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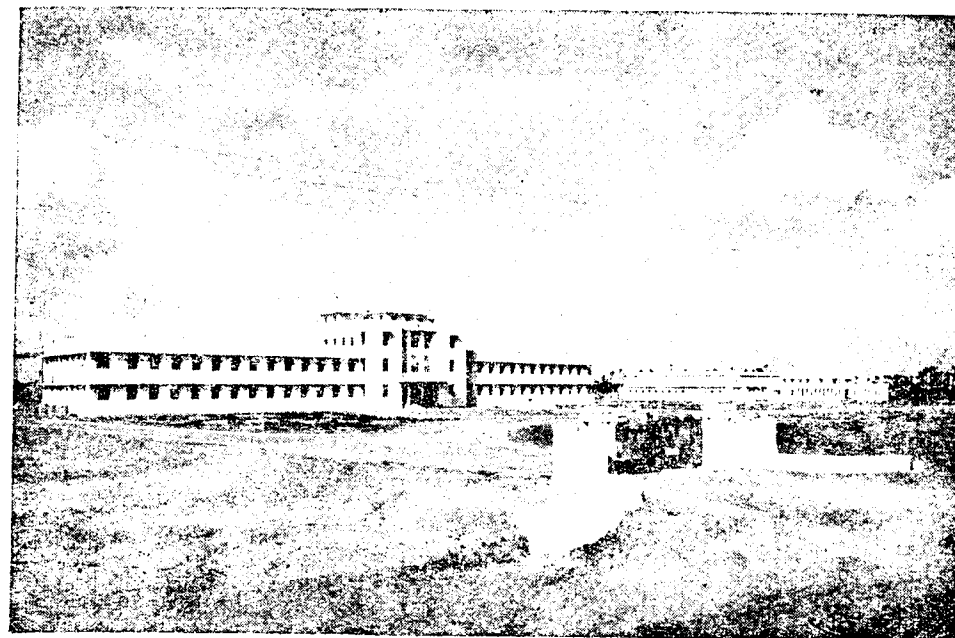


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COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH  
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# Bulletin of The Central Leather Research Institute

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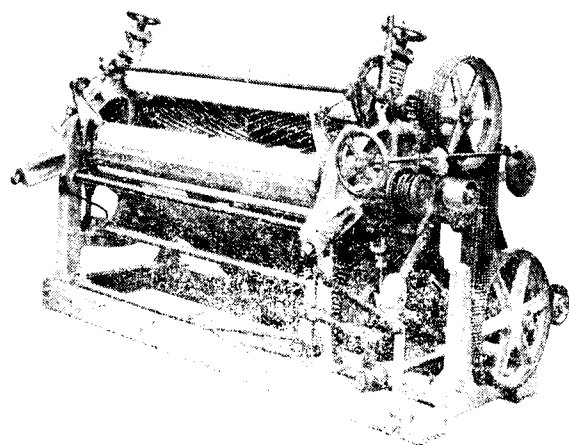
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136609



MAULANA ABUL KALAM AZAD

### **C. S. I. R. MOURNS THE DEATH OF ITS VICE-PRESIDENT**

We record with deep regret the demise of Maulana Abul Kalam Azad, Union Education Minister and Hon'ble Vice-President of the Council of Scientific and Industrial Research, New Delhi, at his residence in New Delhi at 2-10 A.M., on Saturday, the 22nd February, 1958.

A condolence meeting was held under the Chairmanship of Dr. Y. Nayudamma, Director, Central Leather Research Institute. The following resolution was passed in the usual manner.

“This Meeting of the staff of the Central Leather Research Institute places on record its deep sense of sorrow at the sad demise of Maulana Abul Kalam Azad, Union Minister for Education, Vice-President, Council of Scientific and Industrial Research, and a Great Educationist, and conveys its heart-felt condolences and sympathy to the members of the bereaved family.”

As a mark of respect to the departed soul, the Central Leather Research Institute remained closed for the day (22nd February, 1958).

### **MEMOIR**

Maulana Abul Kalam Azad hailed from a distinguished family of Sufis (Mystics) and divines, a descendant of Shaikh Jamaluddin, who made a great name for himself in the reign of the Moghul Emperor Akbar. An element of legitimate pride, born of a noble ancestry and an aristocracy of learning, were discernible in the Maulana's make-up. He

was endowed with a sharp intellect and evinced a scholarly bent of mind with an implicit faith in Hindu-Muslim unity, for which he strove throughout his life. 'Azad', incidentally was a pen name which stuck to him inextricably throughout his life.

Born in Mecca in 1888, Abul Kalam spent his childhood years in Arabia, and was educated under private tutors. His father, Muhammad Khairuddin observed in his life all the family traditions and was both a learned divine and a mystic. For about ten years till 1898, young Abul Kalam was in Arabia when his father, yielding to the pressure of Haji Abdul Wahid, a disciple, came and settled in Calcutta. He learnt Arabic from his mother and Urdu from his father and had a good grounding in both these languages. At Calcutta, he was not sent to any school, but learnt from his father and other Arabic scholars and his progress was phenomenal. In four years, Abul Kalam who was 14, not only finished the course, but began to impart his learning to others. In 1905, he was sent to Egypt for advanced Arabic studies in the famous Al Azhar University in Cairo. After two years stay there, he returned to India in 1907.

Abul Kalam expressed his views fearlessly on all current topics through the various journals he edited with distinction. Urged by a spirit of enquiry, he toured Iraq, Egypt, Syria, Turkey and France and through private study acquired knowledge of European languages and acquaintances with literatures, that he seldom cared to exhibit.

On his return to India in 1907, he found the province of Bengal seething with discontent as a result of the partition and full of a new political awakening. He wanted to bring about a revolution among the Muslims who opposed the National movement and uproot from the Muslim mind the blind and abject sense of loyalty to British rule, that had been sedulously fostered by the so-called British friends of Muslims. With this purpose in view he announced the

publication of *Al Hilal* (the Crescent), a weekly Journal, to serve the Muslim World on June, 1, 1912, when he was 24. From then on, he decided to launch a crusade against political reaction and narrow communalism. When steps were taken to form the Muslim League by Naval Mushtaq Hussain, Secretary of the Aligarh College, to promote loyalty to the British Government, the Maulana swore opposition to this policy. When the first World War broke out, Government suppressed his paper and passed orders prohibiting him from entering the Punjab, the United Provinces and Madras on April 7, 1915. The Bengal Government expelled him from his province and the Government of India interned him in Ranchi.

During his internment here, the Maulana wrote his 'Tazkira' a volume of personal reminiscences and part of his great commentary on the Quran. After his release in 1920, he took a leading part in the Khilafat and non-co-operation movements and was arrested and imprisoned for two years. Later, he took an active part in the Civil Disobedience Campaign of 1930-32 and suffered imprisonment.

Maulana Azad was elected President of the special session of the Congress in Delhi in 1923, and also in 1930. In 1940 he was again elected President in which capacity he continued till 1946.

In January 1947, he joined the Interim Government as Member for Education and Arts in place of Mr. Asaf Ali, who was appointed India's Ambassador in Washington. In August the same year, the Maulana became Minister for Education and in May 1952, was given additional charge of the portfolios of Natural Resources and Scientific Research. He was elected Deputy Leader of the Congress Party in Parliament in 1951 and again in 1952 after the first general elections. He was re-elected, to the Lok Sabha in the 1957 general elections from the Gurgaon Constituency in the Punjab.

As Education Minister, Maulana Azad visited Britain in connection with the future of the India Office Library in July 1955. Later, he visited France, Germany and Switzerland. He was responsible for sponsoring the three-volume report of the University Education Commission in 1948-49 and the publication of the History of Indian Philosophy (two volumes) in 1952.

### RESOLUTION

This meeting of the staff of the Central Leather Research Institute places on record its deep sense of sorrow at the sad demise of Maulana Abul Kalam Azad, Union Minister for Education, Vice-President, Council of Scientific and Industrial Research, and a great Educationist, and conveys its heart-felt condolences and sympathy to the members of the bereaved family.

## ELECTROENDOSMOSIS THROUGH HIDE AND LEATHER MEMBRANES

B. N. GHOSH & S. GHOSH \*

### SUMMARY

An electro-endosmotic method has been developed for the determination of the zeta-potential as well as the iso-electric point of hide and different leathers. The method is not only easy but the hide or leather can be used as such as diaphragm. The electro-osmotic cell to be used and the experimental procedure have been described in detail and the results of such determinations with several samples of untanned hide and formaldehyde, vegetable and chrome-tanned leathers have been discussed.

