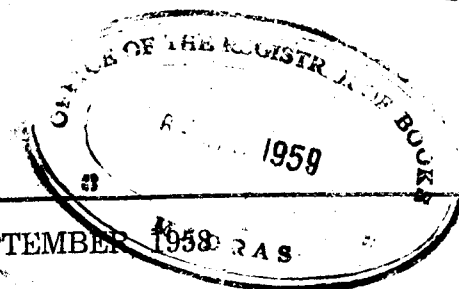


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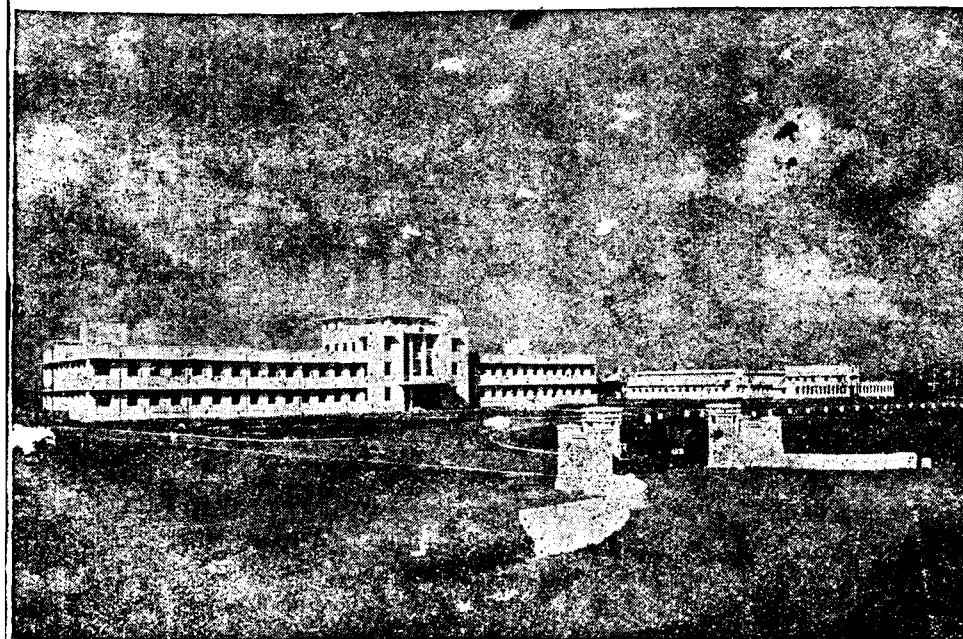


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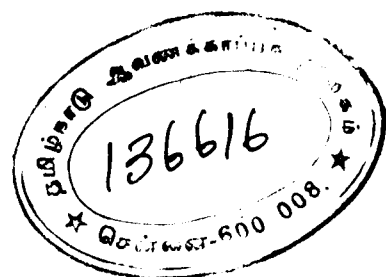
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SPECTROPHOTOMETRIC STUDIES IN LEATHER RESEARCH—PART X

**Effect of Addition of Aluminium Chloride on the Ultra-Violet
Absorption Spectra of Tanning Materials**

BY

D. RAMASWAMY & Y. NAYUDAMMA

Central Leather Research Institute, Madras

Received on 18th February, 1958

SUMMARY

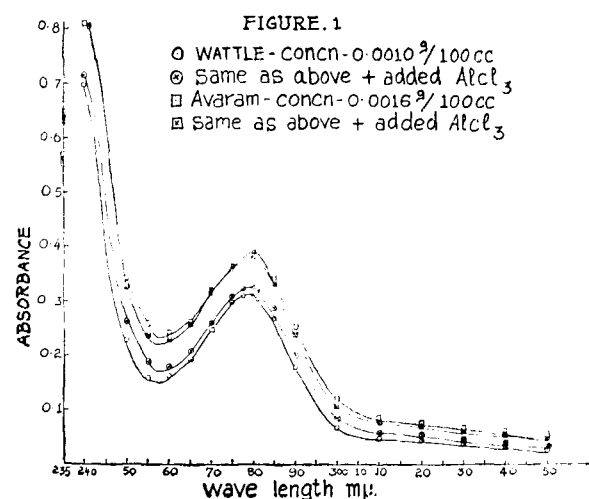
Aluminium chloride has been successfully used for distinguishing the orthodihydroxy phenolic groups by employing it as a complexing agent producing a shift in the maximum of the u-v. absorption curve. Since tanning materials contain polyphenolic groups in different positions, the effect of addition of aluminium chloride on the u-v. spectra of a number of purified tanstuffs was investigated. It has been found that the catechol tanstuffs like avaram and wattle do not give any such shift in the peak nor any change in the intensity suggesting that orthodihydroxy phenolic groups may not be present in these types of tanning materials. With pyrogallol type tanning materials like Myrob and Divi-divi, there is a shift of 35-40 m μ in the peak which is of the same order if 2 hydroxyl groups are present in the ortho position. With a few other pyrogallol type tanstuffs like Dhawa and chestnut an inflexion alone is perceived indicating the possibility of formation of similar complexes with aluminium chloride. Thus the absorption spectra with aluminium chloride added to the tanning materials throw considerable light on the positions occupied by the phenolic groups.

Aluminium chloride has been employed as a complexing agent for the ultraviolet absorption study of orthodihydroxy phenolic groups.^{1, 2} The polyphenolic group gives a maximum at 275-80m μ which gets shifted in the presence of aluminium chloride, if such dihydroxy phenolic groups are present. Vegetable tanning materials are polyphenolic bodies and their ultraviolet absorption characteristics have been widely investigated.^{3, 4, 5} Since these phenolic groups are present at various positions in the different tanstuffs it will be of interest to study the effect of addition of aluminium chloride. Crude extracts did not show up the peaks clearly due to the possible interference of acids and

salts and other impurities and therefore, extracts purified by extraction with ethyl acetate were taken for study. Aluminium chloride addition caused a lowering of pH value but it has already been found that such lowering of pH did not cause any shift in the absorption peak.

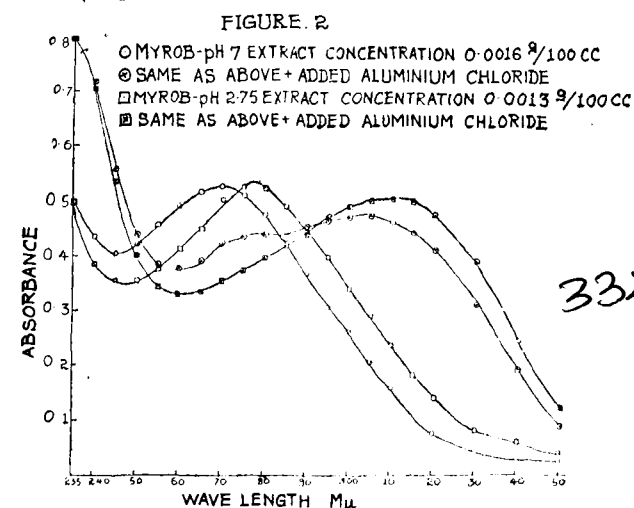
Experimental: 0.2% solutions of purified extracts were prepared and a liquor diluted with distilled water to give spectrophotometric concentrations (0.003 to 0.001%). 2 M solution of aluminium chloride was prepared and sufficient amount of the solution was added so as to give a final concentration of least 0.2 M with respect to aluminium chloride. The readings were taken with Beckmann DU spectrophotometer using 1 cm quartz cells. The results obtained are depicted in Figs. 1-4.

Discussion: The extracts taken for study are Wattle, Avaram, Myrob, Divi-divi, Sumach, Dhawa and Chestnut. It is seen from Fig. 1 that addition of aluminium chloride

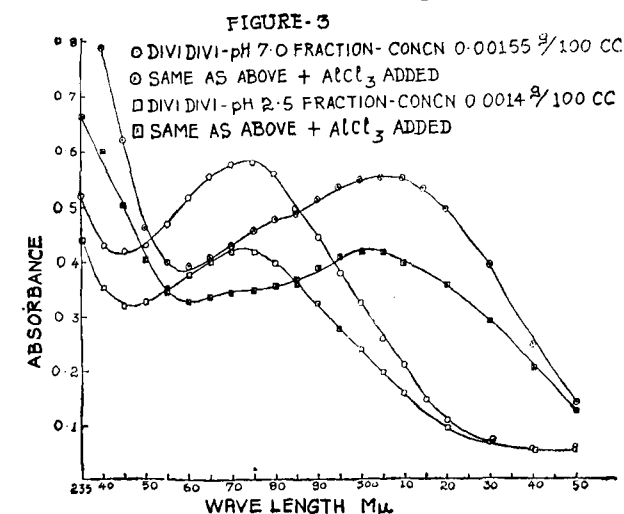


causes no change in the absorption curves of wattle and avaram. The intensities of absorption also coincide (within the experimental error) indicating that aluminium chloride has no complexing action on these bodies. It is clear that catechol tanstuffs like avaram and wattle may not contain orthodihydroxy phenolic groups. Myrob and Divi-divi

members of pyrogallol type tanning materials, purified by extraction at two different pH values (viz., 7.0 and 2.5 to 2.75) showed considerable shifts in the peak when $AlCl_3$ was added (Figs. 2 & 3). A shift to the extent of about



32 mμ was noticed in both the cases at pH values of extraction. The respective absorbance values at the peaks coincided within an error of 5% excepting for Myrob. pH 7 frac-

