically described by his nephew and heir Pliny the Younger. I am sure that any Classics scholars amongst you will have studied Pliny as part of your course - I certainly did.

[SLIDE G33] Pliny the Elder was a huge collector of data and information, he wrote many books, but only one survives, a work of a mere 37 volumes, which

was probably the first encyclopaedia ever written. The first volume was purely devoted to the contents of all the other volumes! It was called the *Historia Naturalis* and this slide shows a page from the edition held in the Victoria and Albert Museum. It was probably made in the 15th century commissioned and owned by Gregorio Lolli Piccolomini, a physician.

[SLIDE G34] We suspect this, because his coat of arms appears in one of the plates of the book, which depicts a physician bleeding his patient. A technique which, incidentally, is seriously being examined by modern medicine along with the use of medicinal leeches (*Hirudo medicinalis*) to help clear blood clots from forming under skin grafts. If anyone is interested in reading more on the subject, then I would commend to you a recent article in last December's *The Pharmaceutical Journal*.

Many of the volumes are devoted to plants and drugs, which he grouped according to not only trees and plants but also to gems and stones, but as we are only taking snapshots at each location I will take some simple examples.

A passage that I particularly liked was the reference to the fact that (and I quote) "a poultice is more efficacious if laid upon him by a maiden, herself fasting and naked, who at the same time has to repeat certain special words". I have no doubt that any man would feel immensely better under these conditions but I have been unable to ascertain what those words should be, I am not sure that it really matters!

One of the first mentions of aromatic oils is the blending of lion fat with rose oil to preserve the complexion. Now nobody would want to endanger our wildlife, but the use of rose oil for skin benefit is widespread throughout the Middle East, India and the Orient. Rosewater and glycerine toner is making a popular comeback today.

Pliny also makes quite a profound statement for its time "The properties of all plants are weakened by habit, and they cease to be beneficial when needed if they have been in daily use". This applies as much today as it did then, and we could happily include modern synthetic medicines in this statement.

12th century

Germany: Abbess Hildegard von Bingen

[SLIDE] And so it is time to set off again and we fly north and forward in time. We arrive in the 12th century in the small German town of Bingen, here we find a remarkable lady, who was a mystic, stateswoman, writer of holy songs and also a phenomenal herbalist. Her name is the Abbess Hildegard von Bingen.

[SLIDE H20] Many of her recipes include fragrant herbal materials, in one example she mentions the use of wood betony leaves (*Stachys officinalis*) used in herb pillows. Our own remedy used in much the same way would be hops (*Humulus lupulus*). She says:-

"Whoever is plagued by wrong dreams should have betony leaves close by when going to sleep, and this person will see and feel fewer bad dreams".

[SLIDE D30] She also uses another fragrant material, powdered English Geranium in a 'flu powder, which should be smelt, (she stresses) **not sniffed**, several times a day after blowing the nose. It has quite a sharp smell and is certainly less aggressive than Eucalyptus and Wintergreen oils or menthol and camphor.

[SLIDE I14] There is an interesting cure for hayfever, which is to inhale the fumes from smoking Yew-tree wood, prepared by placing the shavings of a small piece of the wood into a flowerpot and then heating the pot on the stove.

A flowerpot seems a strange idea, because it has a hole in the bottom, until you think about the purpose of the apparatus. The air circulates through the bottom of the pot and convects upwards carrying more vapour than a pot without the hole.

I tried this at home to see what it smelt like, apart from the smoke alarms going off all over the house, it certainly had a pungent and eye-watering effect. If I had been suffering from hayfever, then I would have been too busy trying to shut down the smoke detectors to think about it. But joking apart, it really did seem to relieve nasal congestion and was quite soothing to the eyes.

13th century

Wales: The Physicians of Myddvai

[SLIDE] But time presses us ever forward and we must go forward again in time and further north, we pass over England and into the beauty of Wales. We are headed to a small village outside of Carmarthen to visit The Physicians of Myddvai, renowned Welsh herbalists of the 13th. century. They probably had their knowledge from as early as the 6th century, not only from the Romans, but also the Celtic priests and the Druids of the time.

I confess that I had never heard of the Physicians of Myddvai, until I saw the television series and read the book of David Bellamy called "Blooming Bellamy". He also pays tribute to them in his book "World Medicine". After much searching I eventually found my own copy of the Physicians of Myddvai translated from the Welsh by John Pughe.