The hide substance, being a protein, in all its reactions involved in the production of leather, offers a charged surface to the reacting substances; the nature and magnitude of the charge determines to a large extent the chemical reactions, which again, in their turn, may alter the surface charge. A knowledge of surface charge is, therefore, of great importance in the production of leather.

From electrokinetic experiments, it is possible to get directly the value of electrokinetic or  $\zeta$  (zeta) potential, which develops because of the surface charge, and is also a measure of it.<sup>1</sup> From such experiments, it is thus also possible to get unambiguously the isoelectric point, where the potential is zero.

Highberger<sup>2</sup> and Beek and Sookne<sup>3</sup> applied the electrophoretic technique in determining the isoelectric point of unlimed collagen. Theis<sup>4</sup> employed the same method to investigate the shift of isoelectric point of collagen on chrome tanning. Cassel and Kanagy<sup>5</sup> made a detailed investiga-

\* Present Address: Central Leather Institute, Adyar, Madras-20

tion on the isoelectric points of collagen and modified collagen by cataphoresis. In all these work, however, collagen has been used in the powdered form and one may doubt as to how far the results obtained with powdered collagen can be applied to structured hide or leather since the mechanical treatment necessary for producing hide powder may alter the property of the original collagen.<sup>5</sup>

In this paper an electroendosmotic method of the determination of the  $\zeta$ -potential as well as of the isoelectric point of several samples of hide and different leathers has been described. This method is not only easy but the use of powdered material is also avoided.

#### *The Cell and Method of Measurement of $\zeta$ -potential*

(i) A simple cell has been devised for measuring the rate of electroendosmosis through hide or leather membranes. The cell, as shown in Fig. 1, consists of two bored

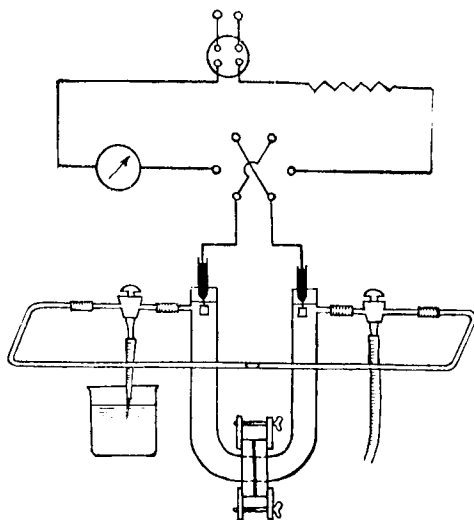


Fig. 1. The Electro-osmotic cell

rubber blocks in between which the membrane is held watertight by means of two wooden frames joined by four screws. The two limbs of the electroosmotic cell, forming

a U-tube together, pass through the bores in the rubber blocks till they come in contact with the leather from the two sides.

The two limbs are filled with the solution, in which the potential is to be determined and in which the membrane has been soaked to equilibrium; two platinum electrodes are dipped in the two limbs for applying potential. The liquid in the limbs is continuous through a narrow flow tube, so that there is no difference in hydrostatic pressure between the two limbs and also the liquid passing through the membrane during electroosmosis does not generate any difference in hydrostatic pressure. The electroendosmosis is measured by noting the movement of a small air-bubble which is made to come into the flow tube during the setting up of the apparatus with the help of two three-way stopcocks; the rate of flow is calculated from the values of the internal cross-section of the tube and the distance moved through by the bubble in unit time. The flow tube itself is filled with conductivity water and is kept horizontal.

In this arrangement, the diameter of the tube is small and the ballooning of the membranes does not occur in general. The apparatus is easier to handle and any leakage or cracking of the glass during clamping is altogether prevented.

The flow tube, stopcocks as well as the glass parts of the cell are kept in chromic acid prior to experiments in order to remove grease completely. This is very important, since otherwise, the smooth movement of the air-bubble in the capillary is prevented and it becomes difficult to have reproducible results.

The electrical circuit for the electroendosmotic experiment is very simple and has been shown in Fig. 1. The supply from DC mains is dropped to a constant voltage of 105 by using a VR 105 electronic valve. The voltage is applied to the electrodes in the cell through a constant and another adjustable resistance, a milliammeter and a commu-

tator. The resistance is so adjusted as to give a current strength of not more than 10 milliamp, since otherwise, at the concentrations of the experiment, there is much of electrolysis and evolution of bubbles.

The experiments were conducted at the room temperature, which was always noted, since this is necessary for getting the viscosity of the liquid at this temperature.

(ii) The  $\zeta$ -potential of the diaphragm is calculated from the experimental data using the Smoluchowski relation :—

$$\zeta = (4 \eta k v / i D) \times (300)^2$$

where  $\eta$  = coeff. of viscosity,  $k$  = sp. conductivity and  $D$  = the dielectric constant of the flowing liquid,  $v$  = rate of flow in cc./sec., and  $i$  = the current strength used.

(iii) In order to find the isoelectric point of any type of leather, first the values of  $\zeta$ -potential are determined in solutions of different pH, and then from the  $\zeta$ -pH curve the pH at which the potential is zero is obtained.

#### Experimental

*Materials:* The materials employed were as follows :

- (i) A sample of limed goatskin after deliming it and equilibrating it at pH 5,
- (ii) a sample of formaldehyde tanned goatskin,
- (iii) a sample of vegetable tanned cowhide,
- (iv) the above vegetable tanned hide after detanning it with several changes of acetone,
- (v) a sample of basic chromium sulphate tanned leather, dried without neutralization,
- and (vi) a sample of chrome tanned calf-skin, without drying and neutralization.

*Procedure:* After properly soaking back the dry samples, all the samples were washed in conductivity water till

almost free from electrolyte. The samples of chrome tanned leather were, however, neutralized prior to washing, by equilibrating to pH~7 by using borax solution. Each sample was cut into several pieces and soaked in solutions of different pH, each solution containing one piece; for the untanned hide and the vegetable and formaldehyde tanned leathers acetate buffer was used at the lower values of pH and borate buffer was used at higher values where necessary. For the chrome tanned leathers, however, the use of anions which form complexes with chromium, was avoided, and the pH was adjusted by adding HCl or NaOH in presence of boric acid. The solutions were properly diluted till the specific conductivity was of the order of  $10^{-3}$  mho/cm. The electroosmotic flow through the samples was determined after equilibration for 3 days, using the equilibrium buffer in the E.O. cell. The pH of the equilibrium buffers was determined in each case using Muirhead pH meter.

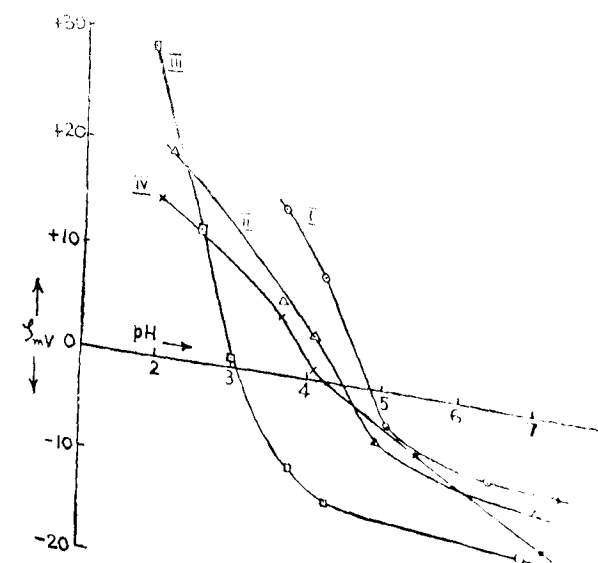


Fig. 2. Plots of  $\zeta$  against pH for hide (I), and formaldehyde (II) vegetable (III) and chrome (IV) tanned leathers.

