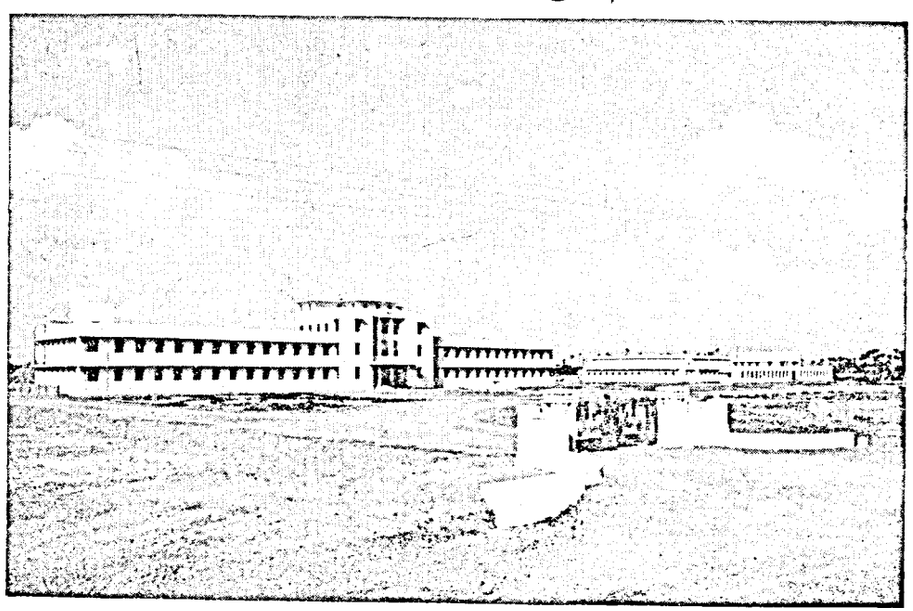
Bulletin of The Central Leather Research Institute Madras

VOL. III MARCH, 1957 No. 8



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317

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MADRAS

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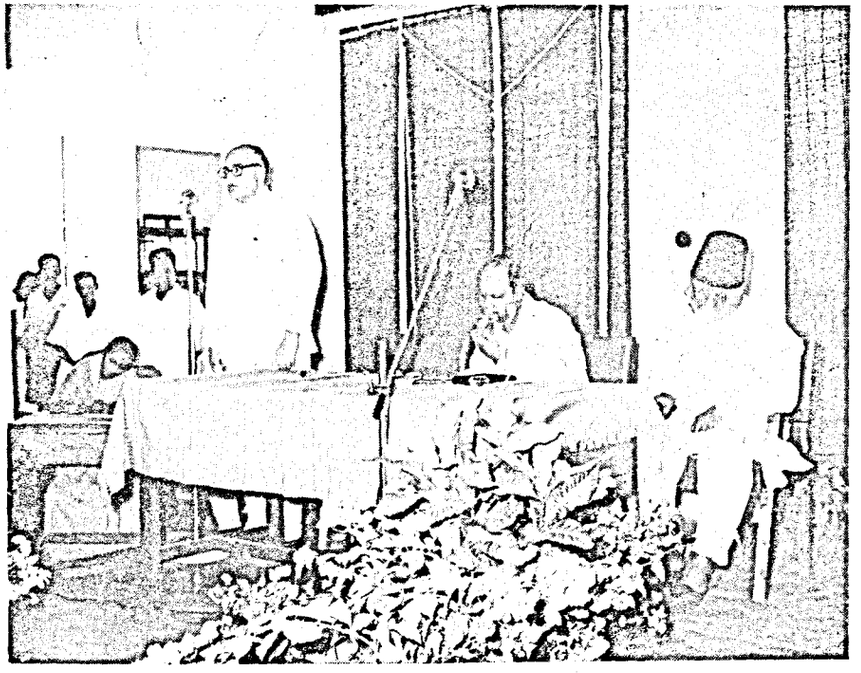

Prof. M. S. Thacker inaugurating the 'Open House' and Practical Demonstration at the C.L.R.I. on 28th January 1957.
Left to right: Hajee Merit Mohammad Ismail Sahib, President, South India Skin and Hide Merchants' Association; Mr. M. J. Jamal Mohideen, who presided over the function.

PHYSICO-MICROSCOPICAL STUDY OF COMBINATION TANNED LEATHER – Part I

(Chrome Retan Leather)

B. C. BASU & S. K. MITRA

SUMMARY

Physical properties, especially flexibility, tensile strength, elongation, bursting strength and thermal stability of chrome retan cowhides have been studied, and correlated to the micro-structure of the reoriented fibres of the leather. Microscopical characteristics of the leather fibres associated with good quality chrome retan cowhide have been indicated.

Combination tannage especially chrome retanning, is known to produce better leather. By combination tanning, it is possible to combine the desirable qualities of more than one tannages in the same leather. Chrome retan leather has lately gained considerable popularity in the industry, on account of its ability to produce fuller leather from thin and loose textured hides and skins, to hold oils and greases, and also because of its suitability for printing or embossing purposes. Leather has a three dimensional inter-weave of fine endless collagen fibres, the condition and arrangement of which constitute the fibre structure of the leather. Since the physical properties of a leather are supposed to be the sum of the physical properties of its fibres, it may be possible to estimate with some degree of accuracy the quality of a leather by examining the characteristics of its fibre structure. The present work consisted in determining the physical properties of chrome retan leather and establishing, if possible, a relation with the micro-structure of the fibres of the leather.

16 samples of chrome retan cow hides were taken as experimental materials. The method used to cut the sides into block and of cutting specimens from this block are shown in Fig. 1.

PHYSICAL TESTING METHODS: The methods used for determining Tensile strength, Elongation and Tearing strength are indicated in Indian Standard Specification.[1] The feel of leather, that is, the characteristic of leather which differentiates it from other materials or of one leather from another when handled, is one of the most important properties, and at the same time very difficult to measure with accuracy, involving as it does so many different physical properties which go to make up the concepts of

stiffness, firmness, etc., by which leather is described. The measurement of feel has been based largely on the work carried out by Peirce[2] on textiles, in which an instrument known as a Flexometer was used to measure the angle to which a horizontally

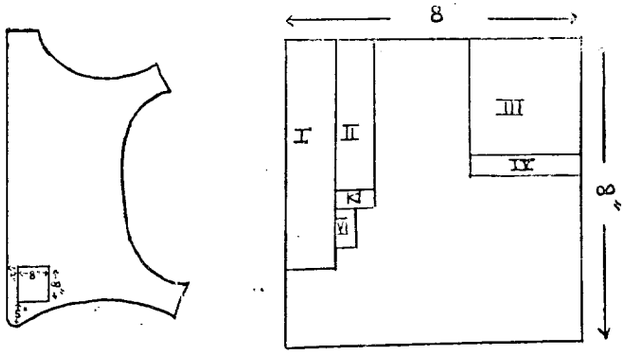

Fig 1 – Diagram showing a side cut into block and a block cut into individual test specimens.

I—Specimen for tensile strength and elongation ($1\frac{1}{4}'' \times 6\frac{3}{4}''$)
II— „ for tongue tear strength ($1'' \times 4''$)
III— „ for bursting strength by Mullen tester ($3'' \times 3''$)
IV— „ for shrinkage temperature ($\frac{1}{2}'' \times 3''$)
V & VI— „ for microscopical examinations ($\frac{1}{2}'' \times 1''$)

clamped piece of leather block would bend under its own weight. The size of the block in the present experiment was $8'' \times 8''$. The shrinkage temperature of the sample was determined according to A.L.C.A. method, using a mixture of 25 per cent water and 75 per cent glycerol. Bursting strength was determined using Mullen tester which has been found to be of great help in the paper industry to determine the strength of paper. Maximum load in the Mullen tester is 1000 lbs., but load required for bursting a few samples of leather under experiment was more than 1000 lbs. Hence all the samples were split into 2 layers and the bursting strength measured separately. Total strength was obtained by adding these two loads. It was found that the bursting load of a specimen with full thickness was greater than the sum of the bursting loads of its split layers. The reason may be attributed to the severing of fibres near the edges when the specimens were split. The thickness of the specimens was measured with the help of a measuring gauge.

Preparation for Microscopical Examination : In the preparation of Sections for the examination of fibre structure, the aim

was to maintain, as far as possible, in the section the same relative positions and the condition of the fibres as existed in the sample. Paraffin embedding was done in the usual way for 2 hours using a paraffin wax melting at 55°C. The rotary microtome was used for sectioning. Vertical sections were cut. Sections were cut from flesh to grain because attempts to cut thin sections in the direction of grain to flesh failed and brittleness was experienced, probably due to split condition of the samples. Rolled sections were discarded as they showed breakage near the junction of corium and grain when flattened in the subsequent operations. The sections with wax attached were floated on to warm water (40-45°C) to spread out and then transferred to slides previously coated with egg albumen which aids the adhesion of the section to the slide. The slides containing the sections were left overnight in the incubator at about 40°C, to dry. Next morning, the slides with the paraffin sections attached were passed through absolute alcohol and xylol in order to clear the sections. When sections were properly cleared as was evident from the transparent appearance when held against a dark object, surplus xylol was wiped off, and mounted in Canada balsam.

