VIOLIN VARNISH

AND

HOW TO MAKE IT

BY

GEO. FOUCHER.

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PRINTED BY J. H. LAVENDER AND CO.,
2, DUNCAN TERRACE, CITY ROAD, LONDON, N.

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PRICE 5/- NETT.

LONDON:

G. FOUCHER & SONS,

226, KING STREET, W.

1911.

PREFACE.

With the object of assisting in the discovery of a Varnish that will equal in quality and beauty that of the great masters of the Middle Ages, I have, with the kind assistance of Mr. Edgar Fenning, endeavoured, in the following chapters, to describe, in the simplest manner possible, the properties and effects of the principal components of Varnish and the best means of employing them.

G. FOUCHER, Senr.

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VIOLIN VARNISH AND HOW TO MAKE IT.

CHAPTER I.

Introductory Remarks.

ALTHOUGH many valuable and interesting works have been written on the manufacture, repair, adjustment, music and technique of the violin, very few writers have attempted to deal, even in the most elementary fashion, with the important and absorbing subject of varnishing.

Varnish, from the earliest history of the art, has always been an essential element in the manufacture of the violin, and the famous craftsmen of the past whose instruments are to-day so highly valued for the beauty and

richness of their tone owed much of their success to the wonderful qualities possessed by the varnish they employed.

The old Cremonese workers, who attained the highest point of perfection in this direction, undoubtedly discovered their secret by a fortunate accident, and it is surprising that, though centuries have passed, no one has since been able to produce a varnish that will in any way compare with that of those great masters of old.

Many attempts have been made to remedy this, and much scientific knowledge has been brought to bear on the subject without much success, and it is with the object of affording to the student a guide and compendium to work upon, that I have ventured to offer this little book to his consideration, and if only a small step in this direction is gained, my desire to assist in the restoration of Violin Varnish to its former perfection will have been amply rewarded.

To obtain an Ideal Varnish, the absolutely correct proportioning of the materials used in its composition must be ascertained.

In the following chapters I have given

several recipes for the manufacture of Varnish, and it is possible by altering and improving on these, and by continually experimenting, to chance upon a combination that will lead to the discovery of a Varnish that will equal in every way the beautiful work of the great masters.

The above-mentioned recipes will also be of service to the maker—whether amateur or professional—who experiences any difficulty in procuring a Varnish that completely meets with his requirements.

He will find it far more satisfactory and economical to make it himself, to his own taste, than by purchasing it ready made.

CHAPTER II.

Varnish, its Uses and Effects.

VARNISH, as applied to musical instruments, is primarily intended to be a means of preservation.

If one of those beautiful masterpieces of the early Italian period could have reached us to-day without having been varnished, it would be in such a lamentable condition of decay as to render it completely unfit for use.

All the magnificent workmanship and design would have been obliterated by the accumulated dirt of many years, and it would be valueless either as a musical instrument or as an object of art.

Therefore, the first care of those making a varnish must be to make certain of its ability to act as a preservative. There are two kinds of varnish in general use, one being made from oil and the other from spirit.

The only varnish that will effect the purpose of preservation is one that has oil as its basis.

All varnishes made from spirit leave on the wood a deposit of rosins of varying degrees of hardness.

These deposits, if soft, are soon worn away by the least friction and even if left untouched will, in time, disappear by the process of natural disintegration, and will leave the instrument itself bare and disfigured. Our attention must then be especially confined to oil varnishes.

In this varnish the opposite effect is obtained, the gums and rosins are dissolved in the oil and the whole forms a siccative substance which, to a considerable extent, assimilates to the superficial part of the instrument, and the oil gradually drying leaves the rest amalgamated with the wood which it covers, and yet at the same time forms a part of.

Although to act as a preservative is the chief function of varnish there are several other properties it must possess if it is to be perfect.

Amongst these are elasticity, transparency, and the ability to improve the tone of the instrument.

Elasticity is an important essential which must be carefully considered.

A good varnish must, in spite of its adhesive character, allow the wood to vibrate freely and should itself vibrate as an integral part of the instrument, and it should not in any way affect the tone possessed by the violin previous to its having been varnished.

It will be seen that if the varnish does not lend itself readily to these conditions and is not elastic but remains hard, it will of necessity tighten upon and compress the instrument, thus rendering the proper production of the sound difficult.

Again, if the varnish does not expand and contract in accordance with the expansion and contraction of the violin, it will crack and so completely spoil the work whose beauty it should enhance.

Transparency, though not quite so important as elasticity, is yet another very necessary quality. An opaque varnish as can be well imagined would be unsightly and absurd.