*Results:* The results of such determinations for hide and some leathers have been plotted in Fig. 2, the sign of  $\zeta$ -potential representing the charge on the surface of the

hide or leather. From such curves the isoelectric points of the different samples were obtained as given in Table I. For the sake of comparison the isoelectric points of similar samples as obtained by other workers using different methods are given in the second column of the table.<sup>5, 6, 7.</sup>

TABLE I  
Iso-electric points of hide and different leathers:

| Nature of the sample.                   | Isoelectric point |                    |
|-----------------------------------------|-------------------|--------------------|
|                                         | Electro-osm       | Other methods      |
| 1. Limed hide ..                        | 4.8               | 4.8-5 <sup>6</sup> |
| 2. Formaldehyde tanned goat skin ..     | 4.5               | 4.6 <sup>5</sup>   |
| 3. Vegetable tanned leather ..          | 3.25              | 3.25 <sup>5</sup>  |
| 4. Sample 3 — detanned with acetone ..  | 3.65              | —                  |
| 5. Chrome tanned skin dried ..          | 4.25              | 4 <sup>7</sup>     |
| 6. Chrome tanned skin without drying .. | 7.5               | 7-7.5 <sup>7</sup> |

#### Discussion

It will be observed from the table that the values of the isoelectric point determined by the electroosmotic method are generally in keeping with the values obtained earlier by other workers using different methods. Thus the isoelectric point has been lowered on formaldehyde and vegetable tanning, whereas it has been raised by chrome tanning. On drying, however, the isoelectric point of chrome tanned leather has been lowered again to a value of 4.25 confirming that on drying, a change takes place in the protein-chrome complex in the direction of the formation of anionic complex.<sup>7</sup> Of interest is the data on vegetable tanned leather. When the basic amino groups of the pro-

tein are inactivated as in the formaldehyde tanned leather, the isoelectric point has been lowered to a value of 4.5. The still lower value of the isoelectric point of vegetable tanned leather suggests that although in the initial stage of tannage, there may be fixation of tannins (which are acidic in nature) by the basic groups of the protein, this is not the only way in which the combination between protein and tannin may take place. In presence of a large excess of tannin, another layer may be formed on this initial layer of tannin. The second layer of molecules which do not take part in the neutralisation of the protein, imparts a higher acidity to the protein-tannin compound thus lowering the isoelectric point very much. This is to some extent corroborated by the fact that on the removal of the excess of tannin from the leather by acetone, the isoelectric point has been raised.

Further work on the electro-osmotic determination of isoelectric point of differently tanned leathers is in progress.

#### Acknowledgement :

The authors wish to thank the Council of Scientific and Industrial Research for giving the necessary finance for conducting this work.

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Technology,  
CALCUTTA.

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## RESEARCH BEARS FRUIT

Practical Demonstration No. 8

Dressing of E. I. Kips and Skins — Semi-Alum Tanning Process\*

BY

M. A. GHANI, R. SELVARANGAN & Y. NAYUDAMMA

This process was demonstrated with the basic idea how lower selection grades of E. I. tanned/bark tanned leathers could be processed to improve the quality of the leather. This process is divided into two parts, the processing of market quality E.I. kips and E.I. skins both of qualities below Fifth Grade, Fifths, inferior Fifths and Rejections. In the demonstration held in September, 1957, E.I. kips were retanned and processed for shoe uppers, chappal uppers, linings and artificial Sambhars. The E.I. skins were tanned and processed for linings and suedes. Besides these different types of leathers, other types of leathers like upholstery, garment, case leathers, crushed grain leather, belting leathers etc., can also be prepared. The fundamentals of the process lie in the use of basic aluminium sulphate instead of basic chrome liquors for tanning and finishing the leathers like leathers of other mixed mineral-vegetable tanned leathers.

### DETAILS OF THE PROCESS DEMONSTRATED

(1) Preparation of Basic Aluminium Sulphate Liquor for tanning 100 lbs. of stock.

|                               |   |                                     |
|-------------------------------|---|-------------------------------------|
| (i) Aluminium Sulphate        | } | Lixivate.<br>Leave for<br>one hour. |
| iron free — 12 lbs.           |   |                                     |
| Water (hot/boiling) — 60 lbs. |   |                                     |

\* Process demonstrated during the month of September 1958

- (ii) add with stirring  
Sodium Citrate — 7.5 ozs. till dissolved.
- (iii) with intermittent stirring, add Soda Ash — 3 lbs. dissolved in 12 lbs. water in the course of about half an hour till all frothing ceases.
- (iv) make up the stock solution to 10-12% Aluminium Sulphate or 1.75 to 2%  $Al_2O_3$  content. This has a basicity of approximately 45%.

(2) Processing of E.I. Kips for uppers, linings and sambhar leathers.

Raw materials. — Quality as mentioned above average weight 8-8½ lbs.

Selection of the raw materials — care is taken to select plump leathers of as uniform a weight as possible. The weight range of each kip should not vary more than 1 lb. to avoid wastage in splitting and shaving.

Soaking, Splitting and Shaving :

The full hides were cut into sides. They were then soaked in water for five minutes and piled overnight. The soaking can be done either in drum or vats. The sides were then split to 1.6 m.m. and shaved to a final thickness of 1.4 m.m. Those sides which were very badly damaged on grain side were split to 1.75 m.m. and were shaved both on the grain side and flesh side to a uniform 1.4 m.m. substance.

Pre-tanning operations :

The weight of the shaved stock is taken jointly for the entire stock as well as separately for those shaved only on the flesh side and those shaved on both flesh and grain side.

The whole stock is taken in a drum and washed and fully soaked by drumming for 45 minutes in plain running water (drum speed 12-14 r.p.m.). The purpose of this

operation is to remove most of the water soluble materials. Water is then drained out.

Now add water in the drum containing the stock to approximately 175 per cent float, and add  $\frac{1}{4}$  per cent of soda ash on the weight of shaved stock dissolved in a little water in the drum and drum the stock for ten minutes. Drain the stock and wash it with running water for five minutes running the drum all the time.

Again add plain water in the drum containing the stock up to a float level of 125 per cent and add  $\frac{1}{4}$  per cent oxalic acid, dissolved in a little amount of water. The stock is then drummed for 10-15 minutes. [The main idea of this operation is to remove all the iron stains caused during splitting and shaving. The use of oxalic acid can be substituted by any bleaching syntan or syntan and oxalic acid or oxalic acid and sulphite or any other suitable combination of bleaching agents.] Now the liquor is drained out and the stock is washed for five minutes by drumming in running water and the water drained out.

Again add plain water to a float of 125 per cent and add  $\frac{1}{4}$  per cent sulphuric acid (concentrated) in the drum diluted with plain water about 5-7 times the amount of sulphuric acid. The stock is drummed for 5-10 minutes after which period the liquor is drained out. In this operation, sulphuric acid can be replaced by Hydrochloric acid.

#### *Tanning :*

For tanning, use 10-12 per cent aluminium sulphate or 1.75 to 2 per cent  $Al_2O_3$  stock solution described earlier on the shaved stock weight. To the stock in the drum, add water 25 per cent that after the addition of the tan liquor, the total float would be about 125 per cent of the stock. The tan liquor is added in three feeds at intervals of 15-20 minutes of drumming and drumming continued to a total period of  $1\frac{1}{2}$  hours. At the end of this time, soda ash (3 lb. per 100 lbs. of stock) used in the basification of the

basic alum liquor used in tanning mentioned above. Soda ash dissolved in water is added to the running drum in 4-5 feeds in the course of one hour. Continue drumming for half an hour after the last feed. Now check the pH of the liquor at this stage. It should be 4.2 to 4.4. In case the pH is low, adjust the pH by further addition of alkali and drumming for half an hour till the minimum pH is 4.2.

The tanned stock is then taken out and piled overnight.

#### *Neutralisation and Fat-liquoring :*

At this stage, separate the stock between those going for (a) grain finish for uppers and linings and (b) Sambhar finish.

#### *2(a) Further processing for grain leathers — Uppers and linings.*

Take the grain leathers and wash them thoroughly in water in drum for 5-10 minutes and check the pH of the leathers. It should be 4.5. If, however, it is less, add about  $\frac{1}{8}$  to  $\frac{1}{10}$  per cent of Soda ash and drum. Drain out the liquor and wash thoroughly and drain out all water.

Fat-liquor the leather with fat-liquor constituted as follows :

|                    |                   |
|--------------------|-------------------|
| Sulphated fish oil | .. 1.25 per cent. |
| Pongam oil         | .. 1.0 per cent.  |

Weights are based on original shaved weight.

To the stock in drum, add the above fat-liquor in a total float of 100 per cent. Water used for fat-liquoring is hot water at a temperature of about 40-45°C. The stock is drummed for thirty minutes.

The stock is then removed and piled overnight.

Leathers for uppers and linings are set on the setting machines or by hand and hung to dry in shade. The drying operation generally takes 24 hours.

The dried stocks are now saw-dusted in moist saw dust overnight to condition the leathers for staking.

The leathers are now staked in the staking machine twice at intervals of two hours and the leathers are trimmed.

All the full grain leathers are buffed with 220 size grit emery paper on flesh side to remove any flesh and also clear the flesh side. The grain side is snuffed with 400 size grit emery paper with a view to correct the grains.

#### *Finishing of Uppers and Linings:*

The leathers are given a stain coat with dye on grain surface and finished in the normal manner using resin finishes as binders and plated under hydraulic press. If required the flesh side of the leathers can be also given a stain coat with  $\frac{1}{4}\%$  basic dye solution. The leathers can be also dyed with 1% acid dye in the drum before fatliquoring operation and then following the successive processes up to finishing.

#### *2(b) Further processing for Sambhar :*

The neutralisation of Sambhar Stock is done exactly as for upper leathers.