Discussion of Results :

Flexibility : It will be observed from the findings in Table I, that comparatively greater angle is formed when the leather piece is clamped at the positions, perpendicular to the back-bone line. Microscopical examination of the fibre structure of retan leather had also led to the observation that in a longitudinal section cut at the line of least stiffness (i.e., more angle), long lengths of fibre bundles appear at a low angle and show comparatively lesser cross-sections. The cross-sections are inclined to be flat and elongated. In a section cut perpendicular to a line of least stiffness, larger and more rounded cross-sections of fibre bundles are apparent and interweaving fibres exhibit higher angle of weave. This indicates that the main " runs " of fibre bundles are along the lines, perpendicular to backbone. Hence it is easy to bend leather parallel to the main runs of the fibres, while more obstructions are experienced when attempts are made to bend leather across them. From flexibility point of view, the samples may be divided roughly into 3 groups, according to the angles they form during bending and are as follows :

(1) Quite flexible — Angle over 40°
(2) Flexible — Between 20 & 40°
(3) Less flexible — Below 20°

Table IV. Showing the Fibre-structure of the leather samples.

Sample No.	Condition of grain surface	Angle of weave	Splitting up of fibre bundles	Packing of fibre bundles	Fullness of bundles	Orderliness of weave pattern	Straightness of bundles
2P	Heavily snuffed	Medium	Large and fine at grain & flesh layers; little amount in the central layer	Slightly loose	Fairly full & thin	Slightly disordered	Medium curves
3.	do	Slightly more than Medium	Large & fine at grain & flesh layers; Medium amount at the central layer	do	Fairly full	do	do
3P	Lightly snuffed	Low to Medium	Very large & fine throughout the structure	Fairly compact	Full	Fairly ordered	Small & medium curves
4.	Heavily snuffed	Medium	Large and nearly uniform throughout	Slightly loose	Fairly full	Slightly disordered	Nearly straight
4P	do	Medium & High	Large at grain & flesh layers; No splitting at the central layer	Fairly compact	In-between fairly full & thin	Disordered	do
5.	Lightly snuffed	do	Large throughout except at some places at the central layer where splitting is less	Fairly compact & compact	Fairly full & full	Fairly ordered	Medium curves
6.	do	Medium	Large at grain & flesh layers but there is no appreciable amount at the central layer	Fairly compact	Fairly full & Thin	Slightly disordered	do
7.	do	do	Medium amount at grain & flesh but there is no splitting at the central layer	Compact (due to non opening up)	Thin	Fairly ordered	do
8.	do	Low & Medium	Large & uniform splitting throughout the structure	Fairly compact & slightly loose	Full	do	Small & Medium curves
9.	do	Medium	Large & fine at the grain layer & medium amount in other portion	Fairly compact & compact	Fairly full	Slightly disordered	Nearly straight
10.	do	Low & Medium	Large & fine at the grain layer but coarse in the remaining portion.	Fairly compact & slightly loose	Fairly full & full	Fairly ordered	Small & medium curves
12.	Heavily snuffed	Medium & High	Large and fine at grain and flesh layers; little amount in the central layer	Fairly compact & slightly loose	Fairly full & thin	Disordered	Nearly straight
13.	do	do	Large throughout except a small portion of central layer where splitting is little	do	do	do	do
14.	Lightly snuffed	do	Little amount at grain & flesh layers; no splitting in the remaining portion	Fairly compact	Thin	Very disordered	Straight but brittle bundles
15.	do	Medium	Large uniform splitting throughout the structure	Fairly compact & compact	Fairly full & full	Slightly disordered	Medium curves
16.	do	do	Large at grain and flesh layers; little amount in the central layer	do	Fairly full & thin	Disordered	do

TABLE I.

Showing the Flexibility of Leather : Size of Sample pieces 8″×8″

Sample No.	Wt. of leather pce. (8″×8″) m.m.	Thickness (Average of 12 readings gms.	Angle Backbone to belly	Angle Belly to backbone	Angle Tail to neck	Angle Neck to tail	Average angle
2 P	74.5	2.15	40	38	46	46	42.5
3	76.5	2.0	36	39	49	54	44.5
3 P	72.25	2.0	54	44	47	48	48.25
4	69.0	1.9	46	31	56	46	44.75
4 P	76.25	1.95	15	18	31	29	23.25
5	69.75	1.8	19	10.5	17.5	20.5	16.8
6	67.75	1.8	27	15	31	28	25.25
7	69.0	1.75	6	3	8.5	14.0	7.9
8	68.25	1.65	40	42	48	46	44
9	87.0	2.3	12	6	13	13.5	11.0
10	62.5	1.5	40	35	50	45	42.5
12	69.75	1.75	24	20	36	38	29.5
13	67.25	1.95	33	27.5	44	39	35.9
14	64.5	2.05	12	8	12.5	15	11.9
15	70.25	1.8	33	21	32	24	27.5
16	71.0	1.8	13	7	8	12	10.0

From structural point of view as indicated in Table IV, it can be said that flexibility depends mainly upon (i) degree of splitting up, (ii) condition of the packing of fibre bundles and (iii) the angle of weave. In general, the samples under group (1) show large amount of uniform splitting up, fairly compact structure and angle of weave lying between low and medium ; whereas those of group (3) show the least amount of splitting up, comparatively more compact packing and angle of weave lying between medium and high. Samples of group (2) show conditions in-between (1) and (3).

As regards elongation, shown in Table II, it will be observed that the elongation increases proportionately at the initial stage but it increases abruptly too high at the break-load. As regards elongation at break load, the samples may roughly be divided into 3 groups and are as follows :—

(a) High elongation — Over 30%

(b) Fair elongation — In-between 20% and 30%

(c) Poor elongation — Below 20%

TABLE II.

Showing Elongation,* Tensile Strength, Tongue Tear strength and Shrinkage Temperature.

Sample No.	% Elongation @ 50 lbs. load	% Elongation @ 100 lbs load	% Elongation @ break load	Break load in lbs.	Tensile Strength per Sq. in	Tongue tear strength lbs. per mm.	Shrinkage temperature °C.
2 P	11.5	16.6	24.0	140	3000 lbs.	6	93
3	8.4	16.6	20.8	104	2419 „	4	105
3 P	10.9	18.0	33.0	158	3511 „	8	110
4	12.5	—	23.0	86	2263 „	3.6	96
4 P	10.4	—	20.8	84	1954 „	5	98
5	14.6	—	27.0	70	1945 „	7.7	100
6	13.6	23.0	34.0	115	2950 „	6.2	99
7	9.4	16.6	28.0	121	3184 „	6	100
8	11.5	18.7	30.0	170	4595 „	10	90
9	—	15.6	30.0	205	4271 „	7	99
10	14.5	25.0	31.2	106	3312 „	7.3	92
12	10.4	—	23.0	90	2432 „	6	99
13	11.4	—	27.0	94	2136 „	4.7	96
14	7.3	14.5	18.7	105	2333 „	4	90
15	11.4	—	28.0	89	2342 „	5.6	110
16	6.2	12.5	18.7	116	2975 „	4.1	115

* Calculation of elongation was done on the original length of Test specimen (i.e., $6\frac{3}{4}$").

In general, the samples of group (a) show the following characteristics :—

(1) Large amount of splitting up.

(2) Angle in-between low and medium.

(3) Fairly compact structure ; and

(4) Small curvature of fibre bundles ; whereas the samples of group (c) show the following characteristics :—

(i) Least amount of splitting up ;

(ii) Angle in-between medium and high ;

(iii) Compact structure ; and

(iv) Maximum straightness of fibre bundles or brittle fibre bundles.

INFERENCE : Flexibility and elongation depend mainly upon the cumulative effects of degree of splitting up, packing of the fibre bundles, angle of weave and straightness of fibre bundles.

With regard to tensile and tongue tear strengths, the sample may roughly be divided into 2 groups and are as follows :—

(1) *Fairly good quality* : Tensile strength—above 3000 lbs., per sq. inch and tongue tear strength—above 6 lbs. per mm. thickness.

(2) *Poor quality* : Tensile strength—below 3000 lbs. per sq. in. and tongue tear strength below 6 lbs. per mm. thickness.

In general, the samples of group (1) show the following characteristics :—

(a) Large amount of uniform splitting up ;

(b) Angle of weave in-between low and medium ;

(c) Fairly full or full fibre bundles ; and

(d) Fairly ordered weave pattern ;

whereas the samples of group (2) show the reverse characteristics of fibre structure as observed in group (1).