Let me start with two rather odorous recipes, the first for impetigo capitis, or crusted scall as it was known in those days.

Take goat's dung, barley meal and red wine, boil together into a poultice, and apply to the part. This is the remedy, when the sore is not opened (by the forcible removal of the crust). Now I think we would all agree that barley is well respected for skin conditions as are most grains such as wheat and oat, and wine could also be explained perhaps as an astringent or mild antiseptic, but why the goat's dung? I really cannot comment.

Whatever the apprehension I would have for this recipe, I would most certainly avoid the next one, which is for application to 'proud flesh', which I interpret as another term for over-active fibroblast activity and the formation of excessive scar tissue.

[SLIDE] Take a toad that can scarcely creep, beat it with a rod, till irritated, it smells, and dies. How irritated can you get? Then put it in an earthen pot, closing the same so that no smoke can come out or air enter in. Then burn it till it is reduced to ashes, and apply the same to the part. Not exactly animal friendly is it - and I could not begin to comment on this recipe from a scientific point of view!

But let's look at a recipe that they used for "any type of wounded integument".

[SLIDE F4] Take the feverfew, bruisewort....

... and here we have a problem, and at the same time, the explanation as to why we are moving to Linnean names on our ingredient declaration. Bruisewort can apply to three herbs.

[SLIDE] And here is my hero Linnaeus

[SLIDE P16] Daisy (*Bellis perennis*)

[SLIDE H35] Soapwort (*Saponaria officinalis*) and

[SLIDE K4] Comfrey (*Symphitum officinale*), though experience would suggest that it is the latter of the three that is used.

[SLIDE H31] also Ribwort Plantain (*Plantago lanceolata*)

[SLIDE E14] Common plantain (*Plantago officinalis*) and finally

[SLIDE B27] sage (*Salvia officinalis*) in equal portion of each, bruise them briskly in a mortar, and boil in unsalted butter, till the butter disappears, then strain well and keep in a box. Anoint any bruise with this.

A modern herbalist would not be at all uncomfortable with this herb and it is well cited for the treatment of problem skin conditions.

15th century

Gilbertus Anglicus

We now venture timidly into the 15th century and make our way to London, where we discover a pot of Gilbert's ointment. Suffering from sore lips, we apply some of the soothing salve and read the recipe on the label. I am assuming that he was very far-sighted and had anticipated the 6th. amendment.

[SLIDE G12] Take a very fat puppy dog and skin him; then take the juice of cucumber, rue and pellitory; berries of ivy and juniper; fat of vulture, fox and bear in equal parts; stuff the puppy therewith and boil him. Add wax to the grease that floats on the surface and make therefrom an ointment. This product has not been tested on animals. Signed Gilbertus Anglicus.

16th century

Philipp Theophrastus Bombastus von Hohenheim (Paracelsus)

Feeling somewhat nauseous, we continue onwards to Switzerland and to the city of Zurich, the year is about 1535.

[SLIDE G4] We stop off in a local apothecary to see how it looks. We quickly pat the little doggy and bid the man in the funny hat a good morning, but do not stop very long because we can see that the pharmacist is busy with some customers, so we pop in to the apothecary next door....

[SLIDE G6]....this apothecary is busy as well, but we quickly pat the little doggy again and bid the man in the funny hat a good morning, before a dreadful feeling of deja vu suddenly sweeps over us. It seems that one of our reference books has made a printing error, or forged the original wood block.

[SLIDE] We go into yet another apothecary, and find him staring at a jar of the lady's urine....what a strange occupation! Yet today the appearance of urine is seen as a valuable diagnostic tool to Chinese doctors, and who knows, in years to come, you might be able to ponder the content of your pisspot with your doctor.

Born in 1493 we come upon Philipp Theophrastus Bombastus von Hohenheim (mercifully he is better known to us as Paracelsus), who apart from being one of the first to lecture in German as opposed to the traditional Latin, proposed a philosophy known as the Doctrine of Signatures. I could not let this evening pass without giving this important medicinalist a mention.

"The mind need not concern itself with the physical constitution of the plants and roots. It recognises their powers and virtues intuitively thanks to the signatures they carry".

This is probably best explained with a few examples.

[SLIDE B15] Let us look at Heartsease or Wild Pansy, *Viola tricolor*. The lower leaves are heart shaped, and so the Doctrine stated that this plant should be good for the heart. In fact it is a heart tonic, and has been used in cases of heart failure.