*Dyeing of the Sambhar :* The following dye combination was used :

Naphthalene G.R.S. 2% }  
and        „        T.N.S. 2% } on shaved wt.

Float water 125% (Tem. of water 40-45°C.)

Drumming for one hour. The addition of dye in two feeds at interval of 15 mts. At the end of one hour drumming 3-5% formic acid on the wt. of the dye added in the drum and drumming continued for another half an hour. At the end of the period the dye is completely penetrated and the clear exhaust liquor is drained.

Now the dyeing operation is repeated with  $\frac{1}{4}\%$  basic dye (Bismark Brown) on shaved weight. Float of water

100%. Temp. 40-45°C. Drumming time 15-20 mts. The exhaust liquor is drained out and the leathers are now ready for fatliquor.

The stock of leather is now fatliquored with 6% fatliquor composed of 4% sulphonated fish oil and 2% free Pongam oil emulsified together in hot water. The amount of float is 100% including the amount of fatliquor. The temperature of the fatliquor mix is 40-45°C. and the stock is drummed with this liquor for 30-45 mts. at the end of which period the stock is taken out and piled overnight. Next morning the leathers are hung to dry in shade. It generally dries up in 24 hours.

#### *Drying, Saw dusting, Staking and trimming and buffing :*

The leathers are then sawdusted for conditioning and then heavily staked on machine. The leathers are then snuffed with 180 grit size paper on both sides and later snuffed with 350 grit size emery on buffing machines.

The leathers are now brushed to clear the snuffed and buffed sides or the buffing dust and are now ready for finishing.

The leathers are now given a spray coat of a solution of  $\frac{1}{4}\%$  basic dye and  $\frac{1}{4}\%$  glycerine solution on both sides. After drying the leathers are put in drum and dry drummed for 2-3 hrs. At the end of this period, the leathers are taken out, brushed and are ready.

#### *(3) Processing of E.I. Skins for linings and suedes.*

*Raw stock.* E.I. Skins of the quality as mentioned earlier.

*Shaving and levelling.* The skins are shaved and buffed with 220 size emery paper for levelling.

*Pretanning and tanning operations.* All operations leading up to the tanning using 15% basic Aluminium Sul-

phate on the dry shaved weight and neutralisation are the same as mentioned in the processing of E.I. Kips in (2).

#### *Sorting of Skins for linings and suedes*

*Lining leathers.* Generally all those skins which are not full and plump and less of grain imperfections, or plump leathers with damages on flesh side, e.g., pox marks, flaying cut marks, etc., are taken for lining and further processing described below in 3 (a).

*Suede leathers.* Plump Skins, without damages on flesh side, and those plump skins with grain damages but without damages on flesh side are taken for suedes. And their further processing done as described below in 3 (b).

#### *3(a) Further Processes for Lining and Dyeing :*

The lining stock is dyed in drum using acid dye  $\frac{3}{4}\%$ , float 100-125% and temperature of the dye bath 40-45°C. — drumming period about 45 mts. At the end of 30 mts., 3% formic acid or acetic acid on the wt. of the dye used is added for exhaustion of the bath. The exhaustion is clear. The exhaust liquor is drained out and Basic dye  $\frac{1}{4}\%$ , float 100% temperature of float 40-45°C. added to the drum and the stock drummed for 15-20 mts. when the dye is taken up completely. Drain out the liquor.

*Fatliquoring of the Stock.* The stock is next fatliquored with fatliquors of the type shown for uppers and linings from E.I. kip under clause 2(a). The float of the drum is 100%, amount of fatliquor 2.5% and temp. 40-45°C. drumming period 20-30 mts.

The leathers are now removed from the drum piled overnight to sam, set by machine or hand and hung up to dry.

Conditioning in saw dust, staking and trimming in the normal manner.

Finishing with pigment finish in the normal manner using casein and resin Binders as binder and glaze finishing the stock.

#### *3(b) Further processing of Suedes.*

*Fatliquoring :* The skins are now taken in a drum and leathers are first fatliquored with the following fatliquoring composition 4.4.5% on the sammed retanned weight.

Sulfonated fish oil .. 4 parts

Free oil .. 1 part

(Pongam, castor, fish oil, etc.,  
or their mixture)

China Clay .. 1 part

Float 100% ; duration of drumming 30 mts.

Temp. of the fatliquor bath 40-45°C.

Drain out the exhaust bath and follow as follows :

#### *Dyeing :*

The stock is dyed to any shade. For black, the following dye bath having 6% dye on the shaved weight was used.

Naphthalene black .. 2%

Chlorozol black .. 2%

Nigrosine .. 2%

using 8-10% acid (formic or acetic) on the wt. of the dye for fixation. Float 100; temp. of the dye bath 40-45°C; drumming time 45 mts. The dye is taken up completely. Drain out the exhaust liquor. Now add methic black dye 1% in 80-100% float at a temp. 40-45°C. and the leathers again drummed for 20 mts. when the dye uptake is complete.

The leathers are now taken out piled overnight and hung to dry up.

The leathers are conditioned in saw dust for 12 hrs. and staked.

The leathers are now buffed first with a coarse emery and followed by a fine emery to bring in the desired nap in the leathers.

The leathers are now sprayed with a solution containing  $\frac{1}{4}\%$  corresponding basic dye and  $\frac{1}{4}\%$  glycerine on flesh side allowed to dry in air and dry drummed or 3 hours at the end of which period the leathers are taken out, brushed and are ready. In the above demonstration  $\frac{1}{4}\%$  methic black and  $\frac{1}{4}\%$  glycerine were used.

## TECHNICAL SEMINAR

### N-terminal Amino Acids of Skin Proteins \*

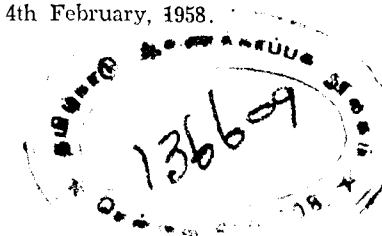
BY

K. THOMAS JOSEPH

The reaction of proteins with fluorodinitro benzene (FDNB) resulting in the formation of non-hydrolysable dinitro phenyl derivatives of terminal amino acids has provided a means of identifying and estimating the amino end groups of proteins and peptides and was first introduced by Sanger in 1945. This method has been of great value in elucidating the structure of many proteins and also for their characterisation.

Chromatographic resolution of the dinitrophenyl amino acids is the most essential pre-requisite for any study of the N-terminal amino acids of proteins by this technique. Column chromatography has been generally employed for the separation and estimation of DNP amino acids but the more convenient technique of paper chromatography is becoming more popular in recent years. After trying a large number of solvent mixtures, it has now been possible to separate almost all the ether soluble DNP-amino acids on a single piece of paper using two different solvent systems. Using this technique, the N-terminal amino acids of all the skin proteins, namely collagen (in different forms), elastin, reticulin, albumin, globulin, mucoids, myosin and wool was investigated. No  $\alpha$  DNP amino acids could be detected in collagen whereas small amounts of different amino acids were detected as amino end groups, in soluble collagens, elastin, reticulin, myosin, wool and the globular proteins

\*Summary of the seminar talk delivered on 4th February, 1958.



present in hides and skins. Middlebrook and others using Sanger's technique have shown that the terminal amino groups of the polypeptide chains of fibres as different as wool and human hair are provided by the same seven amino acids, namely, glycine, alanine, valine, serine, threonine, aspartic acid and glutamic acid. The same seven amino acids were detected in the present study in Indian sheep wool, the only difference being that the concentrations are slightly lower than those reported in other species. The differences in the quantitative data of the N-terminal amino acids of wool reported by different workers are not surprising in view of the known heterogeneity and variability of wool fibres and the different techniques used for the preparation and hydrolysis of the DNP-protein. It is really surprising how and why Nature is able to maintain features of such constancy in fibres as different as wool and human hair.

The data obtained in the present study on collagen, elastin, reticulin and myosin coupled with the data of other workers on Tropomyosin, silk fibroin and Actin suggest that the fibrous proteins as a class contain only insignificant amounts of N-terminal amino acids.

## CLASSIFIED ABSTRACTS

### RAW MATERIALS

A SURVEY OF SKIN DISEASES OF CATTLE IN KENYA AND THEIR EFFECT ON THE FINISHED LEATHER. *H. F. Green, J.S.L.T.C., 42, 12, 418 (1957)* The diseases are described and illustrated as they appeared on the dry raw hides, in sections through lesions and on the finished leather. Demodicosis and streptothricosis were the most prevalent and demodicosis was the most damaging to the leather. Photosensitization, ring-worm, and mange were also found, but were relatively uncommon. A similar survey of native sheep skins is being undertaken.