It will be evident from Table II that samples with large amount of splitting up and fairly-compact or compact structure show comparatively higher shrinkage temperature. The uniform splitting usually indicates a uniform tannage. Loose structure on the other hand, accompanied by open weave invariably shows less shrinkage temperature. As regards sample Nos. 8 and 10, the low shrinkage temperature was probably due to less chrome content or less uniform tannage, although fairly split up condition was maintained by the fat content. Samples having very small amount of splitting up and thin bundles also showed low shrinkage temperature. The low shrinkage temperature of sample No. 14 may probably be also due to low chrome content, as the colour of the micro-section at the central layer was nearly white. Similarly the high shrinkage temperature of sample No. 16 may probably be due to high chrome content or more uniform tannage as the colour of the micro-section at the central layer was fairly dark, i.e., nearly blue.

Bursting strength appears to be dependent mainly upon the thickness of the specimen and the angle of interwoven structure. It has been found that samples with low to medium angle of weave usually show more strength than those with medium to high angulation. Excessively opened up structure does not show good strength as in sample No. 3 P. Due to grain snuffing, almost all the samples did not show any grain crack before bursting.

TABLE III.

Showing the Bursting Strength of leather samples (by Mullen Tester)

Sample No.	Thickness (in mm.				Bursting Strength			Bursting strength (lbs.) per mm.	Load at grain crack in lbs.
	before splitting	grain side of split leather	Flesh side of split leather	Total thickness of 2 split layers	grain split (lbs.)	flesh split (lbs.)	Total		
2 P	2.35	—	—	—	—	—	—	—	930
3	2.2	—	—	—	—	—	—	—	—
3 P	2.25	1.3	1.05	2.35	305	80	385	171	185
4	2.3	0.9	1.65	2.55	160	480	640	280	*
4 P	2.3	0.95	1.6	2.55	155	375	530	230	*
5	2.2	1.5	0.9	2.4	360	30	390	178	*
6	2.15	1.45	0.9	2.35	570	60	630	293	*
7	2.0	0.9	1.3	2.2	205	535	740	370	*
8	1.8	1.0	1.0	2.0	360	190	550	305	*
9	2.6	1.05	1.8	2.85	330	640	970	373	*
10	1.75	0.85	1.05	1.9	260	220	480	274	230
12	2.1	1.2	1.15	2.35	270	70	340	162	*
13	2.25	1.1	1.25	2.35	280	45	325	145	*
14	2.35	0.9	1.55	2.45	175	370	545	232	*
15	2.1	1.2	1.2	2.4	380	95	475	226	*
16	2.1	1.0	1.25	2.25	360	330	690	329	*

* — Grain cracks at Bursting Load.

CONCLUSION : The results of the studies carried so far appear to be interesting and has been presented at this stage as they have been found to be informative. Although most of the conclusions derived from such studies are not considered to be practical as they are based on limited laboratory evidences, it appears that many useful details of physical reorientation of collagen fibres and consequently of leather can be deduced from the microscopical characteristics of fibres associated with good quality chrome-retan leather, which are specified below :—

(1) Opening up of fibre structure—Large amount of uniform splitting throughout the structure (splitting up not carried to excess).

(2) Angulation—Angle of weave lying between low and medium (not above medium).

(3) Packing—Compactness showing a little less compact packing (neither very loose nor very compact structure).

(4) Fullness of bundles—Fairly full and full bundles (neither shrunk nor thin bundles).

(5) Regularity—At least fairly ordered pattern (not very much distorted structure).

(6) Straightness of bundles—having small and medium curves (but not straight or broken bundles).

ACKNOWLEDGMENT : The authors wish to express their thanks to Dr. Y. Nayudamma, Assistant Director-in-charge, Central Leather Research Institute for permission to publish this paper. Thanks are also due to Mr. A. Ganesan for providing the test samples and to the Physical Testing Section of C.L.R.I. for offering laboratory facilities.

Microscopical Laboratory,
Central Leather Research Institute.
26—12—1956.

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1. Indian Standard Specification—1954, 582 (23 & 24).
2. Peirce—Journ. Text. Inst. 1930, 21, T. 377.

RESEARCH BEARS FRUIT

Rapid Tannage of Sole Leather Process No. 1

Manufacture of vegetable tanned sole leather by rapid pit tanning process.

Y. NAYUDAMMA & K. RAJABATHAR

Raw material: Wet salted local buffalo hides weighing 30 to 50 lbs. each.

Soaking: Weigh the hides after removing the excess salt and soak them in plain cold water for a period of 6 hours or overnight. The hides are cut into sides after which they are washed by giving 4 changes of water and trampling during each change.

1st *Liming*: Lime them in once used 2nd lime liquor with the addition of 6% of slaked shell lime powder. Handle the sides twice. Next day, haul them up and add to the same bath 1% sodium sulphide (previously dissolved in hot water or by heating). Put the sides in the same sharpened lime liquor. On the same evening, haul the sides and put back in the same liquor. Next day, the sides are unhaired and relimed.

2nd *liming*: Relime the sides for a further period of 2 (two) days in a fresh bath with the addition of 12% slaked lime powder and 1% caustic soda. The sides are handled twice on the first day. Next day, the sides are handled once only.

Fleshing: The sides are fleshed, weighed, washed. The sides are then left overnight in plain water.

(*N.B.*—Percentages are all based on the wet salted weight, i.e., upto fleshing).

Deliming and Tanning: Next day, trample the sides for a period of 15 minutes, then scud and leave the sides overnight in plain water. Next day trample the sides for a period of 15 minutes, then scud, wash, delime with 1½ to 2% sodium bisulphate (previously dissolved in cold water). This should be added to the bath in 3 instalments over a period of 15 minutes if it is done in drum or 30 minutes if it is done in pits. Drum the sides or trample the sides till the cut section of the butt shows that 1/4th of the total thickness is delimed when tested with an alcoholic phenolphthalene solution. When it is so, add to the same bath a diluted solution of formic acid using ¾% to 1% or 6 oz. to 8 oz. % sulphuric

acid. Drum the sides or trample the sides till the cut section of the butt shows 1/3rd the total thickness is delimed. When it is so, the sides are lightly scudded, rinsed with plain water and then they are taken to suspenders.

Vegetable tanning: The sides are suspended and tilted then and there several times in an old liquor of 10°BK strength and a pH of about 5 to 5.5. Next, the same movement should be given. Next day, the sides are beamed on the flesh sides and are then laid flat in a tan liquor of 20°BK strength, using mimosa extract only. The sides are handled once in the evening. Then the sides should be handled as given below:—

3rd day — piled and transferred to 30°BK liquor.
4th day — beam and put back in the same liquor.
5th day — piled and transferred to 40°BK liquor.
6th day — beam and put back in the same liquor.
7th day — piled and transferred to 70°BK liquor.
8th day — beam the sides and put back in the same liquor.
9th day — piled and transferred to 100°BK liquor.
10th day — beam and put back in the same liquor.

Myrabing: 11th day, pile, drain well and dip them in a myrab. liquor of 60°BK strength which should be prepared a day before use by soaking in hot water, using 25% of the powdered myrobalan nuts. Next day, haul them and put back in the same liquor. Leave the goods in the same bath for a day more. Now the sides are washed on both sides with plain water and piled for 2 days keeping them grain to grain and well covered.

Oiling: The sides are first drummed for 15 minutes in a slowly revolving drum with the addition of Gum Tragon paste, using 2-3 oz. % of Gum Tragon. Then add 2% of Epsom salts. Drum for 15 minutes. Then add 1% glucose. Drum for 15 minutes. Then add a mixture of 3% to 4% of raw pungam oil and ¾% to 1% sulphonated pungam or castor oil. Drum the sides for ½ hour. Stop the drum for ½ an hour, and again drum the sides for another ½ an hour. Then the sides are removed from the drum and hung to dry. When sammed, the sides are set well and again hung to dry. Again set twice before the drying is complete.

(*N.B.*—Percentages are all based on the fleshed pelt weight from deliming to oiling).

Seasoning & Rolling: The dried sides are seasoned and rolled in the usual manner using casein solution, soap, linseed mucilage, gelatine, etc. They are then rolled on and rolled off.

Yield: 53% on fleshed weight.

RESEARCH BEARS FRUIT

Practical Demonstration No. 2.

Rapid Tannage of Sole Leather Process No. 2.

O. S. DAVOOD & B. M. DAS

PROCESS No. 7.

Raw Materials : Wet salted buffalo hides of average weight of 45 lbs. are suitable. They may also be green, wet salted, dry-salted, or dry cured of weights corresponding to wet salted weight mentioned above.

Soaking : Green and wet salted hides are thoroughly washed in 2 or 3 changes of plain water, cut into sides and then put into liming process. In case of dry salted and dry hides soaking period may vary between 24 and 72 hours depending upon the condition of the hides and efficiency of soaking agents used. The best proportion of soaking agents are Caustic Soda 1 lb. or of sodium sulphide 2 lbs. per 100 gallons of water. To this, it is advisable to add ½ lb. of bleaching powder for sterility and to facilitate soaking.

Liming : Liming is done first in an once used liquor to which 10% slaked lime and ½% of sodium sulphide on the soaked weight of the hides are added. The goods are handled and replaced thrice a day for 4 days.