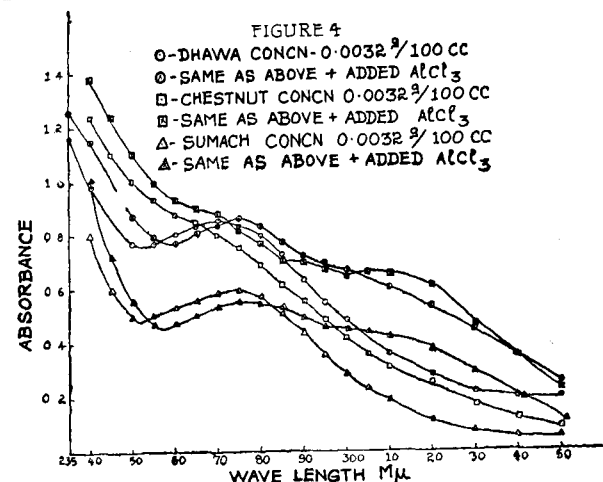


tion where the variation was upto 10%. Since the extent of the shift is of the same order as obtained in case of flavonols and other compounds¹ the presence of o-dihydroxy

phenolic groups is confirmed in the pyrogallol type tannins. Another interesting point appears to be the correspondence of the absorbance value which indicates that resonance, induction and other effects may not be affected by formation of aluminium chloride complex. It is also seen that an inflexion appears in the aluminium chloride added curve either at the same wavelength or at a slightly higher wavelength (278 m μ corresponding to the peak of the solutions as such at 270-275 m μ). The maximum in all probability can be attributed to the absorption characteristics of phenolic groups other than those of the o-dihydroxy type. The maximum is not quite pronounced and the inflexion is scarcely perceptible in Myrob. (pH 2.75) and Divi-divi (pH 7) fractions. The relative absorbance values may quantitatively indicate the percentages of the types of phenolic groups present. This aspect is not discussed in this paper since data on model compounds are not available. The figures further bring out the absorption differences between the fractions extracted at pH 7 and pH 2.5. The shift in the minimum and maximum is of the order of 5 m μ towards the longer wavelength for myrob-fraction extracted at pH 5. The first inflexion at 275 m μ is discernable only with difficulty. In the case of divi-divi, though the latter effect persists, the former, i.e., the shift in the peak and the minimum does not appear. The effect may be due to the carboxyl groups associated with tannin molecule which are free at lower pH exhibiting some activating effect on the formation of the complex with aluminium chloride.

Fig. 4 gives the curves of sumach, dhawa and chestnut. The aluminium chloride added curves have produced only an inflexion at 300-5 m μ in all these curves. However, the first inflexion corresponding to the phenolic groups other than those of the ortho-dihydroxy type is quite pronounced. With Dhawa, however, there were slight shifts (5 m μ) of this peak. The results show that these phenolic groups

may be of such a nature so as to cause interference sterically or otherwise on the stability of aluminium chloride-o-dihydroxy phenol complex thereby affecting the clarity of 305 m μ peak. The absorbance values of the first peak are also found to be higher from the inflexion values of the second peak. Chestnut however differs from all the rest by



exhibiting only inflexions corresponding to both the peaks at wavelengths i.e., 275 and 305 m μ . But it must be stated that the original chestnut itself did not give a peak but only an inflexion at about 270 m μ . This characteristic is perhaps due to the peculiar nature of both the types of ortho-dihydroxy and other types of phenolic groups which are influenced by some factors which are not clearly known at present.

Thus the entire study reveals great potentialities in the use of aluminium chloride studying the absorption characteristics of tanning substances which may throw considerable light on constitutional and positional aspects.

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RESEARCH BEARS FRUIT

Practical Demonstration No. 5

(Second Series)

MANUFACTURE OF PICKING BAND LEATHER BY THE COMBINATION SULPHUR OIL VEGETABLE TANNING METHOD*

BY

S. N. BOSE, N. R. SIKDAR & K. T. SIRKAR

Raw material: Wetsalted prime quality buff hides (65-70 lbs. weight) of non-spready stout nature, without flay cuts or grain damages like scratches, warble holes, etc., are desirable; slaughtered buff hides of prime quality (75-80 lbs.) or ox hides of similar quality and weight range or imported ox hides weighing (70-80 lbs.) or ox butts weighing 35-40 lbs., may also be used.

Soaking: The hides are soaked overnight for about 18 hours in a bath of following composition:—

Caustic Soda: 1/16-1/8% on wet salted weight

Common Salt: 3% do.

Water: 500% do.

Bleaching powder: 3/4 lbs. per 1000 lbs. of soak water.

In the case of imported ox butts, if they are found to be more fatty, caustic soda percentage may be increased to 4 oz per cent and the salt to 6%.

Next day the soaked hides are washed in two changes of plain water in a paddle and then they are rounded into butt, belly and shoulder. The butts are taken out for manu-

facture of picking band while the belly and shoulder portions may be processed into picker or lace or sole. The butts are fleshed to remove patches of flesh if any and after washing again in two changes of water are limed.

Liming: 200% water is taken and to it 5% slaked lime is added. Butts are agitated in this liquor for 10 minutes and left till the evening in it. Then they are hauled up, and put back into the liquor overnight. Next morning the butts are hauled out, half per cent sodium sulphide is added to the bath and mixed well. The butts are now agitated in the liquor and left there for two hours after which they are hauled out again and 5% slaked lime and 50% water are added. The liquor is well stirred and the hides put back and left till the evening in the liquor. In the evening, again half per cent sodium sulphide is added to the bath after hauling up the butts. The butts are then handled in the liquor and left overnight. On the third day also the liquor is strengthened in the morning with half percent sodium sulphide and again at noon with another half per cent sodium sulphide. The hides are hauled up before addition of sodium sulphide and then handled well in the liquor after the addition and left there till the evening when they are hauled up and handled again and left over night in the liquor. On the fourth day hauling of the butts, strengthening with half per cent sodium sulphide and handling the butts in the liquor are repeated. In the case of imported butts containing much of fat, half per cent sodium sulphide is again added at noon after hauling up the butts. This is omitted in the case of Indian hides. After handling the hides are left in the liquor till the evening when they are again hauled out, liquor stirred and the butts put back overnight. On the fifth day the butts are un-haired, washed for half an hour in running water in paddle, fleshed, split to 10 m.m. if necessary, washed again, scudded and weighed. The scudded butts are washed in running water for 30 minutes in a paddle and then delimed.

* Process demonstrated during August/September 1958.

Deliming: Chemicals Required:—

Ammonium sulphate: 3% on limed pelt weight.
Water: 150% do.

The butts are put in a drum (speed of the drum 5 RPM), containing the specified quantity of water and the drum is run. Ammonium sulphate dissolved in 5% water is now added into the drum which is run for one hour stopped for one hour and again run for one hour; after this the butts are left immersed in the deliming bath overnight.

N.B. If in putting the butts well immersed in the bath, the worker, has to enter the drum he should use gas mask so as to avoid being affected by the ammonia gas present in the drum.

Next day, the drum is run for a little more than an hour; by this time the deliming should be complete as evidenced by the cut edge showing no red colour with phenolphthalein. The butts are now taken out, scudded, washed in two changes of water and then pickled.

Pickling: Chemicals Required:

Sulphuric acid (66°Be): 2½-3% on limed pelt wt.
Common salt: 7½-10% do.
Water: 125-150% do.

The specified quantity of common salt is dissolved in 75%-90% of water taken in a drum. The acid is added to 50-60% of water taken separately in a vat and then the solution allowed to cool. The butts are put in and the drum run for half an hour after which time half the quantity of the acid solution is added in a slow stream and the drum is run for another one hour (speed of drum is again 5 RPM). The drum is kept stationary for one hour and again started and the remaining acid solution is added into the drum slowly and the drum is run for one hour again and rested for an hour. For the remaining part of the day till the evening, the drum is run for every 15 minutes of the work-

ing hour. In the evening, the goods are left in the pickling bath overnight, well immersed in the liquor.

Next day, the drum is alternately run and rested for one hour duration over a total time of 5-6 hours. At this stage the cut edge should show deep red colour, with methyl red indicator or yellow colour with bromophenol blue indicator. When this test is satisfied the goods are taken out and horsed up for 24 hours (the speed of the pickling drum also is 5 RPM). In summer the temperature in India goes up very much; therefore, the total pickle float may be partly made up by ice so as to help in keeping the temperature of the bath sufficiently low.

Depickling: Chemicals Required:

Hypo: 15-20% on limed pelt weight
Water: 45-60% do.

The hypo is dissolved in water in a running drum. The goods are then put in, the drum run for one hour, rested for one hour, this being alternately repeated till the evening, keeping the goods immersed in the liquor as far as possible.

N.B. If the worker, has to go inside the drum to immerse the goods, he should be provided with gas mask to prevent his being affected by the sulphur dioxide gas present in the drum.

Next day, the drum is alternately run for one hour and rested for one hour, over a total period of 10 hours, by which time, the freshly cut edge should show an orange colour with methyl red indicator solution. The butts are then horsed up for a day and hung up overnight for sammying. The sammed butts are dry-drummed for half an hour shaved to 4 mm. substance and stuffed as follows:—

Stuffing: First Stuffing:

Beef tallow: 4-4½% on limed pelt weight
Fish oil: 4-4½% do.
Sulphated fish oil: 1% do.

The stuffing drum should be run at a speed of 15 RPM. Its temperature is raised to 45°C by passing hot air inside it. The butts are then drummed in the hot drum for 15-20 minutes and then taken out and piled. The specified quantity of tallow is melted by heating on a water bath and to it are added the sulphated and unsulphated fish oils. The temperature of the mixture is brought to 45°C and this hot mixture (Tallow and unsulphated and sulphated fish oils) is applied on the flesh and grain sides of the goods which are put back into the drum and the drum run. Remnant stuffing mixture, if any, may be put into the drum. The drum is run for two hours after which it is run and stopped alternately for half an hour till the evening. About 4 hours drumming will be possible this way, by which time the whole of the stuffing material would remain adsorbed on the leather. In the evening the butts are hung up overnight. Next day the temperature of the room in which the butts are hung up is maintained between 42 and 45°. The temperature is so maintained for 3-5 days depending upon the humidity conditions of the place. After this a second stuffing is given following the same procedure.