### VEGETABLE TANNING

TANNING PROPERTIES OF VEGETABLE TANNING EXTRACT. *A. Yague Gil and J. Torner Ochoa (Rev. Cienc. apl., 1957, 11 40—53 via. J. Appl. Chem. 7, 10, ii-358, 1957).* Tests for evaluating the following properties of vegetable tannin extracts are reviewed: content of tanning substance; astringency; tannery index; activity of non-tannins; viscosity; specific weight; molecular weight. The factors influencing these properties and their significance for the combination of tanning with the hide are discussed.

### CHROME TANNING

THE WETTABILITY OF CHROME-TANNED LEATHER. *R. G. Milton and C. D. Pomroy, J.S.L.T.C., 42, 12, 402 (1957).* Although wettable chrome-tanned leather with high chrome contents can be made by degreasing the pelt thoroughly before tanning, the leather becomes water-repellent during ageing, presumably owing to the formation of more basic chrome complexes. The changes in wettability occur much more rapidly at higher temperatures and, if the leather is thoroughly dry, acid escapes from the surfaces of the leather, leaving a highly water-repellent film whose thickness is only of the order of 0.1 m.m. or less. The leather inside, from which acid cannot escape, remains as wettable as blotting paper. Since the changes in the chrome complexes are probably also associated with the changes of feel which occur during ageing or intensive drying, studies of the rates at which fat-

free leather develops water-repellency may be important for other reasons. The results of some experiments of this kind are reported.

### OTHER TANNAGES

STUDIES ON TANNING WITH MONOLAYER. *H. Kakiyama and H. Kamei (Rep. Tokyo chem. industr. Res. Inst., 1957, 52, 17—20; via. J. Appl. Chem. 7, 10, ii-358, 1957).* It was found that gelatin could be spread to a monolayer, using aq. NaCl or  $(\text{NH}_4)_2\text{SO}_4$  as substrate. The monolayers thus obtained were compared, in respect of behaviour and structure, with ovalbumin monolayers. The surface pressure of the gelatin monolayer is greater when the area is 0.9 sq. m/mg. whilst that of the ovalbumin monolayer becomes higher when the films are compressed. Compressibility/area curves suggest that the ovalbumin monolayer collapses.

### THEORIES

STRUCTURE OF ELASTIN. *G. N. Ramachandran and M. S. Santhanam (Proc. India Acad. Sci., 1957, 45A, 124-132; via. J. Appl. Chem., 7, 10, ii-358, 1957).* The structure of elastin and its relationship to collagen is discussed. On the molecular level, elastin is analogous to collagen and is built up on a triplechain helical arrangement of amino-acid residues. A material yielding an X-ray diffraction pattern very similar to elastin is obtained by treating collagen with  $\text{Ca}_2\text{Cl}_2$  solution. The relationship between elastin and collagen in biological systems is discussed.

\*COLLAGEN REACTIVITY WITH METALS. *Dr. Rubin Borasky, Nucleonics Division, General Electric Co., Washington, D. C. via Lea. Mfrer, 74, 10, 12 (1957).* Collagen fibrils were treated with compounds containing chromium, strontium, zirconium, silver, barium, tungsten, osmium, mercury, lead, uranium and plutonium. The reactivity or combination of the collagen with these metals was determined by electronoscopic observation and shrinkage temperature measurements. Collagen combines with chromium, zirconium, tungsten, osmium, uranium and plutonium, provided the reaction medium has an acid pH and the metal is part of an anionic complex, or if the metal is capable of reacting with specific reactive groups of the collagen polypeptide

\*Abstracts of some of the papers Presented at International Conference at Rome.

chains. In the latter case, the reaction is independent of pH. Simple cations such as Sr, Ag, Ba, Pb, and  $\text{UO}_2$  do not react with collagen. The significance of these results is discussed as a basis for the formulation of a simple hypothesis for mineral tannage.

\* REACTIVITY OF KERATIN. *J. B. Speakman, D.Sc.F.R.I.C., F.T.I., Dept. Textile Industries, The University, Leeds, England via. Lea. Mfrer, 74, 10, 11 (1957).* There are many interesting analogies between keratin and collagen, and the following items, selected from recent research on keratin, have been chosen for discussion in the belief that they may be found valuable in relation to leather manufacture.

It has long been known that wool is variable in composition, but the extent of the variation is far more serious than was at first supposed. The fibres comprising a single staple differ from one another in plasticity, swelling power, and amino-acid composition. Just as in the case of silk, the amino-acids with short side-chains are concentrated in the crystalline regions, while amino-acids such as tyrosine, lysine and arginine, which have large side-chains, are to be found in the amorphous regions. In fact, the amino-acids, with large side-chains are responsible for the molecular disorder in the amorphous regions. A measure of the crystalline/amorphous ratio of any type of wool can be obtained by either (a) Hailwood-Horrobin analysis of the water-adsorption isotherm or (b) determining the gain in dry weight of a sample after all replaceable hydrogen has been exchanged for deuterium by exposure to saturated  $\text{D}_2\text{O}$  vapour. The second method is much less tedious than the first and is therefore preferred for use with wool.

It has been found that differences in plasticity and swelling power of different types of wool are closely connected with differences in the proportions of crystalline and amorphous material present. Such differences have an equally important bearing on the reactivity of the fibres, especially as the compositions of the crystalline and amorphous phases are different. The use of cross-linking agents to reinforce wool fibres, in processes which are closely related to tanning processes is handicapped by the fact that the structure which is most desirable to reinforce is the amorphous phase, and simple cross-linking of disordered polypeptide chains is not likely to be very effective in modifying such

properties as strength, ease of extension, and resistance to wear. It is not surprising, therefore, that cross-linking agents like formaldehyde and di-epoxides have such little effect on the properties of wool fibres. By analogy with these and other results it is believed that a knowledge of the crystalline amorphous ratio of different types of collagen would be of value in interpreting differences in behaviours and reactivity.

If, then, simple cross-linking agents are not effective in reinforcing the amorphous phase, how is this desirable end to be achieved. Polymerisation reactions seem to provide the best answer. It has now been shown that the effectiveness of benzoquinone in reinforcing wool is due mainly to the formation of a graft-copolymer, and the work in this field seems to clear up some of the controversy associated with the action of benzoquinone as a tanning agent. Other methods of reinforcing wool consist in polymerising monomers within the amorphous phase, preferential internal polymerisation of the monomer being ensured by anchored catalysts of various kinds. Processes of a similar kind should be capable of ready application in the manufacture of leather.

## TESTING

**\*DETERMINATION OF SEDIMENTS BY WEIGHT IN TANNING EXTRACTS.** *Prof. Ing. J. A. Sagaschen Versuchanstalt fuer Lederindustrie, Wien, Oesterreich via Lea. Mfrer, 74, 10, 14 (1957).* In spite of many years' efforts to determine in an objective and for the tanner satisfactory manner the 'insoluble matter' and the mud formation in tanning extracts, no unitary method for such determination is up to now existing.

By the really very simple method of mud determination by means of a graduated cylinder at different concentrations of solution, quite different results are obtained even when all prescriptions are strictly observed. While the results do rather agree with each other when the tests are carried out by the same laboratory, such results often vary considerably when obtained by testers operating in different localities. Such variations are above all due to the diversity of temperatures and to the different composition of the water used for dissolving extracts. Such considerable differences of results which have often caused serious divergences between sellers and buyers, are reduced to a minimum by the

new method of determination by centrifuging described by the author.

For many years such method of determination of sediments by weight by means of centrifuging which has repeatedly been proposed and even applied in a continuous manner in many tanneries, has been amplified and made perfect so that it is now proposed for international application.

The method consists of preparing on well-determined conditions, various tanning extracts solutions, a fixed quantity of each of which is centrifuged for an exactly prescribed period and at a fixed number of turns per minute, and then the dry residues of the solutions are tested before as well as after centrifuging. The difference is indicated as weight percentage upon the lost extract quantity in question and serves to measure the probable and quantity to be reckoned with during liquefying of extracts.

In each case, by means of the simple sedimentation method as well as by the newly proposed centrifuging method, one tries to ascertain the loss which occurs during the liquefying of extracts. The real loss in practice can, however, be determined neither by the one nor by the other method, as the way of using the tanning extracts in the single tanneries is a very individual one, and a unitary treatment is not possible to be realised in practice.

The method of determining tanning extract sediments by weight as proposed above, offers the possibility of a quality appraisal necessary from the commercial and the technical point of view, with satisfactory reproducible values.