On the 5th day, the sides are unhaired and put into a new lime liquor made up of 10% slaked lime and 1% Caustic Soda and about 400% of water on the soaked hide weight. The sides are kept in the liquor for 4 days, handling and replacing them thrice a day.

On the 9th day, they are fleshed, washed well and weighed to determine the limed pelt weight. The new lime liquor now used is the once used limed liquor for the next pack of hides.

Deliming : The sides are delimed in a pit using ½% boric acid (on the pelt weight) and kept overnight in the deliming bath. Next morning they are handled again adding to the bath

a fresh amount of ½% boric acid until ¼ of the thickness of the pelt both from the grain and the flesh are delimed as tested by phenolphthalin. At this stage, the sides are ready for tanning.

Tanning : *Suspenders* : The sides are put into the first suspender liquor which should be a used melloliquor of 7°BK, the new strong liquor having been made from wattle bark or mimosa extract. In this liquor the sides are handled for the day and kept overnight. Next day they are transferred to the next pit containing the second suspender liquor where the strength of the liquor is increased by 2°BK. than the previous. In this way, the sides are passed successively every day through 7 suspenders liquors (the strength of the liquor of succeeding pits being higher by 2°BK than the previous one), the last suspender liquor being of 19°BK when the preliminary treatment in suspenders is completed. From the last suspender, the goods are taken out and taken up for subsequent operations. Total time of tanning in suspenders—7 days.

After tanning the sides in suspenders up to 19° BK the material is tanned in 30°BK liquor in a drum for 8 hours, drumming intermittently and left stationary overnight in the drum. The liquor is strengthened to 40°BK on the second day and again drummed intermittently for 8 hours and leaving the stock stationary in drum overnight. Thereafter drumming is continued increasing the strength of the liquor by 20°BK after every two days drumming intermittently for 8 hours each day and adjusting the strength everyday till it has been tanned in 80°BK for two days. Total drum tanning from 30° to 80° BK takes six days. The speed of the drum—4 r.p.m. The strong liquor is made from Mimosa extract dissolving it in suitable quantity of hot water in a pit. At the end of this period, the tanning is complete and the goods are taken out and horsed up for a day. Further operations follow as indicated below :—

Bleaching : The bleaching of the tanned sides is done with a solution containing :

1%	Perfect Tan 0	on the weight of the leather
½%	Oxalic Acid	,,
10%	Water	,,

The duration of bleaching is one hour. The bleached goods are rinsed and treated with a Myrobalam Liquor usually called Myrobing in the South India Tannery Practice.

Myrobing : The sides are handled in Myrob liquor of 30°BK for 2 days. The goods are kept for a further period of one day in the liquor grain to grain without handling.

Scouring : On the 4th day the sides are taken out, scoured, washed well and then piled up to drain.

Oiling up : The goods are oiled on the grain with Pongam Oil (3% on the weight of the goods) and the flesh sides are coated once with a paste made up of the following :

2 parts of flour,
2 parts of Epsom salt,
2 parts of Glucose
1 part of China Clay, and
1 gallon of water and hung up for sammying.

Sammying, setting and drying : The sammed hides are set out twice either by hand or machine and dried.

Finishing : The dry sides are seasoned on the grain side with the following mixture :—

3 parts of Casein,
¾ parts of Borax,
6 parts of Soap,
3 parts of Linseed mucilage, and
80 parts of water.

Casein is dissolved in hot water with borax and linseed mucilage is extracted with boiling water alone. Solution of soap is made with hot water. The three solutions are mixed together and applied on the grain side of the leather with a brush and dried.

Rolling : The dry sides are now rolled twice. First with light pressure and then with a heavy pressure.

The leather is now ready for the market. The total period of tanning is 26 days from raw to finish. The yield of leather is 55% on the limed pelt weight.

TECHNICAL SEMINAR

'Tanning Potential of Sulphite Cellulose Extract'

K. B. MATHUR

The waste sulphite liquors obtained from the paper mills consist of lignin sulphonic acid in the form of its salts besides some residual sugars as the principal part of their organic constituent. The complex nature of lignin and its sulphonic acid was described based on the various degradation products as produced on distillation with Zn-dust and fusion with KOH etc.

In spite of the fact that lignin sulphonic acid has been widely recognised as a raw material for potential tanning agents, the absence of any real tanning properties by itself has been accounted to the relatively low ratio of phenolic hydroxyl groups. Further, it was pointed out that not only the mere presence of phenolic hydroxyl groups is important, but their position with respect to the methylene bridge is what matters much in the mechanism of phenolic tannages of the type. The compounds of good tannage potential are those where OH groups are para to the methylene bridge ; perhaps due to the greater resonance effects resulting from such hydroxyl groups in contrast to meat substituted ones, and thus promoting the hydrogen bonding. Based on such conclusions, various methods of modifying the lignin derivatives which would result in a product with much improved tanning properties were discussed. One of the methods found by the author to yield a good tanning agent was to condense the sodium lignosulphonate with resorcinol. The details of the preparation were discussed in relation to its solubility and tanning capacity.

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* Summary of the Technical Seminar held on 28—12—1956.

CLASSIFIED ABSTRACTS

RAW MATERIALS

NITROGENOUS COMPOUNDS OF HIDE AND SKIN. *D. Schweisheimer. Aust. Lea. J.* **59**, 8, 150, (1956). Knowledge of changes occurring in hides and skins during the so-called curing period was for many years limited chiefly to the observed weight changes that these raw materials undergo when treated with salt. Now a method has been devised by F. L. De Beukelaer and E. P. Marbach, University of Chicago, whereby hide samples in a very highly subdivided state can be obtained without significant alteration of the natural condition of the protein or other components of the original product. In addition a method of fractionation of hide samples was developed which to date produces 5 fractions with a recovery of the total original nitrogen equal to 99.9 per cent. with an average deviation of 0.6 per cent. Results so far show that brine curing removes six times more non protein-nitrogen than green salted curing and that no essential difference exists between the other fractions.

INVESTIGATIONS ON BATING. PART II. THE LABORATORY EVALUATION OF BATING ACTIVITY. *G. H. Green. J.S.L.T.C.* **40**, 11, 361, (1956). The gelatin viscosity reduction method for the determination of proteolytic activity of enzymes has been examined and put on a quantitative basis. A unit of gelatinase activity has been defined. The gelatin substrate falls in viscosity continuously on storage at 20° but remains constant at 0-4°, but even after two months at the higher temperature the apparent activity of trypsin towards it remained the same.

Electrolytes lower the viscosity of the substrate but do not affect the determination unless the enzymes themselves are inhibited. Ammonium salts at a concentration which may be present in a bate paddle caused severe inhibition of *Bacillus subtilis* protease at pH 6-8. An excellent correlation was obtained between gelatinase activity and bating activity as assessed by laboratory bating and chrome tannage of pieces of goatskins with a wide variety of enzymes. B. *Subtilis* protease alone gave inferior results due to the presence of ammonium salts in the bate. Recommendations have been made for the use of the gelatin viscosity method for evaluating bating materials.

A quantitative method for assaying the activity of proteolytic enzymes towards digestion of limed involuntary muscle (pig uterus) has been described. The influences of electrolytes and pH have been examined and these are not the same as for gelatin. Reasons for this are suggested. There was no correlation between involuntary muscle digesting activity and bating activity.

THE (DELIBERATE) PRODUCTION OF DRAWN GRAIN ON ALUM PRE-TANNED GLOVING LEATHER. *A. Simoncini. Cuoio, Pelli, Mater. Concianti,* 1956, 32, 19. *Via. J.S.L.T.C.* **40**, 11, 379, (1956). Gloving leather with a deliberate drawn grain (*raggrinzito*) is popular in Italy, but its successful production is a very hazardous operation. Best results are obtained by a combination of chemical means. Alum-tanned skins (not more than 25% penetration) are coloured with sumac, and the grain drawn by plunging the cold skins into an acid syntan bath 38°C, and drumming vigorously. This is followed by formaldehyde, chrome in the usual way but at 38°C, mordanting and dyeing.

INFLUENCE OF QUEBRACHO ON THE QUALITY OF SOLE LEATHER. *R. P. LLauro. Bol. Ass. quim. Espan. Industr. Cuero,* 1955, 6, 171. *Via. J.S.L.T.C.* **40**, 11, 379, (1956). In Spain the cost of tanning sole leather with quebracho is about 50% more than tanning with a mixture of indigenous oak and sweetened chestnut. An experiment was designed to find out if the properties of quebracho-tanned leather were superior to oak/chestnut leather. Ox and cow hides were given a normal pre-tannage processing, and then one bend from each hide was tanned with quebracho and the other with the mixed extract. The yield on dry weight was 80.3% for quebracho and 81.2% for oak/chestnut. Physical tests show comparable results for the two tannages, while wear trials indicate that the oak/chestnut is the better tannage. It is concluded that the indigenous materials produce a slightly better leather more economically.

CHROMATOGRAPHY AND SYSTEMATIC DISTRIBUTION OF ELLAGIC ACID. *E. C. Bate-Smiths. Chem. & Ind. Supplent. No.* 14, R. 32 (1956).