A second stuffing is done as follows:

The stuffing drum is heated by passing steam into it for 10-15 minutes, the condensed steam is run out, a gunny bag put in and the drum run for 15 minutes and the gunny bag taken out. The butts are now put in and the drum run again for 15 minutes; the butts are now taken out and piled. The molten stuffing mixture (tallow 4½% and fish oil 4½% on limed pelt weight) is applied on the flesh and grain sides of the goods which are now put into the drum, and the drum run. The stuffing mixture remaining, if any, is now fed into the drum. After running the drum for two hours it is stopped and run alternately for half an hour till the evening. About 3½-4 hours of drumming could be possible thus. In the evening the butts are taken out and

hung up in hot air oxidation room for 15-16 days, at a temperature of 42-45° with humidity being controlled by sprinkling water on the floor of the chamber from time to time. In ascertaining the completion of oxidation, a yellow colour present throughout in a section cut from a thick piece, the soft feel of the butt, the presence of acraldehyde denoted by its characteristic smell and the absence of predominant smell of either fish oil or tallow are taken into account. The well stuffed butts are kept under stretch for one day and then they are shaved to remove the excess fat on the surface if any.

Vegetable tanning: Before the actual vegetable tanning the butts are drummed in 300-400% of lukewarm water containing ½% Turkey Red Oil (TRO) or 2 oz. per cent of nonionic dispersing agent like Triton X-100 (ICI) or 4 oz. per cent Teepol (Burmah-Shell Co.) for two hours (Speed of the drum 10 RPM). The leathers are soaked back by this time. They are then washed in plain water and tanned as given below:

A 75° Bk tan liquor is made by dissolving 75% sulphited quebracho extract in 60-62% water (both weights based on raw pelt weight). A drum of 10 RPM speed is set in motion and the entire liquor put into it. 0.15% para-nitrophenol dissolved in a little spirit and diluted with a small quantity of water is now added into the drum. The stuffed and soaked butts are now put in and the drum run and stopped alternately for one hour till the evening. The butts are left overnight kept well immersed in the liquor. Next day, the drum is run and stopped alternately for one hour till the evening. The total working time would be about 8 hours, and by this time the butts are found to be sufficiently tanned. Now they are taken out of the tan bath.

In another drum, 300% water adjusted to pH of 4 with oxalic acid is taken. The tanned butts are run in this water of adjusted pH for 10 minutes and left well immersed in it

overnight so that the loose tannins get removed and the others get well fixed up. The next day the butts are given another wash with a change of water, scoured, washed again and slicked out, oiled up lightly with pungam oil and sammed.

The vegetable tanning may be done alternatively as follows: About 20% sulphited quebracho extract is dissolved in 80-85% water to give a 75°Bk liquor (based on pelt weight). The butts are dry-drummed for 15-20 minutes and then the liquor prepared as above is fed into the drum and half per cent Turkey Red Oil (TRO) emulsified with a little water and 0.15% paranitrophenol dissolved in a little spirit and diluted with a little water are added into the drum which is run and stopped alternately for one hour till the evening. The butts are then left immersed in the bath overnight. The subsequent operations till the sammying are the same as given above.

After sammying, the third stuffing of the following composition is given.

Fish Oil: 2½% (in summer) or 3½% (in winter)
wts. based on limed pelt wt.

Tallow: 2½% (in summer) or 1½% (in winter)
wts. based on limed pelt wt.

Stuffing is effected with the above mixture and the leathers hung up in a room of temperature 40-42°C for about a week. They are then aged for one more week before being cut into straps. Aging for a month even is preferable as better leathers are obtained. If aging is carried out in a pile, the pile should be occasionally opened and the butts shifted to new positions every day. Not more than 40-50 butts should be kept in one pile.

The leathers are now cut into straps of required dimensions.

Yield: 60-65% on pelt weight.

MANUFACTURE OF GOLD AND SILVER LEATHER*

BY

A. GANESAN

Introduction: Gold and Silver leathers have always attracted the public eye and have been used for a long time in making ladies' sandals. The old method was to paste gold and silver leaves on the prepared leather. The success depended on the skill of the operator. The method discussed below is capable of yielding high quality gold and silver leathers and needs much less skill. Full skins upto a width of 22" may be covered. Though vegetable tanned leathers also may be coated with gold and silver foils, the process detailed below is for chrome tanned kid skins only.

Raw materials: Because the metallised acetate foils are mostly available in rolls of not more than 22½" width, small skins have to be selected as raw materials. Though any leather may be coated with these foils, kid skins are generally employed because with these, the grain pattern becomes more attractive after the metal layer is put on. Leathers not having a pronounced grain will not be so attractive. Only first grade skins must be selected since any defect on the grain will be faithfully reproduced in the finished product. Hence goat skins of 24-28" length may be employed.

Process: Selected kid skins are soaked as usual for glazed kids. After soaking they are given pit liming as detailed below:

The skins are soaked in new lime liquor prepared with 10.0% shell lime (40% CaO) on the soaked, drained weight

* The process, originally covered by Indian Patent No. 55819 is now released to the trade free of cost.

of skins and sufficient quantity of water to immerse the skins. The lime liquor is sharpened by adding 0.75% sodium sulphide (60-62%). Next day morning the liquor is strengthened further by adding 0.5% sodium sulphide (60-62%). The skins are left in lime pits for three more days being handled daily as usual. On the sixth day they are unhaired, fleshed, and put in 5.0% lime strengthened with 0.25% caustic soda, on the fleshed weight.

Next day morning the skins are taken out, refleshed, washed and delimed with 2.0% ammonium sulphate. The delimed stock is scudded, washed and pickled.

Pickling is done in a drum of 8-10 r.p.m., for 1 hour in a bath prepared with 1.5% sulphuric acid and 8.0% common salt. Glauber's salt, if available may be used in the place of common salt. After pickling, the skins are tanned in the same bath by adding a quantity of molasses reduced chrome liquor, prepared in the usual manner and having a basicity of 33-1/3%, in a quantity equivalent to 2.5% Cr_2O_3 , calculated on the fleshed weight. The whole of the required chrome liquor may be added on one feed. The skins are drummed in this liquor for 4 hrs. The basicity of the bath is increased by adding 5.0% hypo dissolved in four times its weight of water. The skins are run in this bath for one hour and left there overnight. Next day morning the drum is run as usual and pH adjusted to 4.0 by adding 4.0% more hypo or 1/2% sodium bicarbonate.

The skins are there pulled out, struck out, sammied, shaved to level substance (0.5 mm.) and assorted. Those included for the gold and silver kids are separated from those considered too defective.

The selected stock is put in a drum and washed twice in cold water using 200% float on shaved weight. The neutralisation is done with 0.75% sodium bicarbonate in the usual way. The leathers are then slightly retanned

with 3.0% of wattle extract and 5.0% Baykanol NL or Tanigan Extra R for 1/2 hour in 100% float. The liquor is then drained. Those intended for gold kids may be retanned with the same blend substituting cutch extract for wattle. For gold kids it is necessary to use 0.25% of a suitable mixture of yellow-orange dyes, i.e., Supranol fast yellow and Supranol fast orange GS. The dye is exhausted with half its quantity of formic acid as usual.

The leathers are now fat liquored with 4.0% egg yolk in cold water for 1/2 hour. After fat liquoring leathers are horsed up overnight, set out next day and dried. The dried stock is aged for 3 days, then conditioned, staked and then stretched on frames with toggles so as to open out well the grain; the leathers are dried in that condition. The dried leathers are trimmed, buffed on the flesh side and are made ready for applying the foil. Leathers may be cut to more or less a rectangular pattern to suit the width of foil.

Metallized acetate foils of gold and silver are available in rolls of 100 yards and in widths of 22 1/2" and 24" respectively and so production of full pieces of gold and silver kids is made possible. Where production is not on a large scale the foils are first cut to the size of the skins by hand. Care is taken to avoid wastage in skins as well as foils. The foils are thus matched to individual leathers. The leathers are now ready to receive the adhesive coat.

The adhesive for silver kid is made up as follows :—

20% casein (Borax dissolved)	..	3 parts
Acrylic polymer emulsion like Bedacryl		10 parts
20% Gelatin	..	5 parts
1 : 1 mixture of water and formalin	..	7 parts

The adhesive is applied on the leather evenly with a smooth brush. Great care is necessary to exclude any lumps of suspended particles and dust. When the adhesive is still

moist, the metallized foil is put on leather and the assembly placed on a card board. The assembly of leather and foil is pressed under a hydraulic press using the maximum pressure but without any heat. The pressed assembly is then put over felt pads on horses and air dried. Where press is not available the foil may be laid on the leather by means of a good glass roll and slicker taking care to avoid wrinkles, folds and air bubbles.

For gold kids the same technique is followed, but the adhesive is changed as given below :

Natural rubber latex	..	20 oz.
20% (Ammonia) casein	..	50 parts.
Water	..	30 parts.

Adhesives based on butadiene, acrylonitrile, polyamide, Neoprene and other synthetic elastomers and resins also are well suited for this purpose. The non-availability at present of many of the basic ingredients severely limits the choice.

When completely dry, the top acetate foil can be peeled off. No rapid drying of the laminate should be attempted when the formulation given above is used. The leathers may be slightly stretched or hand staked or back boarded. The metal layer will be evenly laid on the leather giving a bright lustrous appearance. No glazing is required. The grain will be clearly seen if proper thickness of adhesive had been used.

Different designs may be embossed on these leathers using the ordinary embossing machine. If necessary, the thin metal layer may be protected against abrasion and scuff by spraying a clear lacquer specially made for this purpose.