**\*NOTE ON THE COMPOSITION AND ANALYSIS OF SEMI-CHROME LEATHER.** *Prof. Dr. Ing. V. Kubelka Brno. Tchechoslovakia via Lea. Mfrer, 74, 10, 13 (1957).* The determination of chromium in semi-chrome leather presents certain difficulties which can be overcome by means of the wet oxidation proposed in the paper. The difficulty of the present official method is the expression of the results. Comparable results are obtained when we take the hide substance as the basis for the calculation, f.i.:

$$\text{Degree of tannage} = \frac{\text{Leather substance} - \text{Hide substance}}{\text{Hide substance}} \cdot 100$$

The 'degree of tannage' of semi-chrome leather must comprise the degree of both chrome and vegetable tannages. To be able to do this we must know the chromium content in the 'chrome tanning substance' in leather. By analysing 25 chrome leather samples of Czechoslovakian origin, the Author determined the average chromium content of 36.6% Cr<sub>2</sub>O<sub>3</sub> in the chrome tanning substance. Some experimental work concerning this problem has been done. Some results obtained with leather samples tanned in defined chrome baths are given.

\* LIMITS OF RELIABILITY OF THE PHYSICAL TESTS OF A RAPIDLY TANNED SOLE LEATHER. Prof. Daff. Enrico Sinoncini, *Stazione Sperimentale Industria Pelli e Materie Concianti, Napoli, Italy—via Lea. Mfrer*, 74, 10, 12 (1957). Leather is not a homogeneous material, and it is well known that its physical properties differ from point to point. Sampling leather for physical tests, one has to observe strictly the specifications prescribed by the official methods; notwithstanding the observation of such prescriptions, it may happen that at the various points of the sample drawn in this manner, values will be obtained which do not perfectly agree with each other, and which differ within small limits. When the control is regarding a leather sample taken from an indefinite point of the butt's surface, the result may by chance agree with the average value found examining the sample drawn accordingly to the prescriptions, but mostly it is very far from it.

The following properties of leather have been considered: thickness, density, tensile strength, firmness, stiffness, air and water-permiability, water-absorption, and these properties have been examined all over the surface of the butt. The values determined at the different points of the whole butt and of the sample drawn according to the analysis specifications have allowed to state by means of the comparative test, of which extension are the errors that can be committed each time.

The researches have allowed to conclude that by the physical tests, as they are carried out nowadays, if executed with sufficient strictness, results are obtained which may give with fair approximation a good idea of the tested leather.

THE PROPERTIES OF LEATHERS FROM THE SCIENTIFIC POINT OF VIEW. W. Grassmann. *Das Leder*, 9, 1 (1958). The special properties of leather, which distinguish from textiles,

felts, sheets of synthetic material, etc., are ascribed to the growth structure of the skin which forms a network of fine, inter-connected fibres. Properties that are characteristic of leather are, for example, porosity, water vapour absorption, initial tear strength, bending fatigue resistance, deformation etc. It is the aim of leather science to characterise precisely these and other valuable properties of leather; to provide stimulus for improvement in the quality of leather; and to evolve methods of test.

\* THE DETERMINATION OF SLUDGE IN TANNING SOLUTIONS. Dr. Ing. I. Radic, Zagreb. *Jugoslaviya via Lea. Mefrer*, 74, 10, 13 (1957). The conditions of sedimentation and centrifuging methods are theoretically discussed. In order to obtain the best results with the centrifuging method, experiments were made under varying working conditions, i.e., time and speed. In order to obtain accurate results, the determinations were made on the same strength of solution for each extract. The experiments show that sensitivity of the various extracts to differences in time and speed of centrifuging (the important factors in selecting working conditions).

Comparative results of the centrifuging and sedimentation are shown and from these results it is possible to draw a reciprocal relationship between the weight and volume percentages of the sludge.

On the basis of these experiments it appears that a method can be suggested for the evaluation of the quality of extracts. It is proposed to determine the sludge by the centrifuging method.

NITROMETRY OF METHOXYL GROUP. Kiyoshi Takiura, Yoshio Takino and Shihoko Harada (Pharm Fac, Osaka Univ., Hotarugaike, Toyonaka, Osaka) *J. Pharm. Soc. Japan*, 1956, 76 (11), 1328-1330 via *Anal. Abst.* 4, 10 (1957). The sensitivity of the determination of methoxyl groups by Elek's method is increased by the use of nitrometry in place of iodimetry at the final stage. Methyl iodide is absorbed in a mixture of Br and acetic acid in a stoppered glass tube, and made up to 20 ml with 50% acetic acid (5 ml) and 20% Na acetate soln. An aliquot is treated with formic acid (a few drops) to reduce Br and submitted to nitrometry with KI in saturated NaCl soln. (6 ml) and hydrozine. The presence of an excess of formic acid results in low values, owing to the reduction of HIO<sub>3</sub>.

ESTIMATION OF MELAMINE IN PRESENCE OF GUANIDINE. R. M. Engelbrecht, H. E. Moseley, W. P. Donahoo and W. R. Rolingson (Monsanto Chemical Co., El Dorado, Ark., U.S.A.) *Anal. Chem.* 1957, 29 (4, Part I, 579-580)—via *Anal. Abst.* 4, 10, (1957). Three gravimetric methods are described (i) Melamine is pptd. under acid conditions, as the picrate in the presence of guanidine; the temp of the pptn. is controlled. (ii) The guanidine is eliminated by pptn. as the picrate under alkaline conditions and the melamine is then determined as the picrate in acid media (iii) The melamine is determined by extraction with conc. NaOH soln. Reasonable agreement was attained between the methods.

DETERMINATION OF MELAMINE BY PRECIPITATION WITH CYANURIC ACID. L. Nebbia, F. Guerrieri and B. Pagani (Montecatini Res. Inst. Novara, Italy) *Chim. e Ind.*, 1957, 39 (2) 81-83, via *Analytical Abstracts* 4, 10, (1957). A neutral soln. of melamine (0.2%) in the presence of K acetate is treated with a soln. of cyanuric acid (0.1%). The ppt. of melamine cynaurate is filtered off, dried at 105° to 110° and weighed. Alternatively, the soln. of melamine may be determined within 0.1% gravimetrically or 0.3% conductometrically. Ammeline, ammelide or urea do not interfere. Conversely, cyanuric acid may be determined.

SEPARATION AND DETERMINATION OF MICROGRAM QUANTITIES OF ZIRCONIUM. C. E. Bricker and G. R. Waterbury (Los Alamos Scientific Lab. N. M.) *Anal. Chem.* 1957, 29 (4, Part I), via *Anal. Abst.* 4, 10 (1957). A method is described for the determination of Zr in plutonium alloys in the range 0.01% to 1% on samples containing 15 to 100 g of Zr. The sample is dissolved in acid and the Zr is pptd. by addition of hydroxylamine hydrochloride and p-bromomandelic acid. The ppt. is separated, washed, then heated with 70% HClO<sub>4</sub> and conc. HNO<sub>3</sub> to destroy organic matter. The Zr is re-pptd. and dissolved in the same manner, the soln. is diluted with 2M HClO<sub>4</sub> and chloranilic acid is added. The extinction at 350 m is measured against a blank and compared with a calibration curve. The reproducibility is within 3% when 15 or more of Zr is present; above 25 the average recovery was 98.4% and the standard deviation, estimated from 20 results in the presence of other ions likely to occur, is 3.4%. The double pptn. as mandelate removes most interferences. Large ratios of U give low results; Hf is assumed to interfere. A single determination takes 4 to 5 hr; 12 can be performed simultaneously in about 6 hr.

PHOTOMETRIC DETERMINATION OF CHROMIUM WITH ETHYLENEDIAMINETETRA-ACETIC ACID. W. Nielsch and G. Boltz (Laucherthal/Hohenzollern, Germany) *Metall.* 1956, 10 (19-20), 916-920 via *Anal. Abst.* 4, 10, (1957). A photometric method for the determination of Cr<sup>3</sup> depends on the formation of a violet complex with EDTA (diesodium salt) soln. Procedure—The soln. of Cr<sup>3</sup> is boiled with a soln. of EDTA (diesodium salt) (8%) for 1 min. the pH is adjusted to 3.5 and the colour developed is read at 550 m in a 1-cm cuvette in an Elko II spectrophotometer with an S55E filter.

COLORIMETRIC MICRO-DETERMINATIONS OF MAGNESIUM. J. Carles (Catholic Inst. Toulouse, France) *Bull. Soc. Chim. Biol.* 1957, 39 (4) 445-451 via *Anal. Abst.* 4, 10 (1957). To a sample soln. (6 ml) containing 3 g of Mg per ml add 0.1% gelatin soln. (1 ml) saturated aq. CaSO<sub>4</sub> soln. (1 ml) and 0.05% aq. Titan yellow soln. (1 ml). Shake well and add 5 N NaOH (1 ml). After 10 min. read the extinction at 540 against a water blank treated similarly. Beer's law is followed with amounts of Mg up to 3 per ml of test soln. and a standard curve is not required.