[SLIDE H45] Self Heal or *Prunella vulgaris*, is also known as the Carpenters' herb, because the corolla is shaped like a billhook. The doctrine said that this plant should be good for wounds caused by scythes or similar implements, and it is a proven vulnerary (or wound healer) and helps stop bleeding.

[SLIDE H34] Celandine or *Chelidonium majus* has a bright yellow juice and so should be good for biliary conditions and jaundice. Examination of its properties shows it to be an antispasmodic, reducing inflammation of the biliary ducts and has been used successfully for the treatment of jaundice.

[SLIDE D12] Walnut or *Juglans regia* looks like a brain and so should be good for headaches or mental disturbances. We discover that the walnut is one of the foods rich in manganese, important for nerves, brain and cartilage. Nutritionally, the Missouri Black walnut is of the highest manganese content. But perhaps I am trying to make the plant fit the case.

[SLIDE I30] Eyebright or *Euphrasia officinale* has spots on the flowers that look like blood-shot eyes. This is a superb plant for conjunctivitis and sore or inflamed eyes and it makes an excellent eye wash.

[SLIDE L42] Willow or *Salix alba* grows in damp places, because of this it was assigned under the Doctrine to be valuable for conditions caused by the damp, for example rheumatism.

The willow bark was prescribed and worked. Modern technology investigating the reasons for the success found a glucoside called salicin from which salicylic acid or aspirin was derived. Other plants, which have also been helpful in rheumatism, have also been found to contain salicin (for example wintergreen, birch bark and members of the *Spiraea* group). As we know, the prescribing of aspirin as an analgesic in rheumatic and sciatic conditions is well documented.

17th century

John Gerard

But, if all this talk of awful recipes is too much to bear, then let us quickly move on to something more soothing - to Valerian, but not the Indian Valerian (*Valeriana wallichii*) found in the Himalayas, but the Common Valerian (*Valeriana officinalis*) that is found throughout Europe, America and the Far East.

[SLIDE F47] Galen and Dioscorides called valerian 'phu' - a descriptive response to its odour (which has been likened to the smell of well-seasoned dirty socks! Yet in the 16th century the smell was well liked, and this shows just how perceptions, preferences and vogues can all change with time.

[SLIDE F49] This slide shows *Cetranthus ruber* or Red Valerian, which has similar properties. We look in on John Gerard, an Elizabethan physician, it is now the year 1597 and his great "herbal or the historie of plants" has just been published. He refers to the plant not only as Valerian, but also as Setwall, interestingly the old name phu is still popular in the shops. Surprisingly he is using the dry root as a counter-poison and for the healing of sleight cuts, wounds and small hurts.

He writes: "They that will have their heale, must put Setwall in their keale". Keale, I can only assume is a kind of potage or stew. I don't know whether a keal is some type of potage or stew, or simply a saucepan.

The use of valerian as a sedative or tranquilliser was not really appreciated in this country until about the 17th century.

Up until quite recently it was thought that the action of the active chemicals was utilised by ingestion, but that view has changed and one piece of research from Yokohama has shown that odorant inhalation alone can increase sleeping time.

In another study, it sedated agitated patients, but stimulated those suffering from fatigue. Valerian improved the quality of sleep in subjects in another study, as observed in their brain-wave patterns. It also reduced the time it took for them to fall asleep, and was especially effective for the elderly and the habitually poor sleepers. But it did not affect their dream recall or ability to wake up in the morning.

In Germany, hyperactive children have been treated with valerian since the 1970's. After taking valerian for only a few weeks, 120 children diagnosed as hyperactive, anxious or learning disabled had better muscle co-ordination and reaction time, and showed less aggression, restlessness, anxiety and fear.

People sheltering for their lives during the blitz of World War Two, had to endure the constant bombardment and infernal battering of the Luftwaffe. There were no modern tranquillisers available and so they were prescribed valerian to calm them through the horrific air raids.

And now for an interesting thought. Excessive dependence on valerian causes headaches, mental agitation, much restlessness and severe cases of delusion. It is said that Adolf Hitler was a valerian addict and regularly took large and excessive doses. Those adverse effects described, fit quite well with the descriptions made of his personality in the closing stages of the war. It makes you wonder doesn't it.

But our power is waning and we can travel no further, the excitement of plant discovery begins to tarnish as modern drugs start to replace the old traditional remedies. Aspirin replaces willow, synthetic corticosteroids replace hundreds of plants with anti-inflammatory properties, benzocaine replaces traditional local anaesthetics, and so the list continues.