The leathers are trimmed well and measured. The cost of the aluminium metallized acetate foil works out to about

8 annas per sq. ft. and that of gold foils about Re. 1.50 per sq. ft. Good foils may be obtained from firms such as Swift and Sons, Hartford, Connecticut, U.S.A., and Geo. M. Wiley & Sons, Victoria Road, Ruislip, Middlesex, U.K. Vegetable tanned leathers of suitable thickness may be also coated with the same foils by following this method, adjusting the adhesive coat.

The method described above is more economical and capable of giving better results than the old process where small foils used to be stuck on the leather.

TECHNICAL SEMINAR

Dressing of E. I. Leathers*

BY

P. S. VENKATACHALAM

The dressing of E.I. leathers is a major industry in the U.K. with quite a few tanneries depending entirely on this type of raw material.

The E.I. kips are finished into the following: Shoe upper leather, sandal leather, velvet or suede leather, lining leather, farmers' and army boots and bag and case leather. The assortment of the E.I. kips has got much significance for the dresser. A uniform tannage which does not vary from lot to lot, from region to region, and is stable to light and oxidation, will be very much liked by the dressers. However, the method of E.I. tannage varies from tannery to tannery and even if the dresser sticks to one particular brand he finds that there occur differences between packs. With shortage of vegetable tanning materials and due to the very nature of the tannage, sticking to one type of uniform tannage throughout the country is not possible. It may be mentioned in passing that leathers tanned with hydrolysable tannins are comparatively more stable, e.g., upholstery leather tanned with sumach, chestnut, etc. The factors taken into account in assorting are: tannage, size, defects, tightness, colour and stains. Tightness is a very important factor in selection and is placed above the others. As for uniformity of tannage, the foreign dresser feels that a stock tanned with purely pyrogallol tannins would be more uniformly tanned. A very short liming possibly without the use of lime might help in this connection.

* Condensed from the seminar talk given on 25th July 1958.

The E.I. goat skins are made into upper leather, morocco, semichrome kid and suede, clothing leather and lining leather. The goat skins are well suited for moroccos because of the tightness and toughness of the grain structure and are finished with nitrocellulose lacquers and glazed. Next to moroccos lining leathers from goat skins are very popular and are usually finished with resins. Suedes from goat skins are very popular for making jackets in the continent as they are tougher and more hard-wearing and comparatively stiffer. Actually the E.I. goat skins are stripped and then retanned with sumach, sweetened chestnut, myrobalan and such other pyrogallol tannins, as these confer light fastness of the leather. The occurrence of ugly spue on E.I. leathers makes glazing difficult. Use of sulphonated mineral oil for oiling appears to be a remedy for these, though not for all kinds of leathers especially for nitrocellulose finished leathers. Incorporation of chemicals preventing mildew formation either during tannage or during oiling off might be useful. The shrunk grain leather and the shrunk and printed leather are two kinds of leathers which could be, with advantage, taken up for production on cottage scale level as these are important products processed from E.I. skins.

The E.I. sheep skin is the best material for clothing suede leathers. Sheep skins of wooly sheep and the mixed types have a better drape but do not have the tough fibre structure of the hairy sheep from which the E.I. tanned skins are obtained. While E.I. tannage will dominate this particular field for sometime to come, there is scope for improvement. Since these suede leathers are dyed to pastel shades a uniformly tanned flesh side is a requisite. Very often, however, it is found after semichrome tanning that patches due to tan stains are found on the flesh side. The so-called pickling and depickling done as part of E.I. tanning, need to be further investigated in this connection.

Another trouble that is experienced is due to dents and pits found on the flesh side of the skins. These are probably caused by the crushed pieces of myrobalan nuts. Since the majority of the skins have got to be finished on the flesh side, attempts have to be made to minimise this trouble.

A few words about waterproofing of suedes may not be out of place. The real shower proof treatment is given by the jacket manufacturer himself, using chrome fat complexes and aluminium soap. However, making suedes waterproof seems to be yet in the developmental stage in U.K.

The reasons for the popularity of E.I. leathers appear to be as follows:—

(i) unique structural features of raw Indian goat and sheep skins, (ii) the vegetable tannage imparted serves not only as a means of preservation but also causes the products to lend themselves to uniformity of processing in dressing; (iii) the degreasing achieved in the vegetable tannage, (iv) the quality of craftsmanship revealed by the E.I. Tanner and (v) the clean and almost faultless flesh side obtained in these leathers.

These leathers have got some defects and disadvantages also. The Indian skins suffer from the natural biological defects usually associated with hides and skins. The stains produced in tanning bring down considerably the value of the skins. These stains may be possibly due to lime blast and faulty deliming techniques. In the U.K. caustic soda has been tried as a substitute for calcium hydroxide in liming, with promising results. While this modification deserves to be treated with a good amount of care, it may be worth investigating, for the carbondioxide formed during deliming may produce a good opening up of fibres specially suited for clothing and gloving leathers.

From the foregoing, it is evident that uniformity is the slogan so far as dressing of E.I. tanned materials is concerned. It may appear to be therefore more profitable to send chrometanned skins in the blue as cleanliness and uniformity are essential in materials intended for clothing and gloving leathers. Chrometanning takes a much shorter time and further the raw material for dichromate is available in large quantities in this country. The advantages associated with chrome tanning are: better nap obtained especially with semichrome tannage; the greater stability to light and oxidation; the very much shorter preliminary wet-work, and the greater physical strength. Chrome-tanning too has certain disadvantages, e.g., the careful control necessary in deliming, pickling and tanning so as to ensure uniform chrome content, the more elaborate and careful packing necessary with the wet leathers, and defects being rendered more obvious.

A bit of rethinking appears to be necessary on the part of E.I. trade. The E.I. tanner will have to adjust himself to the changing needs of the dresser at the other end. The purchase of kips may gradually dwindle in the future in view of the regular inflow of retan material into U.K. from the other commonwealth countries. The retan material is ready to be finished into suedes and is vastly superior to the kip in every respect. However, the economic consideration is there because E.I. tanned material is comparatively cheap because of the cheaper Indian labour. Possibly a retanned kip may hold its own in future against similar products from other countries.

TECHNICAL SEMINAR

A Systematic Study of Fungi on Tan Liquors-1

*Aspergilli**

BY

V. S. KRISHNAMURTHY

Summary

Eight species of *Aspergilli*, viz., *A. nidulans*, *A. varicolor*, *A. carneus*, *A. japonicus*, *A. niger*, *A. flavus*, *A. terreus* and *A. unguis* have been isolated from tan liquors collected from the tannery of this Institute of which four are described here.

* Summary of the talk given on 1st August 1958.

TECHNICAL SEMINAR

Economic Problems Facing the Leather Industry with Particular Reference to Raw Hides and Skins*

BY

E. GERGELY *

The economic approach to the production programme is very important. While scientific techniques have advanced rapidly, economic science has been lagging behind. In connection with the development of the Leather Industry, general aspects of the economic development also have to be considered. Leather manufacture is closely connected with the agricultural field, namely livestock and its utilisation. From the economic aspect, the main sector of leather production is rural in nature; it is less capital intensive, more labour intensive and capable of absorbing rural labour of traditional skill. Since hides are locally available, leather and leather goods could be manufactured in this country at quite competitive rates and thus earn foreign exchange.

The necessity for planning is quite well-known. The old *laissez-faire* policy has now given the place to planned economics. The object of planning should be to mobilise the resources, e.g., while it is not necessary to say how much sole leather should be produced or how much footwear should be produced, it is important to say wherefrom the hides are coming and how to improve their quality, i.e., a correct estimate of the raw materials is necessary. Integration also is important. Every activity must have its own particular field and fit in to the general economic development pattern. Actually, planning is only a means for

* Condensed from the talk given by Mr. E. Gergely, United Nations Leather Adviser in Burma, on 7th August 1958.

achieving ultimate object of raising the income and living standards. The potential needs also have to be planned. A programme of planning of leather manufacture has been given by the author in a pamphlet of his.

It is necessary to create a language of planning so that a uniform vocabulary is utilised in all the various fields of activity. The various productive and non-productive activities could be indicated by code numbers. This kind of nomenclature makes it very easy to express the capacity of the various units large and small. Estimating the national income — for the future period, the distribution of the national income and the exact account of the expenditure of the various activities, are all necessary stages in planning.

One of the important tasks in planning is to find out how investment should be controlled. It is necessary to set up a system of economic justification. From the economic point of view hides and skins occupy a very important position in planning the development of the leather industry. While there has been some amount of development in all the countries, sufficient attention has not been paid for improvement of hides and skins. No tanner was concerned as to how the quality of raw hides and skins could be improved by the proper flaying and curing. Some times use of wrong knife spoils the hides. As for preservation bleaching powder is helpful. Use of stretching frames in drying hides and skins deserves attention. In Indonesia the cocoanut fibre is powdered and converted into boards which could be used as soles.

There is no reason why India producing so much of hides and skins should not also become a potential manufacturer of leathers and leather goods.

TECHNICAL SEMINAR

Structure of Collagen*

BY

Y. T. THATHACHARI

Several structural models have been proposed from time to time for the collagen group of proteins, to explain one or other of the main characteristic features like X-ray and infra red data, amino acid sequence, hydrothermal shrinkage, etc. But no single model has been able to account for all the features at the same time. The model now proposed by the Physics Department of the Madras University appears to be the most satisfactory one so far proposed, explaining most of its characteristic features. According to these, the ultimate unit of structure, the protofibril consists of 3 helical polypeptide chains wound together into a super helix and stabilised by hydrogen bonds between CO and NH groups belonging to adjacent chains. Every third residue of each chain is in an equivalent position and hence hydrogen bonds formed repeat after every three residues. In one out of every three residues there is space for getting only a glycine residue, in the side chain, thus explaining the occurrence of glycine almost once in every three amino acid residues.