SPECTROPHOTOMETRY IN ANALYSIS OF OILS AND FATS. N. H. E. Ahlers (*Paint Technol.* 1956, 20, 237-241, 277-283, 324-328, 357-360, 401-404; 1957, 21 6-8, 13) via *J. Appl. Chem.* 7, 10, ii-352 (1957). The applications of u. v. and i. r. spectrophotometry to the study of the composition of oils and fats and their geometrical isomerism, the determination of component fatty acids, and the examination and analysis of oxidized, polymerized and copolymerized oil products are reviewed. The determination of trace metals by visible spectrophotometry and flame photometry, the u. v. spectroscopy of the rosin acids and the possibilities of Raman spectroscopy in oil analysis are also considered.

## GENERAL

THE MIGRATION OF SALTS IN LEATHER. R. G. Mitton, *J.S.L.T.C.*, 42, 12, 424 (1957). Experiments are described showing that when solid sodium chloride or magnesium sulphate is in contact with air-dry chrome—or vegetable-tanned leather dips in a salt solution, movement of salt and growth of salt crystals on the exposed leather can occur very rapidly; the movement of the salt appears to be due entirely to capillary flow of salt solution, followed by evaporation, and the presence of liquid may be essential to the

formation of salt spues. The migration of salt is very dependent on the nature of the vegetable tan, and appears also to depend on the presence or absence of oil in the leather, the nature of the salt, and whether conditions favour evaporation.

### PATENTS

**TANNING (COMPOSITION)** *Boehme Fettchemie G.m.b.H.* (B.P. 755, 331, 15.1.54 Ger., 17.1.53) via *J. Appl. Chem.*, **7**, 10, ii-359, 1957). A composition, suitable for use in the brush-tanning of animal skins and hides, comprises an aq. emulsion containing non-sulphonated mineral, vegetable or animal oil; anion active, cation-active, or non-ionic emulsifying agent; inrg. tanning agent; and a water-sol. derivative (caster or amide) of a poly-alkylene oxide wax (mol. wt. 2000). Thus, a polyethylene oxide wax (mol. wt. 75,000) completely esterified with stearic acid, is dissolved in water, followed by cation-active material prepared from octadecyl chloride and  $(CH_2)_7N$ , and 50 % Na alkyl (12-18 C) sulphate paste, then sperm oil is stirred in, to provide an emulsion to which NaCl and Cr tanning solution may be added without creaming.

**METHODS OF MANUFACTURING AROMATIC SYNTANS.** *G. Reich, Das Leder*, **9**, 1 (1958). Methods of manufacture are briefly outlined of the three basic types of aromatic syntans quoted in the title. The actual condensation process is followed by finishing processes such as purification, pH adjustment, and conversion to a dry state. The dependence of the tanning behaviour of the syntans upon their basic composition is shown in tables.

## NOTES & NEWS

### REVOLUTIONARY CLEANSING PROCESS

Tremendous interest is being shown by British shoe manufacturers in a new process for the cleaning and renovating of suede and leather articles.

At its model plant in Northampton, a new firm, Suedecraft (Great Britain) Ltd., has carried out highly successful tests on soiled suede shoes. The operation was carried out by the spraying of a chemical through the suede by varying air pressure. [Through *Australasian Lea. World* **53**, 11, 7 (1957).]

### BETTER METHODS FOR CURING HIDES

Hides tanned after curing by a new curing method developed by a New Jersey (U.S.) firm have resulted, in lower costs for tanning and shipping and have also improved the quality of the leather, it is reported. The improved method for curing newly slaughtered hides and removing the hair has been developed by the Apex Chemical Co., Inc. The whole process of curing takes from six to 48 hrs. and employs chemicals, one of which is an antibiotic. Both chemicals were developed by the Company. [Through the *Australasian Lea. World* **53**, 10, 17 (1957).]

### SOME ASPECTS OF THE TRENDS IN EUROPEAN LEATHER INDUSTRY

Dr. Bosse of Farben Fabrickan Byer, Leverkusen, West Germany, and Dr. Schultz, Director of Chika (Private) Limited, visited the Institute on Thursday the 16th January, 1958. Dr. Bosse addressed the members of the technical staff of the Institute. Earlier Dr. Y. Nayudamma, Assistant Director-in-Charge of the Institute, welcomed the distinguished visitors. Mr. Desai, Director of Amritlal and Company and his colleagues, who visited the Institute, were also present. Dr. Bosse thanked Dr. Nayudamma for giving him an opportunity to address the staff.

Dr. Bosse in the course of his address said that the European leather industry is now facing a stiff struggle for existence. This is illustrated by the fact that in West Germany alone within the last five years, about fifty tanneries had to close down. There are two causes for this. One is the decrease in the possibility of export and the other, the decrease consumption in various countries. The other reason is that other

materials such as rubber and plastics have replaced leather in various uses. The European leather industry however, in spite of this, did not remain idle. It went into brisk activity in co-operation with its allied industries. This activity is characterised by the following points:

Maximisation and modernisation of production with the aim of increasing the generally very low profits, checking rising production costs. This covers not only installation of time saving machinery, economic finishing equipment as well as planning of production by close co-operation with the chemical industry. Also the leather industry has to apply itself to new demands due to the changing manufacturing methods of the shoe manufacturers according to changes in fashion. The sole leather industry has recently been particularly affected by its ground being won by other sole materials. The sole leather manufacturers have to pay high bank rate and considerable amount of capital is tied down in the manufacture of sole leather.

Dr. Bosse stated that they were studying at Leverkusen the manufacture of chrome retan sole leathers. This is done by chrome pre-tannage followed by tanning with syntans. It is possible to get a firm type of sole leather by this method. It is also possible to get a flexible sole leather. The present trend in Europe is to have flexible sole leather. Impregnation of sole leather in order to improve its resistance to wear and water is also being done. The aim of this development is to make the leather compete successfully with rubber. Recently combination tanning methods for sole leather manufacture are also in use. He also said that a great amount of practical work in recent years has been done in regard to shrunk leather. Also the corrected grain upper leather is also in the market for a number of years. Then he described the processes for the manufacture of shrunk leather. His opinion with regard to the use of binders is that there will be never a universal type of binder. The solution of the problem must be found in the intelligent use and the combination of binders.

Speaking about colouring of the leathers, Dr. Bosse said that there has been a great demand for two tone shade.

Finally Dr. Bosse said that he has not covered all the problems in the European leather industry but only mentioned certain trends and thanked them for their kind attention.

After the talk, Dr. Bosse answered a number of questions on European Leather Industry.