Ellagic acid which is present in a number of commercial tanning materials is a source of trouble in manufactured food products due to its insolubility which may give rise to cloudiness in stored products. It can be recognised by the inspection of chromatogram in Forestal solvent by reason of its distinctive soft violet fluorescence in u.v. light changing to very pale yellow on fuming with ammonia at R approx. 0.33. A list of the families and genera of plants tested in this manner and also with test-tube reaction is given. When methanolic extract of the unhydrylysed tissue gives a characteristic reaction when treated with dilute acetic acid and sod. nitrite becoming yellow-brown to nigger-brown depending upon the concentration of the ellagic acid. But the free ellagic acid behaves differently giving yellow to brown-orange coloration. The colour given by ellagi-tannis such as myrobalans resembles that given by the natural extracts. In most of the species tested, the occasional association of ellagic acid with flavonoid compounds such as leuco-delphinidin and myricetin suggests that it stands in the same biogenetic relationship to them as caffeic acid stands to quercetin and leuco-cyanidin.

K.S.R.

TANNING WITH ALDEHYDES. *W. Schweisheimer. Aust. Lea. J.* **59**, 8, 150, (1957). Aliphatic aldehydes represent a domestic tanning material which can be produced in unlimited quantities. Formaldeyde and glyoxal have not yet found much application in tannery practice. But smooth-grained, soft and pliable leather can be obtained with these aldehydes by tanning in fairly concentrated alkaline solutions, according

to L. Seligsberger and C. Sadlier, Quartermaster Research and Development Centre, Natick, Mass. (U.S.A.). Preferable are solutions of two normal sodium carbonate or of mixtures of sodium carbonate and bicarbonate. Under these conditions formaldehyde produces a white and glyoxal a cream-coloured leather.

Formaldehyde raises the shrinkage temperature to above 90 deg., whereas glyoxal tanned leather shrinks but a few degrees lower. After the tannage the leather must be first neutralised by gradual additions of acids before it can be washed or rinsed in order to prevent strength losses and tenderness of the grain.

Both malon- and succinaldehyde tan best on the acid side, notably between pH 3.5 and 4.5. Their shrinkage temperature reaches 82° within this range and declines slightly, when the tannage takes place at pH 7.0 or higher. Succinaldehyde imparts to the leather a pleasing tan colour and a particularly good round feel ; malonaldehyde gives a yellow leather.

Glutaraldehyde is a good tanning agent over a wide pH range. When employed in the same manner as glyoxal it produces an equally pliable leather of a tan colour similar to that of succinaldehyde.

LEATHER MILDEW CONTROL. *Hans Blumberg. Lea. & Shoes,* **132,** 23, 14, (1956). Much work has been done with a view to find out footwear sanitizing agents and efficient mildew inhibiting agents to protect footwear and leather goods during prolonged storage under various climatic conditions. The two important agents used today are (1) para-nitro-phenol (PNP) and (2) ortho-phenyl-phenol (OPP) combined in stable form with sulphur and chlorine. Though the resistance properties of PNP have been proved satisfactory, its application is expensive and not always certain. The toxic nature of PNP towards human skin has prohibited its use in gloves, hat-sweat band, etc. OPP can be used both as mildew inhibitor and as a sanitizing agent in tanneries during leather processing, during fabrication of leather goods or on completely finished footwear and leather goods are recommended. It completely eliminates chrome sensitization often resulting when the skin is brought into direct contact with chrome tanned leathers and it has also proved non-toxic during prolonged contact with human skin.

Bark tanned leather innersoles and linings which are highly susceptible to bacterial attack under favourabe conditions and which have a tendency to curl on drying, when treated with OPP, are capable of withstanding such changes.

V.V.S.

THE HYDROCHLORIC ACID-BINDING CAPACITY OF HIDE-POWDER IN SODIUM CHLORIDE SOLUTIONS. *P. M. Heertjes and Oei Hoo Djoen. J.S.L.T.C.* **40,** 11, 346 (1956). A method, based on the Donnan Membrane theory, is given for calculating the acid-binding properties of collagen as a function of pH. Experimental proof is given for the system hide powder-hydrochloric acid and water in the presence of NaCl.

DETERMINATION OF FORMALDEHYDE BY DIRECT TITRATION WITH HYDRO-XYLAMINE HYDROCHLORIDE. *E. Grebenovsky and Z. Rezac. Chem. Listy,* 1955, 49 (8), 1185-1187. *Via. Anal. Abst.* **3,** 11, 3367, (1956). In alkaline media the reaction between hydroxylamine and formaldehyde takes place quantitatively and is suitable for the volumetric determination of formaldehyde. In comparison with the acidimetric method, organic acids do not interfere and the end-point, obtained by the " dead-stop " method or polarographically, is sharper. *Procedure* —Dilute the sample containing formaldehyde (3 to 15 mg) with H_2O to 40 ml and add N NaOH (10 ml). In this solution immerse platinum electrodes polarised with 100 mV and titrate with a solution of hydroxylamine hydrochloride of suitable and known concentration (*e.g.*, 0.1 M), the max. sensitivity of the galvanometer being used.

INORGANIC ANALYSIS IN ORGANIC SOLVENTS. I. SPECTROMETRIC DETERMINATION OF CHROMIUM FOLLOWING A CHROMATOGRAPHIC SEPARATION. *A. J. Blair and D. A. Pantony. Anal. Chim. Acta,* 14, (6), 545-552 (1956). *Via. Anal. Abstr.* **3,** 11, 3330, (1956). Chromium in ferrous and non-ferrous alloys, ores, etc., can be determined to within $\pm 2\mu g$ by pptn. of Cr... as 8-hydroxy quinolate (if Al, V and Co are absent), or 8-hydroxyquinaldate, in the presence of a sufficient excess of Fe.... The dried ppt. is dissolved in $CHCl_3$ and the soln. is diluted with an equal vol. of C_6H_6 ; the whole or an aliquot is then passed through a column (30 cm x 5 to 6 mm) of activated almina. The extinction of the eluate, containing the Cr complex only, is measured at 410 or 425 μg with respect to the solvent. Optimum operating conditions, interferences and sources of error are discussed. The results agree reasonably well with those obtained by the standard methods. A sample of 3 to 5 mg is usual, but the amount of Cr to be passed through the column should be between 0.01 to 0.3 mg, and the total weight of metals to be absorbed on the column should be between 1 to 5 mg. The V and Cr in ferrovanadium should be oxidised with $(NH_4)S_2O_8$ and the excess of persulphate destroyed by boiling ; the small amount of dichromate is reduced by and combines with 8-hydroxyquinaldine, whilst all the V remains, obligatory, in the quinquevalent state.

A COLORIMETRIC METHOD FOR DETERMINING DISSOLVED OXYGEN. *Charles S. Oulman and E. Robert Baumann. Sewage & Ind. Wastes* **28,** 12, 1461, (1956). The Winkler Method generally accepted as a standard method is an indirect iodimetric method for determining dissolved oxygen. The colorimetric titration of iodine is however time-consuming and tedious. A modified method of colorimetric determination of iodine released in the urukler method for dissolved oxygen using a spectrophotometer has been worked out. The spectrophotometric calibration, with the necessary corrections to be made for and the turbidity and the accuray of calibration are discussed in detail. The advantages claimed for colorimetric modification are (i) standardisation of solutions is eliminated, (ii) time spent in analysis is reduced, (iii) method is easier and less tedious to use and (iv) the correlation with standard method is direct.

V.V.S.

ANALYSIS OF MIXTURES OF PROTEIN AND NON-PROTEIN FIBRES BY MEANS OF SODIUM HYPOCHLORIDE. *E. Druce. Shirley Inst. Mem.* 1956, 29, 15-21. *Via. Anal. Abst.* **3**, 11, 3398, (1956). A mixture of protein and non-protein fibres is treated with a solution of 1.0 N NaC10 (plus 5 g of NaOH per litre) and the residual non-protein fibres are collected and weighed. With the exceptions of raw cotton and cellulose acetate, no non-protein fibres lose appreciably in weight during the analysis. Raw cotton loses 3 per cent. of its weight and a correction factor can be applied. The method is unsuitable for mixtures containing cellulose acetate. A large number of analyses carried out by this method are reported and their accuracy is assessed to be within 0.6 per cent.

PARTICLE MEASURING. A re-design of the patented sub-sieve sizer has added a unique clamp assembly for the sample tube which, when slipped in place on the front of the instrument with a lever pulled down, is clamped solidly in place with an air-tight seal. The apparatus covers two ranges, 0.2-20 microns and 20-50 microns and is available for use on 115 volt 50-60 cycle a.c. Fisher Scientific Company, 501, Fisher Building, Pittsburgh-19.

—*Pt. Oil & Chem. Rev.* **119**, 26, 26, (1956).