The proto fibrils aggregate to form the gross fibre by cross links between the side chains of adjacent units. The main linkage seems to be between the OH group of hydroxyproline of one unit and the carbonyl oxygen at the same level of a neighbouring unit. This is in conformity with

* Summary of the talk delivered by Mr. Y. T. Thathachari, Senior Research Assistant, Physics Department, University of Madras, on 14th August, 1958.

the observed correlation between the hydroxy-proline content and the thermal stability of various collagens.

The structure has an axial repeat of 28.6 Å and the layer lines of the wide angle X-ray pattern are neatly indexed with this repeat. The transform of the structure agrees broadly with the X-ray diffraction data. The structure also explains the observed infra red dichroism of collagen.

On the basis of the proposed model, a thermal shrunk collagen and gelatin are supposed to be formed by the rupture of inter proto fibrillar cross links. The triple chain units themselves remain intact but take a highly folded configuration. Drastic thermal treatment leads to breakdown of the triple helix unit; the X-ray data support these views.

The main features of the proposed structure appear to be more or less established and attempts are now being made to work out the further details like distribution of side chains, exact mode of aggregation of units, the number of hydrogen bonds etc.

CLASSIFIED ABSTRACTS

RAW MATERIALS

PROTECTION OF DRIED HIDES AND SKINS. R. L. Sykes. *Colonial Plant and Animl Prods. (Gt. Brit.)* 4, 97-109 (1954); *J. Appl. Chem. (London)* 5, i-109 (1955); *Chem. Abst.* 52, 8601 (1958). Treatments designed to protect dried hides against damage by beetles, molds, and bacteria comprised immersion, for various times, in a variety of insecticides, fungicides, and bactericides at various strengths. The hides treated were either 'green,' i.e., from freshly killed goats, or dried 'unarsenicated' skins; the chemicals used included ZnCl_2 , Na_2SiF_6 , Coricide B, Santobrite (Na pentachlorophenoxide), Shirlan NA, *p*-nitrophenol, Dieldrex 15, Gammexane, Na_3AsO_3 , and Vantox A (10% cetyltrimethylammonium bromide). No single treatment gave over-all protection. Against insects, Na_2SiF_6 , Dieldrex 15, Gammexane, and Na_2SO_3 (at high concentration) proved adequate; as fungicides, Santobrite and *p*-nitrophenol (and Na_2SO_3 at 5% concentration) were the most effective; and as bactericides for reducing putrefaction, Na_2SiF_6 , Dieldrex 15, Santobrite, and *p*-nitrophenol were the best. Compatible 'over-all purpose' mixtures are possible, e.g., Santobrite plus 'Dieldrex 15.' Treatment is the more effective when applied to 'green' hides before they are dried.

PROCESS PRIOR TO TANNING

LIMING OF ANIMAL SKINS. VII. ACCELERATING ACTION OF ORGANIC NITROGEN COMPOUNDS ON THE DEPILATION OF ANIMAL SKINS IN LIME LIQUOR. 2. Harukazu Toyoda and Akira Futami (Govt. Chem. Ind. Research Inst., Tokyo), *Tokyo Kogyo Shikensho Hokoku* 52, 321-7 (1957); *Chem. Abst.* 52, 9635 (1958). As tested with pieces of wet-salted cattle hide soaked in lime liquor at 25° for 1-5 days, the addition of 1 mole/l. of the following organic N compounds accelerated the depilation while the rest of 45 compounds tested were either ineffective or retarding: Me_2NH_2 , NaCN , $\text{NH}_2(\text{CH}_2)_2\text{OH}$, NH_2OH , HCl , $\text{MeNHOH}\cdot\text{HCl}$, NH_2NH_2 , $\text{NH}_2\text{C}(:\text{NH})\text{NH}_2$, H_2CO_3 , $\text{NH}_2\text{C}(:\text{NHNHNH}_2)\cdot\text{H}_2\text{CO}_3$, and $\text{NH}_2\text{C}(\text{Set})\text{NH}_2\cdot\text{HBr}$ (which

dissolved the keratin of hair markedly). Thus, the accelerating action was correlated, not with the basicity but with such structures as RNH_2 , R(R')NH , RNHOH , RNHNH_2 , and RC(:NH)NH_2 , where R and R' are H, NH_2 , or alkyl groups.

VEGETABLE TANNING

THE POSSIBILITY OF RAISING THE YIELD OF TANNING FROM VEGETABLE TANNING MATERIAL. M. I. Karpman. *Legkaya Prom.* 17, No. 12, 27-9 (1957); *Chem. Abst.* 52, 8604 (1958). In the extraction of oak, spruce and elm bark the addition of sulphite equivalent to 1-2% of SO_2 raises the yield of total solubles by about 3.5%. The colloid chemistry of wood extracts and the techniques of their extraction are discussed.

PENETRATION RATE OF VARIOUS TANNINS INTO HIDE. Eijiro Sugano and Kazuaki Yamamoto (*Govt. Chem. Ind. Research Inst., Tokyo*). *Tokyo Kogyo Shikensho Hokoku* 25, 369-74 (1957); *Chem. Abst.* 52, 8604 (1958). From the penetration depth of tanning extracts into delimed steer hide in 24 hours at 25°, measured from the grain and flesh surfaces with a comparator, the penetration rate increased with concentration, upto 25% solids, but decreased beyond this limit. The rate of penetration increased in the order: 'Neochest,' 'Dulcotan,' chestnut, wattle, myrobalan, soluble quebracho, and quebracho.

CHROME TANNING

THE REACTION OF SOME THIOCYANATOCHROMIATE COMPLEXES WITH COLLAGEN II. Rhodanilates, K. H. Gustavson, *Garvernrings Forskningsinstitut, Stockholm, Sweden*, *J.A.L.C.A.* 53, 372 (1958). The reaction of methanol solutions of rhodanilates which contain anions of the general type $[\text{Cr}(\text{CNS})_4(\text{C}_6\text{H}_5\text{NH}_2)_2]$ with intact and variously modified collagen has been investigated. The interaction results in hydrothermal stabilization of the collagen tanning. The complex chromiates irreversibly attached to collagen are secondarily formed decomposition products. They contain only three to four CNS groups per two atoms of chromium. The other CNS groups are displaced, as are also the aniline molecules co-ordinated in the complex. This tannage is a unique example of a tannage that really takes place in a nonaqueous solvent, as compared to other so-called solvent tannages that require displacement of the solvent by water before tannage can occur.

OTHER TANNAGES

TANNING WITHOUT TANNIN. CONSIDERATIONS ABOUT THE TANNING AND IMPREGNATING OF HIDES WITH SYNTHETIC RESINS. A. Ionescu. *Rev. Chim. (Bucharest)* 7, 647-53 (1956); *Chem. Abst.* 52, 9635 (1958). A number of suggested methods for tanning with synthetics, such as methylolmelamine and dimethylolthiourea, are discussed. The methylol-urea method is preferred as the finished leather attracts very little H_2O even in the humid Rumanian climate, so that the leather will withstand prolonged storage rather well.

PROCESSES AFTER TANNING

RAISING THE WEAR RESISTANCE OF SOLE LEATHERS. A. I. Metelkin, V. G. Suchkov, and K. M. Zurabyan. *Legkaya Prom.* 16, No. 9, 20-2 (1956); *Chem. Abst.* 52, 8605 (1958). Sole leathers were soaked for 2 hours in spent vegetable tanning liquor at 25° and pH 5.5-6.0, washed in running water for 1.5 hours at 20-22°, and treated with a water emulsion of polymethyl-acrylate for 8 hours at 20-22°, with pH 10.5 maintained by addition of NH_4OH solution. The water-absorption capacities of the treated leather and the control were 31 and 57%, respectively. Wear resistance of bull, cow, and pig leathers so processed, compared with controls, measured by the 'Pozukaya' machine, 24.7:17.2, 23.2:20.0, and 17.1:14.1 hours per mm. abraded, respectively.

WATERPROOFING LEATHER WITH SILICO-ORGANIC COMPOUNDS. T. I. Motina and V. G. Suchkov. *Legkaya Prom.* 17, No. 12, 18-22 (1957); *Chem. Abst.* 52, 8606 (1958). The use of organic Si compounds for water proofing leather is reviewed and results of experiments with 'GKZh' (I), a polymerized form of $[-\text{Si}(\text{H})(\text{Et})\text{O-}]_x$, with varying amounts of Na_2CO_3 (II) and emulsified oils (III), are reported. In typical tests of leathers with the use of mixtures 10% I+1% II, 10% I+1% II+8% III and 5% I+1% II+18% III the time in minutes of the appearance of the first drop of water in the diffusion test with relation to the control samples was 63:11, 123:2, and 86:1, respectively; permeabilities to water in ml./sq. cm./hr. were 0.044:0.22, 0.044:1.1, and 0.05:0.86, respectively.

FATLIQUORING EXPERIMENTS WITH DOMESTIC SULPHATED OILS ON CHROME-TANNED LEATHERS. F. Kolos and L. Wiedner. *Bor-es Cipotech.* 5, 81-6, (1955); *Hung. Tech. Abst.* 8, No. 2, Abstr. No. 97 (1956); *Chem. Abst.* 52, 8605 (1958).

Fat-liquoring experiments were conducted on Cr-tanned side leather and glove leather. For Cr side leather a standard fat-liquoring method with sulphated sunflower-seed oil was applied; fat rapeseed oil is better than sunflower-seed oil for liquoring, the best results being obtained with rapeseed oil having a sulfation degree of 19 ± 1 . Thus the quantity of grease used could be reduced by 20% and furthermore the obtained leather possessed better properties. Sulphated neat's foot oil was superior to sulphated train oils for fat liquoring glove leather from pigskin bellies. Fatty spews do not necessarily occur in fat liquoring with neat's foot oil; this phenomenon is primarily due to incorrect sulphation or to the oxidized fatty acids enriched by excessive sulphation. Sulphated neat's foot oil with a sulphation degree of 19 ± 1 produced the best results if the sediments, consisting principally of oxidized fatty acids, do not exceed 5% by volume.