TOTAL EXPORTS OF E.I. TANNED SKINS AND HIDES FROM MADRAS PORT, DURING THE YEAR 1957

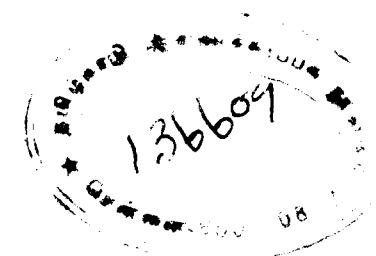
| Names of Exporters                                                                     | Countries | C.H.  | B.H. | Cow Calf | Buff Calf | Sheep | Goat | TOTAL |       | TOTAL |       |
|----------------------------------------------------------------------------------------|-----------|-------|------|----------|-----------|-------|------|-------|-------|-------|-------|
|                                                                                        |           |       |      |          |           |       |      | Hides | Skins | Hides | Skins |
| 1. The India Leather Corporation (P) Ltd. . .                                          | UK        | 481   | 6    | 146      | 98        | 1271  | 1134 | 731   | 24.5  | —     | —     |
|                                                                                        | CONT      | —     | —    | —        | —         | 467   | 1360 | —     | 1827  | —     | —     |
|                                                                                        | JAPAN     | —     | —    | —        | —         | 603   | 8    | —     | 611   | —     | —     |
|                                                                                        | USA       | —     | —    | —        | —         | —     | 4    | —     | 4     | —     | —     |
| 2. Gordon Woodroffe & Co. (Madras) Ltd. . .                                            | AUST      | —     | —    | —        | —         | —     | 2    | —     | —     | 731   | 4849  |
|                                                                                        | UK        | 1982  | 110  | 25       | 164       | 120   | 465  | 2281  | 485   | —     | —     |
|                                                                                        | CONT      | —     | —    | —        | 60        | 528   | 1090 | 60    | 1618  | —     | —     |
|                                                                                        | USA       | —     | 198  | —        | 309       | —     | 157  | 507   | 157   | —     | —     |
| 3. Simson & McConechy Ltd. . .                                                         | AUST      | —     | —    | —        | —         | —     | 2    | —     | 2     | —     | —     |
|                                                                                        | CANADA    | —     | —    | —        | —         | —     | 10   | —     | 10    | 2848  | 2272  |
|                                                                                        | UK        | —     | —    | 1        | 9         | 823   | 613  | 10    | 1436  | —     | —     |
|                                                                                        | CONT      | —     | 5    | 40       | —         | 96    | 125  | 45    | 221   | —     | —     |
| 4. A. T. B. Mehtab Majid & Co . .                                                      | USA       | —     | 260  | 10       | 40        | —     | 91   | 310   | 91    | 365   | 1748  |
|                                                                                        | UK        | —     | —    | —        | —         | 506   | 1031 | —     | 1537  | —     | —     |
|                                                                                        | CONT      | —     | —    | —        | —         | 5     | 38   | —     | 43    | —     | —     |
|                                                                                        | JAPAN     | —     | —    | —        | —         | 25    | —    | —     | 25    | —     | 1605  |
| 5. Wheatley & Yate . .                                                                 | UK        | 929   | —    | 39       | 120       | 205   | 997  | 1088  | 1202  | —     | —     |
|                                                                                        | CONT      | —     | —    | —        | 24        | 1     | 187  | 24    | 188   | 1112  | 1390  |
| 6. The East Asiatic Co. (India) Pt. Ltd. . .                                           | UK        | —     | —    | —        | —         | 1037  | 106  | —     | 1143  | —     | —     |
|                                                                                        | CONT      | —     | —    | —        | —         | 35    | 105  | —     | 140   | —     | —     |
|                                                                                        | JAPAN     | —     | —    | —        | —         | 87    | —    | —     | 87    | —     | 1370  |
| 7. The South Indian Export Co., Ltd. . .                                               | UK        | 2437  | 45   | 270      | 133       | 248   | 594  | 2885  | 842   | —     | —     |
|                                                                                        | CONT      | —     | —    | 5        | 1         | 21    | 372  | 6     | 393   | —     | —     |
|                                                                                        | USA       | 2     | 813  | 25       | 110       | —     | 98   | 320   | 98    | —     | —     |
|                                                                                        | CANADA    | —     | —    | —        | —         | —     | 22   | —     | 22    | 3211  | 1355  |
| 8. P. Krishnaswamy & Co. . .                                                           | UK        | 3489  | 40   | 435      | 211       | —     | —    | 4175  | —     | —     | —     |
|                                                                                        | CONT      | 10    | —    | 6        | 2         | —     | —    | 18    | —     | —     | —     |
|                                                                                        | USA       | —     | 15   | —        | —         | —     | —    | 15    | —     | 4208  | —     |
| 9. K. O. Mohamed Sulaiman & Co. . .                                                    | UK        | 2039  | —    | 257      | 305       | —     | —    | 2631  | —     | —     | —     |
|                                                                                        | CONT      | 3     | —    | —        | —         | —     | —    | 3     | —     | 2634  | —     |
| 10. T. D. Moorthy & Co. . .                                                            | UK        | 2531  | 9    | 3        | 31        | —     | —    | 2574  | —     | 2574  | —     |
|                                                                                        | —         | —     | —    | —        | —         | —     | —    | —     | —     | —     | —     |
| 11. Merit M. E. Ebrahim & Co. . .                                                      | UK        | 1730  | 29   | 275      | 70        | —     | —    | 2104  | —     | —     | —     |
|                                                                                        | CONT      | —     | —    | 3        | —         | —     | —    | 3     | —     | —     | —     |
|                                                                                        | USA       | —     | 10   | —        | 4         | —     | —    | 15    | —     | 2122  | —     |
| 12. Best & Co., Ltd . .                                                                | UK        | 1559  | —    | 85       | 27        | 23    | 279  | 2071  | 515   | —     | —     |
|                                                                                        | CONT      | —     | —    | —        | —         | —     | 2    | —     | 2     | 2071  | 517   |
| 13. Miscellaneous shippers (Below 1000 bales of skins or 2000 bales of Hides each) . . | UK        | 15622 | 249  | 1950     | 2783      | 263   | 5638 | 20604 | 8330  | —     | —     |
|                                                                                        | CONT      | 21    | —    | 16       | 9         | 65    | 3257 | 46    | 3923  | —     | —     |
|                                                                                        | JAPAN     | —     | —    | —        | —         | 99    | 25   | —     | 1024  | —     | —     |
|                                                                                        | USA       | —     | 214  | 20       | 146       | —     | 642  | 380   | 642   | —     | —     |
|                                                                                        | AUST      | 5     | —    | —        | —         | 12    | 106  | 5     | 232   | 21035 | 14151 |

## VISITORS

| <i>Name</i>                                                                                               | <i>Date of visit</i> |
|-----------------------------------------------------------------------------------------------------------|----------------------|
| Mr. A. E. Inkumsol, M. P. Minister for Housing,<br>Ghana Grade Mission                                    | 26-12-1957           |
| Hr. C. B. K. Baah, Member of Ghana Parliament<br>Mr. Odeneo Alunokwa                                      | "                    |
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| Mr. Hareram Chakrabarthy, Dy. Director, Small<br>Industries Service Institute, Calcutta                   | "                    |

|                                                                                                 |            |
|-------------------------------------------------------------------------------------------------|------------|
| Mr. V. Satyanarayanan, Jt. Director of Industries & Commerce, Hyderabad                         | 28-12-1957 |
| Mr. G. P. Chaturvedi, Asst. Director, S.T.S.I., New Delhi                                       | "          |
| Mr. V. R. Mudholkar, Principal, Khadi Gramodyog, Mahavidyala, Krishnarajapuram, (Bangalore)     | "          |
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| Mr. Chhotey Lol Sharma, Try. Section, Khadi & V. Ind. Commission                                | "          |
| Mr. S. B. Chatterjee, Asst. Director, S.I.S.I., Calcutta-16                                     | "          |
| 30 delegates from the 7th Annual Anatomical Society conference                                  | 29-12-1957 |
| 7 delegates from Poona, the All India Educational conference                                    | 30-12-1957 |
| Swami Pranavananda (of Holy Kailas and Manasa-lovar) F.R.C.S. Himalayan Explorer, Almora (U.P.) | 3-1-1958   |
| T. N. Krishnaswami, Santhome, Madras-4                                                          | "          |
| Mr. K. T. Achaya, Regional Lab., Hyderabad                                                      | 4-1-1958   |
| Mr. K. H. Patel, Indosal Chem. Corpn. Ltd. Bombay                                               | 6-1-1958   |
| Mr. M. K. D. Sanghvi, Dept. of Chem. Tech. Matunga, Bombay                                      | 7-1-1958   |
| Dr. H. J. Babha                                                                                 | "          |
| Dr. S. Kaul, Director, N. B. G. Laboratory, Lucknow                                             | "          |
| Mr. R. Satyanarayan                                                                             | 8-1-1958   |
| Mr. O. V. Abid Ali                                                                              | "          |
| Dr. M. M. Das, Dy. Minister, Education, New Delhi                                               | "          |
| Dr. W. Railston, (Adviser to U.K. Colombo Plan) Mr. Y. V. Subba Rao ..                          | 9-1-1958   |
| Prof. Pikovsky and 4 others                                                                     | "          |
| Mr. I. P. Barditt                                                                               | "          |
| Mr. A. B. Dapgum; L. V. Bardine                                                                 | "          |
| Mr. K. M. Reddy and party from Bd. High School, Chittoor Dist.                                  | "          |
| Mr. M. N. Das (Jadavpur University)                                                             | "          |
| Mr. Rose M. Reid, 223, Well Street Hackney London E. 9                                          | 10-1-1958  |
| Mr. L. C. Ross (C. S. I. R. O. Australia)                                                       | "          |
| Mr. P. F. Butler (-do-)                                                                         | "          |
| Mr. Anton Peterlin                                                                              | "          |

|                                                                            |           |
|----------------------------------------------------------------------------|-----------|
| Mr. S. C. Desai, Director, Amritlal & Co., Bombay                          | 17-1-1958 |
| Mr. M. A. Esmail Thawerbhoy                                                | 24-1-1958 |
| Mr. P. Vijayaraghavan with a batch of 40 students from Vivekananda College | 25-1-1958 |
| Mr. N. R. Muniswamy, Member, the House of the People and Member, P.A.C.    | 28-1-1958 |
| Mr. A. Rangaswami                                                          | "         |
| Mr. R. K. Shirpuzi                                                         | 31-1-1958 |
| C. K. G. H. School, Chintadripet                                           | 3-2-1958  |



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