THIN FILM MEASURER. A photometric precision instrument accomplishes the accurate measurement of extremely thin film thicknesses to the order of molecular dimensions, precise to within a few Angstrom units. The Quantum Ellipsometer is a polarising spectrometer that measures directly the thickness of films which can be deposited on suitable substrates. It fills the gap between molecular layer dimensions and the point where other instrument readings take over. The device is ruggedly built. It is designed for both visual and photometric readings. An ultra-sensitive photomultiplier system is included to give greater accuracy and reproducibility over visual observation. Quantum Inc., 756 N. Brooksvale Road, Cheshire, Conn.

—*Paint, Oil and Chem. Rev.* **119**, 26, 27, (1956).

INVESTIGATION OF THE STIASNY REACTION FOR THE PRECIPITATION OF POLYPHENOLS IN SPRUCE BARK EXTRACTIVES. *A. Wissing. Svensk. Pappenstidn.*, 1955, 58, 745. *Via. J.S.L.T.C.* **40**, 11, 378, (1956). Results show that for the quantitative determination of the fractions of tanning extracts forming reaction products with formaldehyde, the Stiasny reaction gives comparable results only at the same concentration of tanning material and within a narrow range of pH. The influence of insoluble matter of the tanning extract is also discussed briefly.

A SIMPLIFIED PREPARATION OF D-ARGININE. *Sanford M. Birnbaum, Milton Winitz and Jesse P. Greenstein. Arch. Biochem. & Biophys.* **60**, 1, 496, (1956). Concentration of the digestion mixture of acetyl-DL-arginine with acylase I gave the very insoluble acetyl-D-arginine in high yield and purity. Hydrolysis of the latter compound with HCl yielded D-arginine-HCL nearly quantitatively.

APPLICATIONS OF INFRA-RED SPECTROSCOPY TO SURFACE COATINGS. *L. A. O'neill and C. P. Cole. J. Appl. Chem.* **6**, 9, 399, (1956). A survey is made of the applications of infra-red spectroscopy in the surface coatings field, especially in connexion with (1) the chemistry of drying oils, particularly with reference to the geometrical isomerization of fatty acids, the autoxidation process and copolymerisation of oils with unsaturated compounds; (2) the curing of epoxy resins; and (3) the identification of synthetic resins.

ALTERNATING CURRENT POLAROGRAPHY OF ORGANIC COMPOUNDS. VI. FURTHER DEVELOPMENT OF THE THEORY. *B. Breyer and H. H. Bauer. Aust. J. Chem.* **9**, 4, 437, (1956). In previous papers of this series (Breyer, Bauer, and Hacobian 1954; Breyer and Bauer 1945, 141, (1956). Structural changes in tanned collagen fibrils during 1956) it was shown that the A. C. polarographic behaviour of organic at the electrode. Empirical and theoretical expressions for the dependence of the alternating current on the bulk concentration of depolarizer were qualitatively correlated. In the present paper, the theoretical treatment is developed further, permitting the evaluation of the adsorption coefficients of the oxidized and reduced forms at the electrode surface.

ELECTRON MICROSCOPE RESEARCHES. *D. Burton and R. Reed. Paper presented at S.L.T.C. Annual General meeting. Via. Chem. Age,* **76**, compounds can be explained by postulating adsorption of the substances shrinkage in hot water were described. First the fibrils swell either at certain regions along their length or at their ends. The bands across the fibrils become fainter in the swollen regions and, significantly, become much closed together. At the same time the swollen portions flatten and assume a peculiar spiral form. This initial swelling is usually observed at a temperature below that of macroshrinkage, *i.e.*, below that of a strip of leather as determined in the usual apparatus. Moreover, the fibrils in any particular sample of leather do not all swell and shrink at the same rate.

On raising the temperature, the swollen fibrils break across to form short, study structures, which on prolonged heating are reduced to ill-defined masses of glue-like material. These changes appear to take place with all the leathers so far examined, but are best illustrated in the case of chrome and oil-tanned leathers where the fibrils are not obscured by the presence of amorphous material such as vegetable tannin.

On the basis of these results suggestions were put forward for the structure of the native collagen fibrils, its stabilisation by tannage and its shrinkage by hot water.

ELECTRON EXCHANGE POLYMERS. VIII. THE REDOX POTENTIALS OF POLYMERIC HYDROQUINONES. *Lionel Luttinger and Harold G. Cassidy. J. Poly. Sci.* **22**, 101, 271, (1956). The redox potentials of linear and crosslinked polymeric hydroquinones were studied under a variety of experimental conditions. For aqueous systems a sulfonated copolymer was employed. The main features of these titrations were: (1) In aqueous solution the potentials were up to 200 mv. higher

than that of a comparable monomer. (2) These potentials fell to about the expected value when the titration was carried out in 1 M KCl. (3) Titrations of the unsulfonated copolymer in 90% dioxane-water indicated that a small but measurable enhancement of the potential (about 10-50 mv. over that of a comparable monomer) exists in this case. (4) Both the liner and crosslinked polymers yielded substantially the same results. (5) A smaller enhancement of the potential was observed when bromine rather than ceric sulfate was used as oxidant. (6) The reactions were very slow, but in the case of the oxidations with ceric sulfate the reaction rate was increased tenfold in the presence of 1 M KCl. The potentials are discussed in the light of current polyelectrolyte theory, which gives a plausible explanation of much of the observed effect, but direct experimental confirmation was not forthcoming. Various possibilities with regard to the catalysis by KCl are discussed. These polyelectrolyte phenomena are also shown to have important consequences for redox enzyme and other protein systems.

RESISTANCE OF LEATHER TO ENZYMATIC ATTACK BY TRYPSIN. *F. Stather, S. Walther, and V. Stather. Das Leder,* 1956, 7, 13. *Via. J.S.L.T.C.* **40**, 11, 380, (1956). Reports on the action of trypsin on leather in buffered solutions do not hold good for unbuffered solutions : in the later case, the following results were obtained :

Chrome tannage confers the highest resistance to trypsin attack. Vegetable tanned leather is resistant when the degree of tannage is sufficiently high ; syntans give similar protection, but not sulphite cellulose extract. Even leathers tanned with a high percentage of alum are not resistant, nor are those formaldehyde tanned. There is a certain, but not complete, relationship between shrinkage temperature and resistance to trypsin attack : but not between the latter and resistance to hot water (soluble nitrogen produced by shaking leather sample for 7 hr. in water on a water bath).

NEUTRAL RAW WOOL SCOURING. *R. A. Olney and B. A. Ryberg. Dye-stuff Ame. Rep.* **45**, 22, 781, (1956). The principles of neutral raw wool scouring have been successfully and economically applied by the authors in the scouring of over fifty million pounds of wool of many types in a number of plants. The wool scoured by this method was much whiter, loftier, faster drying, had a kinder handle, and gave less noilage than that scoured by the conventional soap and soda method. This paper describes the laboratory and plant work done to establish the optimum conditions for scouring raw wool using a nonionic detergent and sodium sulfate as a builder. The relative effects of temperature, type of builder and detergent, and builder concentrations are discussed. A starting formula, based on laboratory results, was successfully applied in extensive field tests. Additions of detergent and builder, however, had to be worked out for each plant due to the differences in equipment, type of wool scoured, etc.

APPLICATIONS OF INFRA-RED SPECTROSCOPY TO SURFACE COATINGS. *L. A. O'neill and C. P. Cole. J. Appl. Chem.* **6**, 9, 399, (1956). A survey is made of the applications of infra-red spectroscopy in the

surface coatings field, especially in connexion with (1) the chemistry of drying oils, particularly with reference to the geometrical isomerization of fatty acids, the autoxidation process and copolymerization of oils with unsaturated compounds ; (2) the curing of epoxy resins, and (3) the identification of synthetic resins.

AUSTRALIAN WOOL RESEARCH : COMPOSITION, STRUCTURE, FELLMONGERING, CARBONIZING AND FELTING. *Fibres (Engrg. & Chem.)*, **17**, 11, 367, (1956). A thorough understanding of the microscopic structure and chemistry of wool is essential in the coming technological struggle between wool and its man-made rivals. Research with that objective has already helped substantially in the development of improved methods of fellmongering and carbonizing. New knowledge of the nature of wool and related animal fibres is now being applied to the problem of finding a substitute for rabit fur in the manufacture of felt hats.

pH CONTROL IN WOOL PROCESSING. *Techl. Correspondent, Text. Rec.* 74, 880, 59-60 ; 881, 52-3 (1956). *Via. Am. Dyestuff Rep.* **45**, 22, 800, (1956). The author examines some of the aspects of wool finishing with respect to the effect of pH in the various processes discussed.

In carbonizing with aluminium chloride, the pH of the bath should be adjusted to 1.4-1.6 by addition of hydrochloric acid, to stabilize the aluminum chloride. A suitable indicator (Tropaeoline 00) is recommended to be used.

When wool goods are to be crabed, the pH should be maintained at 7, or a little on the acid side, to avoid blooding of dyed goods.

In bleaching with peroxide, pH plays an important part. The author recommends maintaining it at 8.2 to 9.2, using sodium pyrophosphate as stabilizing agent. A low pH stabilizes the peroxide too much and retards the bleaching action, while a high pH releases the oxygen too rapidly.