If varnish were not transparent, all artistic workmanship would be unnecessary and useless as it could not be seen, and all the beauties in the grain of the wood would be effectually disguised.

A good varnish has a distinct effect in the improvement of the tone of a violin.

That mellowness and richness which is always associated with violins of very old manufacture largely depends on the excellence of its varnish.

This brings us back to the knowledge possessed by the old makers, which enabled them to produce such wonderful varnish and how it came to be lost.

Much controversy and discussion has been centred on this subject, which has many curious and interesting features.

It was probably not a secret at one time, but each maker in his endeavour to surpass his rival tried to improve upon what we recognise now to have been as near perfection as possible, so that instead of attaining the ideal they gradually fell away from their high standard until the original process has been buried in the innumerable and vain

attempts to supersede the first and most successful efforts.

Others again have from a purely mercenary motive used such materials in the composition of their varnish that were not of the best quality, and which, in the course of time, have deteriorated to such an extent that at the present time varnishes are much below the standard set by the examples left us by the great masters of other days.

CHAPTER III.

Oils.

AMONG their many and varied properties, oils have the capacity of marking paper in a greasy fashion, different oils doing so in varying degree of persistence. In this manner we are able to distinguish broadly between oils and the kind known as essential oils.

There is another class, which is not much more than a modification of the first—namely, Siccative oils.

The name Siccative is given to a certain class of oils which are produced by other oils coming into contact with air and, by absorbing the oxygen, acquire the property of drying rapidly.

Linseed oil is naturally siccative, but the process of dessication is exceedingly slow, and commercially the property is of not much value.

Chemistry has, however, been called into operation, and, by various processes, oil can be rendered siccative in a very short time, and so enables us to make use of it in the manufacture of varnish.

Linseed oil is not soluble in water, very slightly in alcohol, but can be dissolved in ether and essential oils.

If prepared by the cold process it is a light yellow colour, and if prepared by heat it is brown yellow.

In common oil, there is often a solution of oils of resin, and such oils must never be employed if good results are to be obtained.

The quality of oil depends completely on the nature of the seed from which it is extracted.

A good oil is very liquid and transparent, and is practically odourless.

Viscous and strong smelling oils are the result of using seeds of inferior quality, or those not fully matured.

Oils as usually obtained in the trade are seldom pure, they generally contain colouring matter, and are otherwise adulterated, therefore only those of the very best quality must be used.

When oil has been kept for a long period it loses many of its impurities, and when buying it always enquire as to the age, as the older it is the better.

With the aid of chemistry we are able to render oil siccative in a very short time. The process need not be entered into fully at present, but the most usual method is to heat it in the presence of various metallic oxydes.

The mere fact of boiling oil will to a certain extent make it siccative, but if boiled together with some litharge it will become more siccative still, while similar treatment with oxide of manganese will impart a high degree of siccativity to the oil.

The oils in which oxygen is most intimately combined, in which the admixture of metallic oxides dissolved therein is the most perfect, and which contain the smallest amount of moisture, are the only ones that should be used for the purpose of making varnish, as the success of the varnish depends chiefly on the quality of the oil in its composition.

The distinctive character of Essential Oils

is that while it will mark a piece of paper in a greasy fashion, the mark is not permanent, but will in a certain time entirely disappear, and, under the influence of heat, disappear more rapidly.

They have the property, as have certain other oils, of becoming solidified and leaving a deposit of rosin.

Technically, there are many varieties of these oils, which are all duly classified, but for our purpose we can divide them into two broad classes—those that remain liquid and those that can be solidified in the form of crystals.

They are hardly soluble in water, though they impart to it its odour.

NOTE.—I have throughout used the word drying, because it is the usual expression. As a matter of fact oil does not dry at all, but becomes solid by contact with the oxygen in the air, and clings permanently to the surface to which it is applied.

CHAPTER IV.

Alcohol.

IN the previous chapters I have dwelt rather emphatically on the superiority of oil varnish as compared with spirit varnish.

However, no work on Varnish would be complete without some reference to alcohol.

Alcohol is a produce composed of carbon, hydrogen and oxygen; it is usually diluted with water in various quantities, by which its strength is determined.

Alcohol is or can be extracted from an innumerable variety of materials, in fact, anything containing sugar in any proportion can, by the process of fermentation, be used for the production.

The materials most usually employed are wines, roots, seed, etc. Alcohol is seldom

obtained pure for numerous reasons, the principal being that it absorbs with great avidity the moisture contained in the atmosphere. It also contains a proportion of essential oils.

The chief characteristics of alcohol, when pure, are its powerful, pungent odour, and its caustic action on organic tissue.

It is a very volatile liquid, and colourless in appearance.

