

SHELLAC (AN OLD FRIEND)

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As restorers and conservators, a material which I am sure we all come into contact with on a fairly regular basis is shellac. It is a material which we all keep in the cupboard in one or more of its many forms. At times we can all be accused of over-working Shellac because of its versatility, but we must be wary of not seeing it as a finish for furniture of all periods, which it most definitely is not. There are no real secrets involved with shellac, but even today many people regard lac as some vague form of lacquer, varnish or gum which may be a synthetic, an abbreviation or perhaps a trade name.

In fact the word lac derives from the Sanskrit word LAKE meaning one hundred thousand, presumably adopted because of the myriads of insect LACCIFER LACCA toiling to secrete the resin: some 150,000 of them are involved in the production of sufficient matter to result in one pound of shellac. Lac is the only known animal resin, all others being of vegetable origin. Lac is not generally cultivated but is classed as a minor forestry product and is likely to remain as such.

Lac is harvested in INDIA (Madhya, Pradesh, Bihar & Orissa in the main), Thailand, Burma & the East Indies, in this order of importance. Although known for some twenty five centuries, importation of lac into Europe did not occur until about two hundred years ago. At the beginning of the nineteenth century Charles Hatchett, an Englishman making an analysis which compares very favourably with that of the present day, states the chemical composition of shellac to be as follows:-

RESIN	90, 90%
WAX	4,00
GLUTEN	2,80
IMPURITIES	1,80
COLOURING EXTRACT	0,50

These properties naturally vary somewhat according to the different species of host tree, strain of insect, climate and geographical location. Lac production is cyclic and commences with the insect itself feeding parasitically upon the sap of very young and tender shoots of the host trees. After digestion the sap is exuded through dorsally situated ducts forming a crust or shell, the resin hardening immediately on contact with air. The matter left behind by the insects is cut from the trees by the cultivator, sold as such and is known as *sticklac*. Alternatively it may be crushed, separated from twigs and other impurities, washed free from much of the natural red dyes, sieved, dried and sold as *seedlac*. This lacmatter may now be further processed into *shellac* by heating in a long muslin sleeve before an open hearth: one end of the sleeve is pegged so that rotation of the free end causes the melting resin within to undergo a crude form of filtration through the material of the sleeve whence it is scraped and either allowed to cool and harden into discs of some two or three inches diameter known as *buttonlac* or stretched into wafer-

thin sheets, which after cooling are broken into small flakes, well-known in industry as *shellac*. Further modifications may be carried out such as bleaching, dewaxing, decolourisation, esterification, hydrolysis, partial conversion into hard lac resin, blending with synthetics and/or other natural resins, likewise with synthetic and/or natural waxes.

The properties of lac may be summarised as follows:-

Hardness coupled with a measure of elasticity: high mechanical strength and abrasion resistance: good adhesion and bonding: solubility in alcohols and aqueous alkalis giving uniform films possessing high gloss: general insolubility in hydrocarbons: high mould fidelity and good filler tolerance coupled with low coefficients of contraction, expansion and thermal conductivity: excellent anti-tracking properties with low dielectric constant and high dielectric strength; thermoplastic and partial thermosetting propensities.

The physical properties of lac resin depend upon the relative proportions of two fractions, namely HARD LAC RESIN (HLR) and SOFT LAC RESIN (SLR). The former has most of the desirable characteristics and the latter most of the disadvantages. Obviously then, the whole lac may be improved by either removing the SLR fraction or converting at least part of it into HLR, simultaneously eliminating impurities, wax and colouring matter (water- and alcohol-soluble dyes) by sedimentation, filtration and chemical reduction respectively. This process has been performed and the improvement in the product is marked to a greater or lesser degree depending upon the method of application of the resultant HLR.

It will readily be seen that this combination of qualities in one substance is truly remarkable, explaining the efforts over many years, albeit so far not totally successful, to produce a synthetic shellac economically: incidentally the results of this work, both positive and negative, have led to the founding of the modern synthetic resin and plastics industries.

Applications of lac in consequence of these properties are literally endless and lac resin can be found in one form or another in an incredible amount of products and industries. Here are just a few paint and varnish notably the basic resin for French polishing, lacquer, and distemper, conservation, restoration, furniture, metal, foil and paper, leather, electrical insulation, flooring, decorating, moulding, hatting and textile dressing, abrasive wheels and cloth, brake linings, rubber hardening, foundry work and pattern making, linoleum and American cloth. As I said the variety of uses is almost endless, I could carry on listing many more at present and I am sure in the future with further research and study more will be developed.

Thus the versatility of lac, not far behind that of rubber, demonstrates that even in this age of man-made materials, natural products undoubtedly continue to have their place.