The author discusses the shrinkage of wool in fulling, both acid and alkaline, and quotes a research report stating that between pH 4 and 10 there is little change in feltability. Below pH 4 increased felting takes place. Above pH 10 the wool fiber is degraded.

In the anti-shrink process for wool, using sodium hypochlorite, careful control is essential to avoid damaging the fiber unnecessarily. A pH of 8.5-10 is suggested.

The use of proteolytic enzymes (trypsin and papain) for non-shrink finishes is also discussed. Here the pH of the liquor must be maintained at a constant figure by the use of suitable buffers.

If wool is chlorinated at less than pH 4, it will dye deeper than untreated wool, according to the author ; if chlorinated at over pH 6, it will lighter than normal wool.

Ten references to the literature are cited.

SHRINKPROOFING WOOL WITH PERMONOSULFURIC ACID-CONTROLLED pH VALUES. *US Pat.* 2,701,178 (*Stevenson Dyers—Fell—Feb.* 1, 1955). *Via. Am. Dyestuff Rep.* **45**, 26, 959, (1957). Shrinkage ... monopersulfuric acid.

Particularly good shrinkproofing results are achieved, according to the present patent specification, by treating the goods at temperatures upto 50°C with this acid or salts thereof, either at pH values under 2 in the presence of strong sulfuric acid or at pH between 7 and 11.2.

Good hand and color as well as full shrinkproofness are said to be obtained ; no fiber damage can be noticed.

Examples : An all-wool fabric is treated for 40 sec. at 33°C in a bath containing permonosulfuric acid and sulfuric acid or in the cold for 30 min. in a bath containing the sodium salt of permonosulfuric acid, adjusted with NaOH to a pH of 10.

Among the references cited by the Patent Office :

US Pat. 2,173,040 (Muller/1939) : organic compounds of persulfuric acid, *e.g.*, p-toluene persulfonic acid, are used as oxidizing, bleaching and disinfecting agents, also for oxidizing of starch products.

French Pat. 784,828 (1935) and 798, -566 (1936) (E. Franz): bleaching of fibres with oxidizing baths, among them, monopersulfates and monopersulfonates.

Brit. Pat 451,026 (E. Franz/1936): bleaching of wool with peroxide or peracids or salts thereof (among them, permonosulfuric acid or salts thereof). The baths are adjusted to a pH lower than 7 by the addition of aliphatic acids.

Further reference is made to Brit. Pat 692, 258 (Stevenson Dyers) reported in Am. Dyestuff Reptr. 42, 620 (1953), which may be parallel (or at least very similar) to the current US Patent.

NEW METHODS IN SOLE ATTACHING AND SCRAP RECLAIMING. *Lea. & Shoes* **132**, 18, 44, (1956). Two new processes in sole attaching and scrap reclaiming that are drawing much comment throughout the world trade have been developed in Germany recently.

A new process invented by a leading Pirmasen shoe manufacturer has proven successful in incorporating a leather surface to the 'transparent' natural rubber outsole on the side that opposes the shoe bottom. The actual adhering operation is done during processing of the rubber outsole. Immediately after the latter is formed, a leather layer dyed to a suitable congruency with the rubber surface is attached to the top surface of the outsole while the rubber is still 'active'. By using a special two-stage vulcanizing cement, the leather layer is vulcanized firmly to the rubber outsole. The process is called the " deep-freeze " process.

Intensive wear and tear tests over a long period prove an enduring inseparable bond between the leather layer and rubber outsole.

The new German process of reclamation of leather scraps consists essentially of insisting leather particles into a small air chamber and then introducing pulverised resin sprayed by pneumatic pressure. The coated particles drop into a conveyor and the layer becomes irregular due to the varying particle size and weight ; the mass is then taken to an infrared dryer which evaporates the resin leaving a loose, irregular surface of intertwined structure. The optional compression of the leather layer produces a leather material varying from a low to high degree of firmness and density.

V.V.S.

AEROSOL SHOE POLISH : A shoe polish that comes in an aerosol can has been developed by Power-Matic Corp., Scranton, Pa., and will be marketed under the name of Sprayola.

Big advantages of the new polish result from its pressure packaging. The spray is convenient, there is no mess, and there is no loss of polish ingredients by evaporation, say the manufacturers. The polish will be available in 12- and 6-ounce cans. Colors include black, brown, tan, ox-blood, neutral and white.

—*Science Digest*, **40**, 5, 95, (1956).

MANUFACTURE OF FOOTBALLS

A model scheme for the manufacture of footballs has been prepared by the Small Industries Organisation of the Ministry of Commerce and Consumer Industries for the guidance of small industrialists.

Entitled " How to Manufacture Footballs ", the scheme will enable prospective manufacturers to take up football-making in a scientific manner. The scheme gives details of the raw materials required for the manufacture of footballs as well as the tools and equipment to be used. From the selection of leather to the finishing operations of stitching, the different stages of making a football have been set out in the booklet which is illustrated with suitable photographs and drawings.

Owing to the great popularity of the game of soccer in all parts of India, the internal market for football is steadily expanding. The possibilities of export are also considered good. Indian footballs have been exported to several countries over the past years, the total value of the exports being between Rs. 2 and Rs. 3 lakhs a year. With the development of the industry on proper lines, particularly the production of standard goods, the exports could be considerably stepped up. The Indian Standards Institution has formulated a tentative standard for football and has also published a standard for football leather.

The manufacture of footballs is at present being carried on mainly in Jullundur, Meerut, Delhi and Calcutta.

—*THE HINDU*, dated 25th February, 1957.

The State Trading Corporation was trying to develop new markets. It had accordingly concluded an agreement to supply shoes to the U.S.S.R. valued at Rs. 1,18,05,000.

—*J. Ind. Tr.* 7, 1, 62, (1957).

A NEW B. L. M. R. A. PUBLICATION.

With the ultimate object of bringing about an improvement in the quality of imported hides, skins and crust leathers, the British Leather Manufacturers' Research Association instituted surveys of the industry in India, Pakistan, Ceylon, the Sudan, E. Africa, S. Africa and Nigeria. Mr. G. W. Douglas, M.Sc., M.I., CHEM.E., F.R.I.C., was deputed to undertake these surveys, and his report is now published as a 77 page booklet by the B. L. M. R. A. The price is 7/6 post free. It is a most informative publication, and one which will interest not only hide and leather importers, but the leather trade in general. The full title of the Report is "Survey of the Production of Hides, Skins, and Rough-tanned Leathers in India, Pakistan, Ceylon and Africa," and copies can be obtained from the B.L.M.R.A., Milton Park, Egham, Surrey.

—*J.S.L.T.C.* **40**, 11, (1956).

NEW TANNING INDUSTRY IN CENTRAL AFRICA

A new tanning industry has been added to Southern Rhodesia's growing list of industries, according to a foreign commerce report.

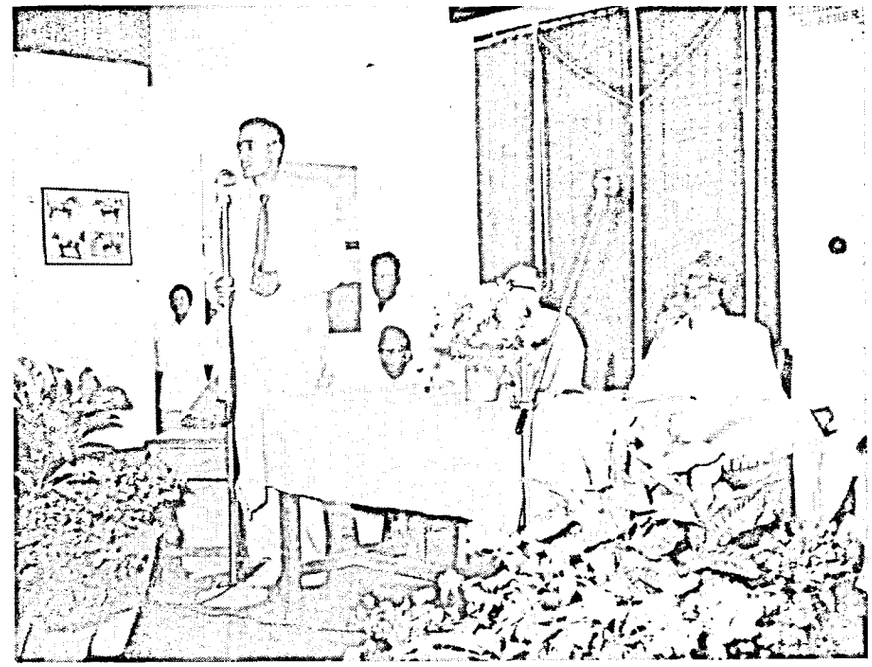
The Rhodesian Wattle Co., has started production of tanning in the first of its extract factories in Silversteams near Malsetter in the Eastern Districts and also has started construction of a second factory near Invanga, about 100 miles farther north.

When the two plants reach full production, it is expected that, at current prices, the value of the extract produced will be about $ 2,800,000 annually.

