

LETTERS TO THE EDITOR

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An investigation on rate of uptake of vegetable tannins with respect to time and concentration.

Holmes and Woolenber^g carried out certain investigations on the "rate of uptake of tanning matter, with respect to time and concentration" and concluded that the speed of penetration into the pelt was higher for the more concentrated liquors and graphs of uptake of tan against time, were approximately exponential in form. Hence in our work on 'rapid tanning of heavy leather,' it was attempted to study the variation in the rate of penetration of tannins, when pelt pieces

were treated with vegetable tan liquors of different strength.

Wattle liquor was prepared and adjusted to different barkometer strength of 10°, 25°, 40°, 50° and 60°. A wet salted medium buffalo hide was soaked and limed as for sole leather tannage. After completely deliming and washing, pieces of dimensions 6 "x6". were cut from the butt portion. The pieces were weighed and each of them was put into these liquors, maintaining a pelt-liquor ratio of 1 : 10. The rate of penetration was visually observed after each day (from the cut edge) and findings were recorded as shown below:

| Strength of liquor | After one day | Penetration in % (approx)-each day | | | | | | | | | |
|--------------------|---------------|------------------------------------|----|----|----|----|------|------|------|----|----|
| | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 10°BK | 20 | 20 | 25 | 33 | 50 | 50 | 60 | 66 | 75 | 80 | 95 |
| 25°BK | 20 | 33 | 40 | 50 | 60 | 75 | 90 | 95 | Full | | |
| 40°BK | 25 | 40 | 50 | 60 | 75 | 90 | Full | | | | |
| 50°BK | 30 | 40 | 50 | 66 | 80 | 95 | Full | | | | |
| 60°BK | 25 | 33 | 50 | 60 | 75 | 85 | 90 | Full | | | |

From the data, it may be clearly seen that the 'concentration effect' is very much prominent in the uptake of tannins. Even though it is a fact that liquors of low concentration can penetrate through the pelt faster, unless the liquor is sufficiently strong, there is not sufficient fixation of tans along with the penetration. Hence, in the former case, even though the penetration initially appears to be fairly quick, it is more of getting

"coloured through" rather than actual take up of tannins. Subsequently penetration slows down as seen in the table and even after 12 days, tanning is not complete in the case of 10°Bk liquor. Liquors of 40°Bk and 50° Bk take 7 days to achieve complete penetration. In the case of higher strength (60° Bk), even though the penetration appears to be complete by the 8th day, a cut edge of the tanned piece shows non-uniformity in colour

denoting more fixation near the surfaces and less at the centre. So obviously it is inadvisable to commence tanning in liquors of concentration greater than 50°Bk. The same experiment was repeated after the pelt was brought to the isoelectric point by treatment with a buffer of sodium-citrate and citric acid. It was observed that the penetration rate improved especially in stronger liquors.

Temperature is also a vital factor in speeding up of the tannage of heavy leathers. Temperatures varying from 35 to 50°C have been successfully tried by Mikhailov and Suchkov⁵ and by Van Vlimmeren⁶.

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10-7-1981

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