Legislation becomes tougher, more regulated. The study of plant medicine goes into decline. Even in our own industry, some ingredients become pharmaceuticals requiring licenses (I can remember formulating quite legally a cream with oestrogen, and a toner with lignocaine back in the '70s).

The legislators cut our palette of permitted colours, banned fragrance ingredients and eliminated favourite preservatives (how **did** we manage without formaldehyde?).

This is progress, and it would be wrong to criticise too strongly those improvements, which in the most part have come from self-regulation. The pendulum swings, and today the botanical world is supplying new drugs (taxol from the yew, vincristine from the Madagascan Periwinkle, and others). The teaching of plant pharmacy is again on the increase, public awareness is increasing and clinical scepticism waning.

But some things never change, and they are the people involved in the industry of pharmaceutical and cosmetics and the types of difficulties that they experience. My slides are all of grocers and apothecaries of the 17th and 18th centuries. In fact it was the grocers that became the apothecaries.

[SLIDE G10] I start with the representative who has a transport problem, the sheer volume of data and samples that he tries to bring with him slows him down to such an extent that he cannot arrive on time.

[SLIDE G9] Then there is the supplier who is one of the pillars of our industry. He complains that he cannot get a foot in the door and therefore doesn't stand any chance of winning any of our business. He says that we accuse him of being pedestrian.

[SLIDE G1] There's the goodie-bag supplier who leaves a thousand and ten samples on Monday and then phones you on Friday and is disappointed that you haven't evaluated all of them and raised a dozen orders.

[SLIDE G8] Here is the high-technology supplier who is so proud that he has produced a CD-ROM on plant data that he insists that all his representatives wear them as ear-warmers. They also carry a large demonstration model of a CD-ROM disc to explain how it works, and just in case they are stuck with a computer illiterate have a back-up of computer print outs.

[SLIDE G39] Then we see the supplier of mystery, the type of person who leaves you with Kalaya oil as the new oil from Africa, and when you have spent three months developing a super new product, it is then that you discover that it is distilled from emu fat.

This person also has exotic ingredients called Bai Hua She and Xi Jiao all the way from China. He does not seem to have any way of finding out what these

things are, so in desperation you learn Mandarin, Fukin-wa, Hakka and Cantonese.

You then take to eating in Chinese restaurants every night for two months, until eventually you find a waiter who can understand your brand of Chinese. He tells you that the materials you have been examining are the very poisonous viper snake that comes from the Shensi Province and dried Rhinoceros horn, neither of which were on the menu, but if you'd like to come back next week and order number 27 special, then he is sure he could oblige.

[SLIDE G11] Finally, we see the innovator, the man who has collected a plastic bag full of dead leaves, mouldy seeds, miscellaneous desiccated stalks and other plant detritus which he empties on your desk and for the next two months everything you touch has bits of dead plant stuck to it. He is totally baffled as to what the plants were, because all the little labels written in some remote Mayan dialect have fallen off, mainly because the local gloy in the Lower Amazon being made of monkey spit retains its stickiness for about ten minutes. He knows that the plants must be good because the native elder of the Atroari tribe dressed in traditional tribal dress told him so.

What he didn't see was the village chieftain going back after his meeting to the big city in an Amarni suit behind the wheel of a new Mercedes.

This is a great industry, I wouldn't change any of it for all the tea (that's the camellia *Thea sinensis*) in China. There just wasn't time to tell you about the Chinese Traditional medicine, or the herbalology of the North American Indians, nor did I have time to mention the wonders of the ancient Aztec and Mayan civilisations.

[SLIDE K28] But just one quick flick into the future, sometimes we can learn from looking around us, rather than trying to invent something new.

These girls from the Orahimba tribe of North Africa, are using a red ochre as a sunscreen in exactly the same way as we would use titanium dioxide as a total sun block. I must thank Gilpatrick Devlin of de Beers for letting me have this wonderful slide.

We must now come to the end of our four thousand-year journey, we have seen many strange people and some fairly strange formulae along the way. I believe that there are many new ideas waiting to be rediscovered, but we have to act fast, because not only are the old cultures dissolving and dissipating, but also many of the ingredients are fast disappearing with deforestation and land clearance.

I am really honoured to have been asked to present this talk today, and I do so hope that I have lived up to your expectations.

Thank you.

[FINAL SLIDE]