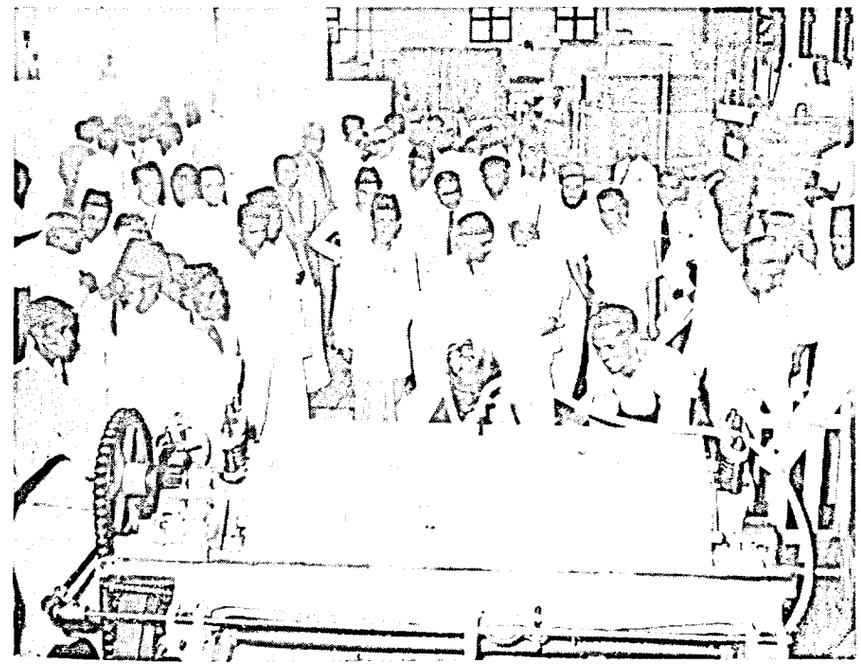
—*Lea. & Shoes*, **132**, 23, 9, (1956).

That world production of leather footwear totalled about 1,487,158,000 pairs last year. This includes all varieties of footwear made partly or entirely of leather. World *per capita* output of leather footwear was .57 pair in 1930 ; .48 in 1940 ; .50 in 1950 ; .60 in 1954 ; .68 in 1955.

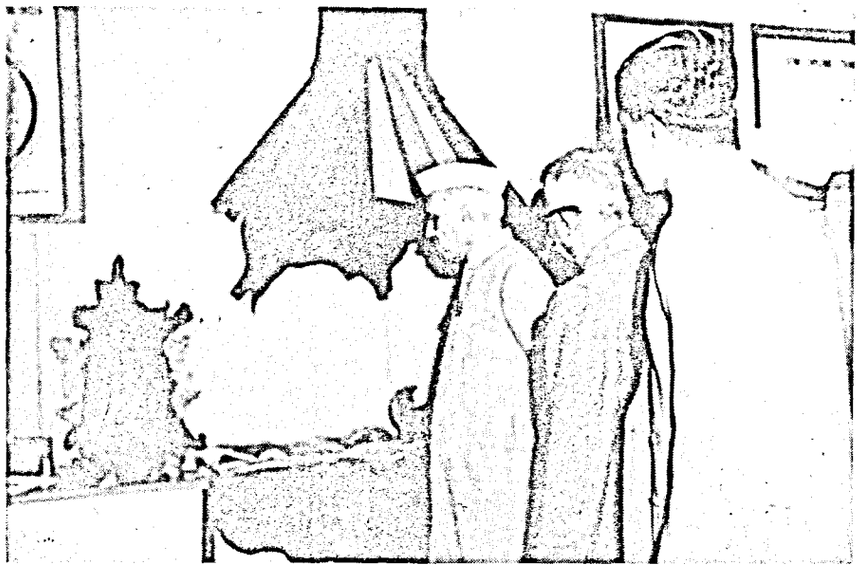
—*Aust. Lea. J.*, **59**, 8, 52, (1956).



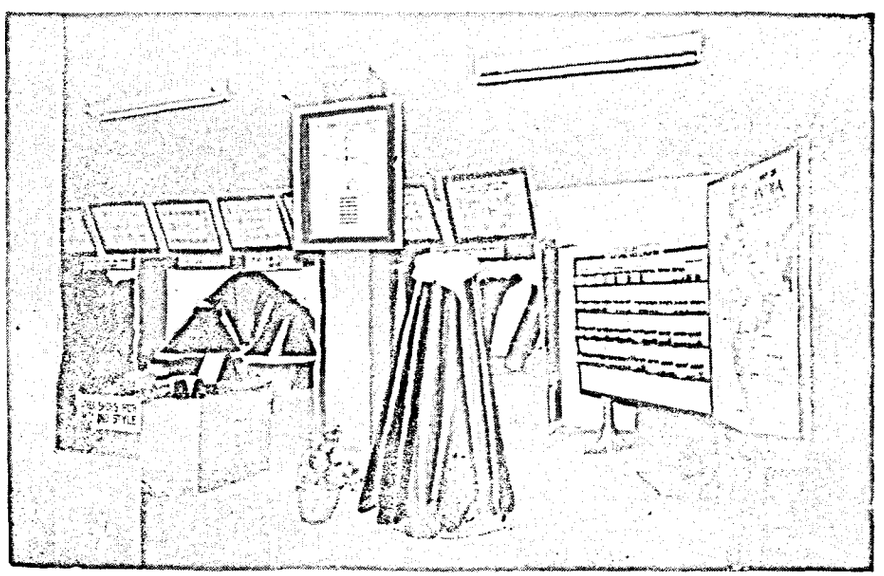
Dr. Y. Nayudamma welcoming the delegates on the occasion of the inauguration of 'Open House' and Practical Demonstration at C.L.R.I. on 28th January 1957.



Members of the tanning trade and industry in the Lime yard of the tannery when the house was declared open.



Shri Jawaharlal Nehru at the C.L.R.I. stall in the UNESCO Conference Exhibition held at Delhi in 1956.



C.L.R.I. stall in the Madras University Centenary Exhibition held in January 1957.

C. L. R. I. NEWS

Dr. Y. Nayudamma, Assistant Director-in-Charge, went on tour to Delhi on 25th February, 1957 to attend the Joint Meeting of the Ministry of Heavy Industries, Development Wing and the Council of Scientific & Industrial Research, on 26th and 27th February, 1957.

Sri D. Ghosh, Junior Scientific Assistant, proceeded to Australia on 22nd February, 1957 for higher studies in Leather Technology under the Colombo Plan.

Exhibits from Central Leather Research Institute were sent to the Japan International Trade Fair, Tokyo, and the Prague Fair.

The following persons attended the Practical Demonstration No. 2. 'Manufacture of Rapid Tanned Sole Leather' which began at Central Leather Research Institute from 5th March, 1957 onwards :

1. Sri Jagjit Singh, Pioneer Sports Goods Ltd., Jullundur.
2. Sri S. V. Bandare, Scion Tanneries & Leather Works, Bombay.
3. Sri D. V. N. Sarma, Dayalbag Taj Tanneries Ltd., Agra.
4. Sri P. M. Krishnan, 78, C. P. Koil Street, Madras.
5. Sri Malik Basha, Madras Chrome Tannery, Pallavaram.
6. Sri Abdus Salam, Lari Tannery, Kanpur.
7. Sri R. Kalyanasundaram, Chrome Leather Co., Chromepet.
8. Sri S. H. Badsha, Narsat Tannery, Pallavaram.
9. Sri J. B. Jamal Ahmed, Kamayut Tannery, Burma.
10. Sri Syed Asadulla, Garden Tannery, Chromepet.
11. Sri A. Mohamed Yousuff, c/o Hajee Ahmed Hussain Bros.
12. Sri M. A. Malick, Pallavaram.
13. Sri M. C. Chouthury, General & Industrial Leather Co. Ltd.
14. Sri P. A. Naik, Western India Tanneries, Bombay.

We welcome the following persons who have joined this institute :

Sri S. P. Ghosh, Junior Scientific Assistant.

Sri K. Radhakrishnan, Junior Scientific Assistant, (ICAR Scheme).

Miss D. V. Subbalakshmi, Senior Laboratory Assistant.

Miss P. V. Rajalakshmi, -do-

Sri S. Ranganathan, -do-

Sri T. S. Kailasa Mahadevan -do-

VISITORS

Name	*Date of visit*
Dr. Lee A. DuBridge, President, California Institute of Technology, U.S.A. ..	
Dr. L. Krafft von Dellmensingen, German Consul General, Calcutta ..	20-2-1957
Dr. H. U. Meyer, German Consul, Calcutta ..	
Mr. Ernst Kunish, German Consul, Bombay ..	
Mr. Rolf von Keiser, Commercial Councillor, German Consulate, New Delhi ..	
Dr. Ph. Koenigs, Consul, Madras ..	
Mr. Alfred F. Kickbusch, Trade Commissioner, German Consulate, Madras ..	
Students and Staff of the Madras Veterinary College ..	1-3-1957
	1st & 2nd March, 1957