It readily dissolves such substances as rosins, gums, etc. Hence it is extensively employed in the manufacture of varnish.

The great number of uses industry now make of alcohol has enabled the manufacturer to produce alcohol on a large scale.

Owing to the prohibitive price reached by spirits of wine, scientific research was brought to bear on the subject, and many discoveries were made, by which alcohol is now no longer extracted exclusively from spirits of wine. The most usual substitute to spirit of wine is wood, from which methylated spirit is extracted. This spirit of wood (methylated), when of good quality, is often used by varnish makers, although it

contains, in common with all other spirits, a certain amount of essential oils, ether, and other alcohols.

It is therefore advisable, when using alcohol, to procure the best quality obtainable, and if necessary as a precaution, to purify it further by the extraction of as much of the moisture and essential oils as possible.

CHAPER V.

Dry Substances forming the basis of Varnish.

GUMS are as a general rule easily dissolved in water.

Gum-Resin, which is a mixture of gums and resins with the addition of volatile oils, salts and water is insoluble in water. Gums are derived from vegetables of numerous kinds.

The product of each plant enables us to distinguish the variety. Rosins are also obtained from vegetables, and in such quantities that the manufacture has developed into a large and increasing industry.

There are two methods of extracting rosin from plants.

One way is simply by collecting the natural secretion, and the other by provoking such secretion by making incisions in the tree at certain periods of the year.

Rosins when pure are usually without

taste or odour—white, yellow, or brown in colour. They are insoluble in water but can be dissolved to a certain extent in alcohol, ether and various oils. Oxygen has not much effect on them with the exception of the copals.

It is very difficult to obtain a pure rosin, it is nearly always a mixture of different rosins, each having separate properties.

One great difficulty to be met with in the making of varnish is that rosins are not always of the same degree of hardness.

This applies to such an extent that various rosins are classified under two heads, namely, hard and tender.

Under the heading of hard we have copal, shellac and amber. The name tender is given to such rosins as sandarach, mastic and dammar.

But there are some copals which are neither hard nor tender, but are what might be termed semi-hard. It is difficult in spite of these descriptions to obtain in the trade an article that will correspond accurately to the various requirements that may be needed.

Gum Arabic.—There are numerous varie-

ties of this gum, the distinctive character of which is its solubility in water and non-solubility in alcohol. It is to be found in Africa, India and Australia.

It is extracted from the different species of Acacia, but many fruit trees produce similar gums.

Rosins—Copals represent a great number of rosins which vary very much in constitution. Anime is but a variety of rosin, and dammar is also but a series of similar products. Copal is much employed in the manufacture of all kinds of varnish. It is derived from certain vegetables grown principally in Africa, and as they are sent to us mixed indiscriminately it is with great difficulty that the manufacturer can distinguish between them, consequently they can seldom repeat a varnish identically from two deliveries of rosins.

It is also obtained in small quantities from India, America and Australia.

It is a hard substance which, after being subjected to the process of melting, becomes partially soluble in spirit and to a higher degree in ether and essence of turpentine.

Correctly speaking it is not a pure rosin, but a mixture of rosins each having separate degrees of solubility.

It also contains some oils.

Hard copals will melt at 350° centigrade.
Semi-hard „ „ „ 150° „
Tender „ „ „ 100° „

Hard copals mostly come from Zanzibar. Those known as animes reach us from Bombay and also Madagascar. The semi-hard are obtained from Africa and reach us in different forms. Those coming from Angora are in the form of reddish balls.

Those from Benguela (Africa) are of two different kinds, one yellow in colour and of a flat shape similar to a shell, and the other of a grey colour and is sometimes called African gum. Copal from Sierra Leone is white and elastic and is especially adapted to be mixed with other varieties in the manufacture of varnish. Asia supplies us with many copals but these are not genuine Asiatic products, but are sent from Africa, mixed in Asia and from thence exported to Europe.

The real copals of Asia are divided, as are the others, into hard and tender. The best

African copals are the hardest, they much resembling amber. They are easily distinguished from it, however, as they will readily melt if brought into contact with the flame of a candle.

There are many kinds, the following being the best known:—Zanzibar, Madagascar, Cape of Good Hope, Sierra Leone, Congo, and Angora. The solubility of copals has been mentioned before when describing the rosins. They are a mixture of various matters of similar constitution, but which differ in several essential points, notably by the variations in the degree of solubility.

Certain other bodies mixed with the rosin will greatly facilitate their dissolution in alcohol, camphor and ammonia being generally used for this purpose. The process is very gradual, but camphor is extensively employed by most makers.