A SEARCH FOR SUBSTANCES PROMOTING THE SWELLING CAPACITY OF CASEIN HYDROLYZATE, Naoharu Shikazono and Tadyao Kanayama. (Govt. Chem. Ind. Research Inst., Tokyo) Tokyo Kogyo Shikensho Hokoku, 52, 235-41 (1957), Chem. Abst. 52, 8583 (1958). The swelling capacity of partial hydrolyzate (insoluble and soluble parts) of casein was promoted by adding 10-20% of H_3PO_4 , $(NH_4)_2HPO_4$, (I), some thermally unstable phosphates, and some organic bases, but hindered by inorganic bases and salts and pigments, and unaffected by inorganic acids (except H_3PO_4), organic acids, alcohols, and aldehydes. I added in a suitable amount markedly increased the swelling capacity regardless of the hydrolyzing conditions, produced a finer foam structure of carbonated casein skeleton, and prolonged the fire-retarding time. The swelling was promoted more in the insoluble part of the primary hydrolyzate than in the soluble part by I or H_3PO_4 , and more in the soluble part of the secondary hydrolyzate of the insoluble part (harder to hydrolyze than the casein itself) of the primary hydrolyzate. This suggests that the organic P contained in casein seems to affect the swelling.

THE PRODUCTION AND USE OF CHROMIUM STEARATES IN THE LEATHER INDUSTRIES. T. I. Motina and V. G. Suchkov. Legkaya Prom. 18, No. 2, 26-8 (1958); Chem. Abst. 52, 8603 (1958). A high degree of water impermeability is imparted to leathers (chrome, Russian, and sole) by the use of 5-10% of chromium stearate as a lubricating agent. For example, the time in minutes of the first drop of H_2O to penetrate in rela-

tion to the control was 211 : 2. Leather so treated, without further fattening with any other agent, is superior in durability to normally fatted stock.

WATER RESISTANCE OF SHOE UPPER LEATHERS TREATED WITH COMPOSITIONS OF STEROLS AND OF HYDRO-CARBON SULFONATES OF HIGH MOLECULAR WEIGHT, A. W. Hopton, Niagara Industrial Laboratories, Niagara Falls, N.Y., J.A.L.C.A., 53, 436 (1958)—Two types of compositions are described which give moderate to high water resistance to chrome and retan upper leathers when tested on a dynamic machine. These compositions are as follows:

(a) Free sterols and sterol-like bodies derived from wool grease and incorporated into the leather with petroleum oils, petrolatum, and fatty acids.

(b) Hydrocarbon monosulfonate salts of high molecular weight with fatty acids, fatty alcohols, or alkyl phenols. The sulfonate salt, usually that of sodium and of molecular weight preferably 500-700, may be derived by purification of a by-product from petroleum refining or may be synthesized.

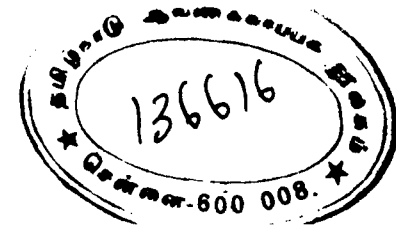
Tests on leathers treated with these compounds indicate that they impart somewhat less water resistance than two other commercial water repellent agents, although the order of magnitude of the water resistance is about the same. The sulfonate composition is superior in performance to the sterol and also lower in cost.

Leather treated with the compositions must have about one-third of the free pore space filled to give optimum results. The leather obtained by these treatments resembles conventional stuffed upper leather with respect to feel and has similar breathing qualities. Treated leathers show some within-lot variations attributed to unknown factors in hide and skins, but a moderately high water resistance may be obtained on an average with suitably tanned and finished leather.

TESTING

VOLUMETRIC DETERMINATION OF SULFATE IONS Laszlo Szekeres and Erzsebet Bakacs (Agarartudományi Egyetem Altalanos Kem. Tansek., Budapest). Magyar Kem. Folyoirat 61, 298-300 (1955); Chem. Abst. 52, 8847 (1958)—The SO_4 content of alkali sulfate solutions was determined. Dissolve the alkali

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sulfate containing approximately 0.05 g. SO_4 —in 3-5 ml. water, then add a known excess of 0.1 N Na_2CO_3 solution, 2 drops phenolphthalein solution and 10-20 drops ether. Then add sufficient EtOH to give a 25-30% concentration. Titrate the solution with 0.1 N BaCl_2 solution to the disappearance of the red colour. A blank determination was carried out with an identical quantity of Na_2CO_3 solution. This method overcomes the difficulty in the observation of the end point when titrating the SO_4 —directly with BaCl_2 solution and with phenolphthalein as indicator.

A FAST TITRATION METHOD FOR THE DETERMINATION OF SULFATE WITH BARIUM CHLORIDE. *Erzsebet Bakacs (Budapest Agrartudományi Egyetem). Magyar Kem. Folyóirat* **61**, 48-50 (1955); *Chem. Abst.* **52**, 8847 (1958)—An alc. 0.01 M BaCl_2 solution is used (pH 10). Indicators used are Eriochrome Black T and Mg sequestered with complexon. At the equivalence point Ba displaced Mg from the Mg. complex which colored the Eriochrome Black wine red. The method can also be used with the addition of CCl_4 . Then on shaking the BaSO_4 ppt. will be in the lower phase (CCl_4) and, therefore, the colour will be well visible in the clear liquid above the white layer.

THE ETHYLENEDIAMINETETRAACETATE [EDTA] TITRATION: APPLICATION. I. H. Flaschka, A. J. Barnard, Jr. and W. B. Broad (Univ. of N. Carolina, Chapel Hill). *Chemist Analyst* **46**, 106-12 (1957); *Chem. Abst.*, **52**, 8828 (1958)—A review with 50 references. Discussed are the preparation, storage, and standardization of EDTA solutions, practical precautions, the selectivity of the titration, and the application to the determination of cations, anions, water hardness, org. compounds, pharmaceuticals, and biological fluids. II *ibid.*, **47**, 22-8 (1958)—A review with 170 references. Applications to the following metals are discussed: Al, Sb, As, Ba, Sr, Bi, Cd, Ca, Cr, Co(II) Cu, Ga, and Au.

BIDIMENSIONAL HORIZONTAL PAPER CHROMATOGRAPHY. *Enrico Urbani and Giuseppe Scollo-Lavizzari (Univ. Camerino, Italy), Ricerca Sci.* **27**, 455-7 (1957); *Chem. Abst.* **52**, 8825 (1958)—In a Pyrex glass vessel (I) ($20 \times 20 \times 4$ cm.) was placed a Petri dish containing 20-40 ml. of solvent. An isosceles triangular piece of Whatman No. 1 filter paper (16 cm. base and 18 cm. height) was placed with 3 cm. of the apex dipping into the solvent and the base resting on the edge of I. A square of the same filter paper (16×16 cm.) which had been spotted with the solution to be analyzed, was placed across the top of I and

fixed in place with glass rods. The entire apparatus was enclosed by a glass cover. When the 1st solvent (II) front reached to within 2-3 cm. from the edge of the paper farthest from the spot, the paper was turned at right-angles and developed with the second solvent (III). II was PrOH 60: NH_4OH 4: Me_2CO 30: H_2O 20; III was H_2O saturated with PhOH . The spots were developed with 0.1% ninhydrin in N BuOH saturated with water.

CORRELATION WITH R_f VALUES AND DISTRIBUTION COEFFICIENTS IN AMINO-ACID PAPER CHROMATOGRAPHY. Wm. M. McCord and Geo. H. Nelson (Medical Coll. of Carolina, Charleston) *Proc. Soc. Exptl. Biol. Med.* **97**, 210-12 (1958); *Chem. Abst.* **52**, 9277 (1958)—The distribution coefficients of 19 protein amino acids between the 2 phases of a $\text{PhOH-H}_2\text{O}$ mixture were determined at various H^+ concentrations and at temperatures of 20°, 25° and 30°. The R_f values calculated from each of these distribution coefficients have been correlated by statistical methods with corresponding R_f values as measured by paper chromatography, and a significant relation has been established. Tabulated numerical data are presented.

COLORIMETRIC METHOD FOR THE ESTIMATION OF TYROSINE, J. H. Ottaway (Univ. Coll., London) *Biochem. J.* **68**, 239-44 (1958); *Chem. Abst.* **52**, 9270 (1958)—A simple and reliable method of estimating tyrosine has been developed, based on earlier work which may be used for the determination of 10-250 γ of tyrosine in 2-4 ml. samples. To 2 ml. of tyrosine solution is added 0.1 ml. 0.3% 1-nitroso-2-naphthol in acetone. The solution is brought to 60° and 4 drops of concentrated HNO_3 added. After another minute at 60° the solution is cooled and 6 ml. of a stabilizing reagent is added (50 ml. M NaCl, 75 ml. acetone mixed, made up to 300 ml., plus 5 ml. 0.5 M FeCl_3). After 10-45 minutes the colour is read (absorption peaks at 320 and 500 m μ); Fe^{++} , Co^{++} , Ni^{++} , excess Fe^{+++} , tungstic acid, molybdic acid, cysteine and EtOH, inhibit the colour reaction. Trichloroacetic acid, glucose, and Cu^{++} do not interfere. Tryptophan inhibits the colour development depending on its concentration. In addition to tyrosine, *p*-hydroxyphenylpyruvic acid, glycyltyrosine, and *p*-cresol give the characteristic red colour. Tyrosine in proteins give the colour. Precautions are given for the determination of tyrosine in various biological fluids.

