Tawed skins are considered more resistant to chemical deterioration and I prefer to use skins of goat or sheep rather than pig for joints and laces etc., since it appears to be considered that these materials should stay supple for longer (no sample testing on controlled skins have been produced but I have obtained some 1968 Gentili tawed goat). I choose the naturally thinnest skins--please note these are certainly not always the smallest animals—for such an important task as a joint of a limp vellum non-adhesive end, it is certainly not worth risking using a heavier material pared down.

This material could be described as being halfway between vellum and leather in that the skin is treated with potassium alum to produce a material similar in handling qualities to a leather. But the treatment is easily reversed by water, thereby reversing to a hard inflexible untanned hide with all its vulnerability to water and lack of flexibility. The method most commonly employed for deciding whether or not 'tanning' has occurred is measurement of the shrinkage temperature of the skin. Alum-tawed skins have shrinkage temperatures often lower than that of the untreated skins, while tanning increases the value considerably. The alum tawing procedure is a very old one. Stambolov quotes references tracing its use back to the Sumerians, besides referring to its continued employment up to the present day.

Basically, the treatment consists in soaking the skins in a mixture of salt (sodium chloride) and potassium alum (potassium aluminum sulphate - $AlK(SO_4)_2 12H_2O$) which should be iron-free, as iron increases the breakdown of the basic skin structure. The salt plays an important role in the process - since alum dissolved in water gives a solution of low pH, treatment of skins without salt being present gives a thin hard product. The hydrolysis reaction which occurs is:-

$$Al_2(SO_4)_3 + 2H_2O \rightleftharpoons 2\,Al(OH)SO_4 + H_2SO_4$$

When skin is put into this solution swelling occurs and free acid is fixed onto the skin, in a quantity depending upon the pH of the working solution. This disruption of the equilibrium brings about more dissociation of the alum. The basic aluminum salt is deposited on and in the skin.

When sodium chloride is added as well to the solution, it suppresses the acid swelling and allows more basic aluminum salt to be formed and deposited within the skin--that is, it permits a higher solution pH value to be retained without precipitation of the aluminum salt.

the makers alum is NOT potash alum but $Al_2(SO_4)_3$ 12 18 H_2O
above description does not necessitate potash alum

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... above description does not necessitate potash alum at a relatively stable level (even though this was too dry), then it is usually possible to restore the flexibility. However, should the conditions have fluctuated between humid and very dry, then much more damage will have been inflicted upon the structure—perhaps irreversibly. When the skins do dry out, then of course it will readily be seen how easily brittle fractures of the fibers could result on handling, remembering always that it is the relatively narrow thongs across the spine of the book on which the whole mobility of the structure hinges that are under discussion at the moment.

Should inflexible but otherwise good thongs be encountered, their condition could be improved by the following treatment:

Use of 1:1 iso-propanol: water (the iso-propanol opens up the fiber structure and carries the water into the dried-up fibers) then use of iso-propanol mixed with 2% salt solution in water. The salt increases the swelling. Finally this second solution, containing now 2% neatsfoot oil, is applied.

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