ANIME.—This copal is the produce of America, Brazil and Cayenne. It is very hard, but readily dissolves in alcohol.

DAMMAR.—This comes from Australia and New Zealand, is partly soluble in alcohol but not completely so by the cold process.

It can, however, be entirely dissolved in boiling alcohol and essential oils. It is one of the most tender of copals. It is also found in Batavia, and this kind is favoured by many on account of the whiteness of its colour.

Gum Benzoin.—This is a compound of many kinds of rosins, some acids, and a certain amount of essential oils. It is easily dissolved in alcohol. The best qualities are obtained from Siam.

Shellac.—This is a rosin which differs in every respect from any other kind. It is somewhat similar to the cochineal, it being the produce of an insect that lives on certain plants. It is soluble in alcohol only, to which it gives its colour. From it, is made the French polish which is mostly used in the furniture trade.

Mastic.—There are two sorts of mastic, that in tears being the purest and best. It comes from Africa, and is partly soluble in alcohol and completely so in ether and essence of turpentine. Mastic is used in all varnishes to render them pliable and to make them dry slowly.

SANDARACH.—This is a product of Algeria and Morocco. It is quite soluble in alcohol and essence of turpentine and is extensively employed in the composition of spirit varnishes.

DRAGON'S BLOOD is procured from India, Ceylon and America. It is soluble in alcohol, ether and oils. It imparts to its solvent a rich blood red colour.

AMBER.—This is a resinous fossil and is found in many countries. It is generally understood to be the petrified remains of certain trees that are now extinct.

It is hard, yellow in colour and transparent.

Its composition is complex consisting of three different kinds of rosins, some essential oils and a small quantity of mineral matter.

In its natural state it is not soluble in alcohol nor essence of turpentine nor essential oils.

It can, however, be dissolved by the following process.

Place some in a clean earthenware vessel and heat it gradually, when melted pour on to a marble slab, when it becomes hard again reduce it to powder.

It can then be readily dissolved in spirit,

essence of turpentine and also in all the oils extracted by the distillation of tar.

This method is very old and can be applied to many hard rosins not soluble in their natural state.

Great care must be taken not to apply the heat too long or too fiercely, otherwise it will burn and so spoil the colour and deprive it of its properties.

Amber is much used in the manufacture of the most durable varnishes, particularly that used by painters and decorators.

TURPENTINE.—This is an aleo rosin and is the produce of certain plants of the coniferae family. It contains varying proportions of essential oils.

The commonest type is the most siccative, and by the addition of one part to sixteen of magnesia it will become hard.

It is completely soluble in alcohol. Another variety, Venice turpentine, is not siccative but easily dissolved in spirit.

It is a mixture of essential oils and rosins.

ELEMI.—Elemi may be classed as a rosin. It is obtained from Brazil and Mexico. It is partially soluble in alcohol, water or ether.

CHAPTER VI.

Colouring Matter.

THERE are two important qualities which the matter used in colouring must possess.

These are durability and solubility. The necessity of durability is obvious, and solubility is essential in order that the varnish may retain its full transparency.

Colouring matter that is not completely dissolved merely renders the varnish a mixture that has neither transparency nor beauty.

Many of the gums and rosins used give a certain amount of colour to its solvent, hence care must be taken not to add to a varnish a colour that does not naturally match with the original appearance, except in such cases where it is desired to obtain a special hue.

It is advisable to dissolve each colouring substance in advance in as strong a solution as possible, and add it to the vehicle you wish to use in such quantities as are required.

The following colouring matters can be used separately to give a plain colour, or mixed to suit individual tastes:—

For yellow colour, use—
Saffron.
Cur'cuma.
Quercitron.
Fustic wood,
etc., etc.

For red colour, use—
Dragon's blood.
Carthamine.
Alazarius garancine,
etc., etc.

For red brown, use—
Cochineal.
Sandal wood,
etc. etc.

CHAPTER VII.

Elementary Notes on Varnishing.

ALWAYS, before varnishing, apply a coat of a substance that will leave after dessication a colourless surface of rosin.

If your oil varnish dries too quickly, add more oil.

To make your varnish more siccative, add more rosin or gum to it.

By the addition of a proportion of essence of turpentine, a new produce will be obtained that will dry very rapidly.

To keep brushes in good order wash them carefully after using in a little turpentine or methylated spirit, according to the varnish you have been using.

After having prepared your instrument for varnishing, proceed as follows:—Place in a saucer a sufficient quantity of varnish to give a complete coat. Use a flat brush about 1in. wide, and cover the instrument

quickly, evenly and very thinly. When quite dry proceed with the second coat, and so on until you have obtained the depth of varnish and colour you require.