DETERMINATION OF THE N-TERMINAL AMINO ACIDS OF SOME PROLAMINS, T. Deutsch., *Magyar Kem. Folyóirat* **61**,

135-7 (1955); *Hung. Tech. Abstr.*, 8, No. 1, Abstr., No. 32 (1956); *Chem. Abst.* 52, 8251 (1958)—The N-terminal groups were determined by the 2, 4 dinitrofluorobenzene method. Ascending 1-dimensional paper chromatography was employed to separate the 2, 4-dinitrophenyl-(DNP)-amino acids with M Na citrate solution (pH 6.4) or a solvent mixture composed of iso-BuOH-BuOAc and 2% HCl solution (5:3:2) for irrigation. The ether extracts of the DNP-prolamine hydrolyzates were studied. It was found that zein contains alanine and threonine, and avenin contains threonine as a N-terminal grouping, but no free N-terminal groups could be identified in hordenin and in the gliadin of *Agropyron cristatum*.

POLAROGRAPHIC DETERMINATION OF ELECTROPHORETIC FRACTIONS. *E. Balle-Helaers* (Lab. Analyses Méd., Brussels). *Clin. Chim. Acta.* 3, 51-6 (1958); *Chem. Abst.* 52, 8251 (1958)—A method was studied for quantitative estimation of proteins separated by paper electrophoresis. At very low concentrations the height of the Brdicka polarographic wave is directly proportional to the concentrations of individual proteins. In alkali-denatured, bromophenol blue-stained fractions the polarographic activity is proportional to the chromopexy except for γ -globulin, for which a correction coefficient of 2 is applicable. This method, although not yet refined, is very sensitive, permitting determination of 1-200 γ protein/cc.

COLORIMETRIC DETERMINATION OF LARGE AMOUNTS SILICA. *R. Petcov and G. Daducanu.* *Rev. Chim. (Bucharest)* 8, 259 (1957); *Chem. Abst.* 52, 8826 (1958)—A mixture of 9 g. KOH and 3 g. KNO₃ is fused in a Ni crucible. Add 0.2 g. of the SiO₂-containing material to the cooled melt and heat to 600° for 20 minutes. After cooling, dissolve the melt in 1 l. of water and to a 10-ml. aliquot of this solution add 1.5 ml. 2 N HCl. and 2 ml. of a 2.5% solution of NaF. After 10 min. add 0.3 g. AlCl₃ followed by 3 ml. of a 5% solution of ammonium molybdate. The developed colour is measured photometrically. Gravimetric and colorimetric comparisons gave an absolute error of -0.46 to $+0.46\%$.

DEPENDENCE OF THE VISCOSITY OF SOLUTIONS OF POLY (METHYL ACRYLATE) AND POLY (SODIUM ACRYLATE) ON MOLECULAR WEIGHT, *Hiroo Ita, Shoji Shimizu, and Shigenari Suzuki* (Toa Gosei Chem. Ind. Co., Ltd., Nagoya), *Kogyo Kagaku Zesshi* 59, 930-2 (1956); *Chem. Abst.* 52, 8688

(1958).—The viscosity of acetone solutions of poly (methyl acrylate) (I) with different degree of polymerization in the range of concentration of 0-12 g./l was determined by the Ubbelohde viscometer at 30° to give the intrinsic viscosity (η). The osmotic-pressure determination of the same solutions at 30° gave the average molecular weight of I. The degree of polymerization calculated from the viscosity was correlated with (η) by the following formula: (η) = $a + P^b$, where a and b are 1.49×10^{-3} and 0.52, respectively. Similar experiments for the Na salt of I in 2N NaOH at 30° gave a similar relation, with the values of a and b of 3.38×10^{-3} and 0.43 respectively.

THE DETERMINATION OF TRIBUTYL PHOSPHATE IN KEROSENE SOLUTIONS. *A. J. Fudge and G. C. Hutton* (Atomic Energy Research Estab. Harwell, Engl.). *Atomic Energy Research Estab.* (Gt. Brit). AERE C/R-2384, 17 pp. 1957); *Chem. Abst.* 52, 8848 (1958)—A rapid method has been developed for the analysis of commercial tributyl phosphate (TBP) and mixts. of TBP in odorless kerosene, with better than 2% coeff. of variation. The TBP is hydrolyzed by refluxing with 55% HI, the excess being destroyed with HNO₃. The butyl iodide and the I are then removed by heating, and the phosphate in the residue in detd. colorimetrically as phosphovanadomolybdate. Beer's law is obeyed when the 4360 A. Hg line is used for measuring absorption. Specially purified anhydrous TBP was prepared for standards. The HI should contain less than 1 p.p.m. P. The concn. of HNO₃ must be kept below 0.6 N to avoid interfering with the development of the colour. Approx. 40-mg samples is used, and the final soln. should not contain more than 1.0 mg. P/5 ml. to obey Beer's law.

METHODS OF FRACTIONATION AND IDENTIFICATION OF CONSTITUENTS OF CONDENSED TANNINS, *David G. Roux, Leather Industries Research Institute, Grahamstown, South Africa, J.A.L.C.A.,* 53, 384 (1958)—The main factor limiting the identification and characterization of the constituents of those condensed tannins used for tannage is the extreme complexity of the polyphenolic mixtures in which they occur.

Separation of the main wattle 'constituents' may be achieved on a milligram scale by using the 'preparative' paper chromatographic method on thick sheets. These 'constituents' migrate as discrete spots on two-dimensional paper chromatograms run under

certain conditions, but they are still not completely pure and do not crystallize from solution.

Various methods are discussed of overcoming these difficulties by simplifying the complex mixtures prior to the application of modern chromatographic and partitioning techniques.

A microfusion method is described for investigating small quantities of polyphenols obtained from chromatographic separations on thick paper sheets.

METHODS FOR THE EVALUATION OF SYNTHETIC TANNING MATERIALS. B. Toth. *Bor-es Cipotech.* 5, 16-18, 40-4 (1955); *Hung. Tech. Abst.* 8, No. 1, Abstr. No. 101 (1956); *Chem. Abst.* 52, 8603 (1958)—For the evaluation of synthetic tanning materials the determination of the tannic acid content by means of hide powder is not sufficient. The H-ion concentration of the solution affects tanning and binding values. When the original pH of auxiliary tanning materials is increased by 2.5, the original tannin content decreases to about 1/3; this decrease is far less in case of substitute tanning materials. The fractionation of synthetic tanning materials by means of salts is examined by various methods. Different methods of testing insolubles and the tendency to form sediments are described for certain tanning agents. The ash content of syntans must always be low since the content of mineral substance changes the acid:salt ratio and may bear substantial quantities of undesirable Ca and Fe compounds.

DIFFERENTIATION BETWEEN ANIMAL AND VEGETABLE FATS. H. Sulser and H. Högl (*Eidg. Gesundheitsamt., Bern, Switz.*). *Mitt. Gebiete Lebensm. u. Hyg.* 48, 248-58 (1957) (in German); *Chem. Abst.* 52, 8589 (1958)—Reverse-phase paper chromatography is carried out with the unsaponified fraction of fats. The paper is impregnated by wetting with a 10% solution of paraffin in petroleum ether. The unsaponified fraction is dissolved in CHCl_3 and moves in the mobile phase of 84% aqueous AcOH. Zones containing sterols are developed after drying of the paper by spraying with SbCl_3 solution. The R_f value of pure cholesterol was 0.42. Whale fat, pork fat, cattle body fat, cattle kidney fat, and butter fat showed the presence of cholesterol at R_f values between 0.41 and 0.44. Pure ergosterol had an R_f of 0.89, γ -sitosterol 0.38, and β -sitosterol 0.34. Hardened peanut oil showed the presence of γ - and β -sitosterol at the expected R_f values and that of 2 unidentified sterols with R_f values of 0.42 and 0.28.

The plant sterol with the R_f of 0.42 gives a grey-blue colour with SbCl_3 which differs from that of cholesterol. The method is valuable for the differentiation between animal and vegetable fats.

PAPER-CHROMATOGRAPHIC SEPARATION OF FATS. M. Jáky. *Elelmezesi Ipar*, 10, 44-50 (1956); *Hung. Tech. Abstr.* 9, No. 1, Abstr. No. 100 (1957); *Chem. Abst.* 52, 8589 (1958)—The dissociation of the fatty acids can be reduced by utilising solvent systems containing AcOH in appropriate quantities and consequently they will appear as well-defined spots in the chromatograms. Saturated and unsaturated fatty acids with identical C atoms in their chain, such as stearic, oleic, linoleic, and linolenic acid, can be separated and very often identified by reversed-phase chromatography. The paper-chromatographic data obtained for the fatty-acid mixtures of sunflower-seed oil, wheat-sprout oil, rice-sprout oil, and rapeseed oil corresponded with published data; with linseed oil there was a significant difference, probably owing to the fact that the R_f value of one of the 2 possible isomeric forms of linoleic acid approaches that of oleic acid. Since the Fischer rule is valid for fatty acids, it can be used in the paper-chromatographic determination of the components of the different fatty-acid mixtures. The R_f values of the individual components of fatty acids occurring in the natural fats change in a characteristic manner, consequently the components in mixtures of natural fats can be determined.

THEORIES

CONTRIBUTION TO THE KNOWLEDGE OF THE FINE STRUCTURE AND CHEMICAL PROPERTIES OF ANIMAL CONNECTIVE TISSUE FIBRES, P. Souza Santos, H. Souza Santos, G. A. Edwards, A. R. Hoge, and P. Sawaya, *Mem. inst. Butantan* 27, 1-25 (in English, 27-39) (1955-56) Pub. (1957); *Chem. Abst.* 52, 8244 (1958)—Collagen fibrils isolated from various tissues of toad, reptiles, pigeon, rat and human were studied by electron microscopy. The period of alternating light and heavy bands is approximately 600 Å. long in all species, but the diameter varied considerably within and between species, from 600 to 1400 Å. Fixation in 5% formalin gives more uniform preparations than with other fixatives. Increase in length with increase in tension applied is mostly in light bands. When fibrils break under tension, it is into units of 2 bands. Tendons left for a long time in physiological NaCl solution split longitudinally and flatten; this

indicates the core to be liquid. In water at 40° fibrils show no change; at 60° they shorten, increase in diameter and dissociate to gelatin. In water at 100° solution is complete in 2 minutes. Prefreezing is necessary to make fibrils soluble in diluted AcOH; reprecipitation by citrate buffer at pH 4.9 at 37° is complete in 2 hours, but does not take place in 1 week at 4-5°. Fibrils so precipitated are without cross-striations until after they reach a certain length. Tendons not prefrozen swell and become transparent but remain linear in diluted AcOH. If placed in AcOH at 37°, then cooled to 4°, they become zig-zag. Fibrils show no change in 0.0001 N NaOH.