Always work in a dry room free from dust.

In winter the room should be warmed.

Spirit varnish must be very thin to be applied easily; hence, to acquire body and colour, 6 to 12 coats are necessary.

If each coating is polished before adding the next, an extra translucid varnish will be obtained.

To polish spirit varnish, use raw oil and finest Tripoli powder.

To polish oil varnish use water and finest pumice powder.

Always filter the varnish; this can easily be done with wool or fine cloth.

All gums used must be pure, and it is advisable to clean them before dissolving.

Add to the gum to be dissolved a small quantity of broken, not powdered, glass. The glass will get mixed with the gums and prevent it forming a solid mass, thus enabling the solvent to act more promptly. Two coats of oil varnish are sufficient.

To colour essence of turpentine dissolve in it some dragon's blood, etc.

Be very careful in the manipulation of the various ingredients when they have to be heated. Accidents will occur if proper care is not taken. Whenever possible the heating should be done out of doors.

Always heat liquids in a water bath.

Varnishes made with essence of turpentine are distinguishable by their fluidity, great brilliancy and quick drying qualities, but they are not very durable.

By the addition of siccative oil to them, the drying qualities are reduced, but greater durability is obtained.

Oil varnish forms a solid mass, and its clinging capacity is unequalled.

Anilyne dyes are not fast colours.

CHAPTER VIII.

Examples of various kinds of Varnish.

Spirit Varnish.

No. 1.

Fill a bottle with shellac, broken glass and spirit in equal proportions. Roll and shake bottle from time to time during 12 hours. Boil in hot water bath. Dilute to substance of thin glue, and filter on wool. The natural colour will be that of the shellac. Alter to taste by the addition of coloured spirit.

Spirit Varnish.

No. 2.

Dissolve in Alcohol 5 oz. Sandarach.
5 „ Mastic.
½ „ Camphor.
(Add broken glass)

Roll and shake from time to time during 24 hours. Heat in hot water bath. Dilute and colour to requirements.

Spirit Varnish.

No. 3.

Dissolve in alcohol 6 oz. Shellac.
24 „ Sandarach.
3 „ Mastic in tears.
3 „ Elemi.
6 „ Turpentine.

Add some broken glass

Proceed as for No. 2.

Spirit Varnish.

No. 4.

Dissolve in alcohol 5 oz. Mastic.
5 „ Sandarach.
1 „ Elemi.
1 „ Animé.

Add broken glass

Proceed as for Example No. 2.

Spirit Varnish.

No. 5.

Dissolve 2 oz. turpentine in 1½ pint of spirit.

Add broken glass.
2 oz. Shellac.
8 „ Sandarach.
1 „ Mastic.
1 „ Elemi.

Proceed as explained for Example No. 2.

Amber Spirit Varnish.

No. 6.

Dissolve in alcohol 4 oz. Sandarach.
4 „ Prepared Amber.
1 „ Mastic.
Add broken glass

Proceed as for Example No. 2.

After dissolution of the rosins add 1 oz. of turpentine (liquid).

Amber and Turpentine Varnish.

No. 7.

Place in a bottle 4 oz. Sandarach.
4 „ Mastic.
4 „ Animé.
2 „ Prepared Amber.
and some broken glass.

Bring gently to melting point (in hot water bath). When melted add 12 oz. of turpentine (liquid). Continue to heat until completely dissolved.

Amber Oil Varnish.

No. 8.

4oz. prepared amber broken in small pieces.

Place these in an iron saucepan. Pour on it a spoonful of essence of turpentine. Cover saucepan with lid. Place on slow fire. In about fifteen minutes the amber will be melted. Take saucepan off the fire. Let it cool a little and add 2 oz. drying oil. Mix well and thoroughly. Add 4 oz. essence of turpentine which may have been coloured.

Amber Oil Varnish.

No. 9.

16 oz. prepared amber.
8 „ oil (siccative).
16 „ essence of turpentine.

Mix amber with oil. Melt by slow fire as per example No. 8. When dissolution complete add essence of turpentine.

Amber Oil Varnish.

No. 10.

16 oz. prepared amber.
8 „ oil (siccative).
16 „ essence of turpentine.

Mix amber with turpentine as explained in example No. 8. Melt by slow heat. When dissolution complete add the oil.

Oil Varnish.

No. 11.

Melt on fire as explained in example No. 8.
15 oz. copal.
Add to it 8 oz. oil (siccative).
Dilute with 24 oz. essence of turpentine.

Varnish for Bows.

No. 12.

Dissolve 12 oz. Shellac.
3 „ Dragon's Blood.
3 „ Copal.
in one pint spirit.