HAIR ROOT STUDIES, A. Kuntzel and T. Stirtz, *Institute fur Gerbereichemie der Technischen Hochschule Darmstadt, Federal Republic of Germany, J.A.L.C.A.*, **53**, 445 (1958)—Both in keratolytic and enzymatic unhairing, hair loosening commences with an attack on the outer root sheath and is continued by the swelling and breakdown of the inner root sheath and parts of the hair that are not keratinized. Papillary hairs, club hairs, and new hairs are affected similarly. Short hairs that project only slightly from the epidermis are not efficiently removed by the unhairing machine. Inefficient removal of the remains of hair roots during scudding leads to leather defects when the hair roots or new hairs are pigmented.

EFFECT OF VARIOUS PARAMETERS ON THE RATE OF FORMATION OF FIBRES FROM COLLAGEN SOLUTIONS. Howard B. Benssan and Barbara L. Hoyt (*Western Reserve Univ., Cleveland, O.*). *J. Am. Chem. Soc.* **80**, 719-24 (1958); *Chem. Abst.* **52**, 9259 (1958)—The influence of several parameters on the rate of fibre formation from collagen solutions was determined by measuring the increase in turbidity as the gel was formed. The ranges of the environmental factors were as follows: Temperature 28-37.5°; pH, 7.1-8.5; ionic strength, 0.085-0.115. The order or decreasing inhibition (increasing rate) at constant ionic strength for anions was S_2O_3 , SO_4 , Cl, Br, I, CNS, and for cations, Ba, Ca, Mg, Li, Na, K. The maximum rate for the reaction occurred near pH 8. The ionic strength or type of salt had little effect on the optimum pH despite the fact that the mobility of the protein was greatly affected by these factors. The energy of activation for the reaction was unchanged by the type of cation or by the concentration of the salt. It was altered slightly by pH and urea and greatly by different anions.

EFFECT OF DILUENTS ON FUSION TEMPERATURE OF THE CRYSTALLINE REGIONS IN PLAIN AND TANNED COWHIDE. Lee P. Witnauer and Jeanne G. Fee (*Eastern Regional Research Lab., Philadelphia, Pa.*). *J. Polymer Sci.* **26**, 141-50 (1957); *Chem. Abst.* **52**, 8601 (1958)—Melting (shrinkage) phenomena in plain cowhide were investigated by measuring the temperature at which contraction first occurred in specimens containing varying amounts of ethylene glycol, formamide, phenol, and water as diluents. Similar measurements were made on cowhide specimens which had been tanned with HCHO and with a vegetable tannin which contained water as the diluent. In all cases the temperature at which contraction first occurred was found to increase as the diluent concentration was decreased, in general accord with the theory of melting point depression. The melting temperature of the crystallites in undiluted cowhide was found, by extrapolation of the data of each system to zero diluent content, to be about 145°. The melting temperature of undiluted tanned cowhide, however, depended on the tanning agent employed. A value of 120° was obtained for the vegetable-tanned cowhide and 151° for HCHO-tanned cowhide.

AMIDE AND C-TERMINAL RESIDUES IN PROTEINS. I. CHARACTERIZATION OF THE C-TERMINAL RESIDUE. A. C. Chibnall and M. W. Rees (*Univ. Cambridge, Engl.*). *Biochem. J.* **68**, 105-11 (1958); *Chem. Abst.* **52**, 8225 (1958)—The carboxyl groups of C-terminal residues in proteins, after preliminary esterification, can be reduced with $LiBH_4$ and on subsequent acid hydrolysis the modified residues are present in the hydrolyzate as amino alcohols or hydroxyamino acids, as the case may be. The suitability of the procedure for the determination of the C-terminal residues in proteins has been explored and in agreement with Crawhall and Elliott it was found that the issue was complicated by the simultaneous reductive cleavage of peptide bonds which occurs, under the conditions chosen, to the extent of 1-2% of the total peptide bonds. Data are presented showing that with a protein of low molecular weight such as insulin (5732) the interference is not serious and a satisfactory determination of the C-terminal residues can be made. With a protein of much higher molecular weight such as β -lactoglobulin (37,000), the interference is serious. The procedure is not recommended as a reliable one for proteins but it may be of use with peptides of low molecular weight.

II. AMMONIA NITROGEN AND AMIDE NITROGEN OF VARIOUS NATIVE PROTEIN PREPARATIONS. A. C. Chibnall, J. L. Mangan, and M. W. Rees, *Ibid.* 111-14; *Chem. Abst.* 52, 8227 (1958). Attention is drawn to the need to ascertain the free NH_3 content of native protein preparations as a factor in the determination of the amide N. A sample of insulin prepared by counter current distribution had a theoretical amide N of 6 groups/mole (5732); all other samples had low values, which suggested loss during manufacture from the pancreas. Studies of crystallised, β -lactoglobulin yielded different content of NH_3 but correct values of amide N (6.80-6.83%).

IN VITRO COMBINATIONS OF COLLAGEN A-MUCOPOLYSACCHARIDE ACID, Suzanne Bazin, Albert Delaunay, and Nicole Briquet (Inst. Pasteur, Garches, France), *Ann. inst. Pasteur*, 93, 624-30 (1957) (English Summary; *Chem. Abst.* 52, 8228 (1958)—*In vitro* collagen-heparin combinations and collagen-chondroitinsulfuric acid combinations depend upon ionic linkages as evidenced by the influence of pH. The latter combination may also be held by Hydrogen bonding. Determinations of hexosamine (for mucopolysaccharide acid) and of hydroxyproline (for collagen) suggest numerous combinations between collagen and chondroitinsulfuric acid.

PATENTS

ARTIFICIAL GRAIN COATINGS ON SPLIT LEATHER. Carl Freudenberg K.-G.a.A., Ger. 878, 544, June 5, 1953 (Cl. 28a, 9); *Chem. Abst.* 52, 8606 (1958). The leather is impregnated with solutions of unmodified alkyd resins which have free OH groups, especially polyesters made from 3 moles adipic acid, 1 mole of a triol, and 3 moles butylene glycol. Thus, to 100 parts of such a solution 25 parts of a mixture of 3 moles toluylene diisocyanate and 1 mole hexanetriol was added after evaporation and fluffing; seasoning procedures may follow.

TANNING AGENT FROM SULPHITE LEACH AND LIGNIN EXTRACTS. Hermann Babel, Ger. 898, 350, Nov. 30, 1953 (Cl. 28a, 6); *Chem. Abst.* 52, 9636 (1958)—Synthetic tanning agents are obtained by treating sulphite leach with aqueous solutions of K ferrocyanide and K ferricyanide. Such tanning agents do not cause darkening of the leather, and they must not be employed in strong acid solution. Thus 100 kg. sulphite leach is treated with a solution of 20 kg. K ferrocyanide in 300 l. water. The

influence of light favours the formation of 2 layers, the upper being liquid and red-brown and the lower yellow brownish. The upper layer is removed, and the lower is treated with water. The red-brown layer is dried to give a red-brown substance which forms on air a kneadable solid. The deposited lower layer may be used as a tanning agent too.

CONDENSATION PRODUCTS WITH TANNING PROPERTIES. Farbwerke Hoechst A.-G. (Karl Reichner, inventor). Ger. 907, 894, March 29, 1954 (Cl. 12q, 2004); *Chem. Abst.* 52, 9637 (1958)—Water-soluble tanning agents are prepared by condensation of alkylbenzenesulfonic acids containing at least 2 free aromatic H atoms with biphenyl-sulfonic acid, 4, 4'-dihydroxydiphenyl sulfone (I), and HCHO. Instead of I, alkali condensation products of I and HCHO can be used. Thus, technical xylene 100 and biphenyl 100 were mixed and sulfonated with 20% oleum 230 parts at 100-20° until the product was water-soluble. After dilution with water, 170 parts I and 110 parts 30% aqueous HCHO were added. The mixture was heated in 2 hours to 90-5° and kept at that temperature for several hours. Dilution with water, neutralization with NH_4OH , and addition of AcOH yielded a tanning agent, especially suitable for production of white, soft and light stable product from the skins of reptiles.

LEATHER-FATTING AGENTS. Rudi Heyden, Gerhard Dieckelmann, and Jürgen Plapper (to Böhme Fettchemie G. m. b. H) US 2822,235, Feb. 4, 1958; *Chem. Abst.*, 52, 9637 (1958)—Epoxidized derivatives of oils and fats are superior to natural fats and oils as leather-fattening agents with respect to light fastness and capability of bond to the leather. Suitable epoxidized derivatives are made by peroxide treatment of unsaturated fatty acids or esters. For example, a suitable fat liquor was made from 47 parts epoxidized 9-octadecenyl butyrate (I no. 7.5 and epoxide content 3.92%) stirred into a mixture of 44 parts water, 0.5 part of an alkyl sulphate mixture (containing alkyl groups of 13-18 C atoms), and 2.5 parts of a cation-active emulsifier (a reaction product of 1 part dedecyl chloroacetate, 1 part hexamethylenetetramine, and 5 parts polyethylene glycol distearate). In other examples the following epoxidized fats were used: phthalic acid di (9-octadecenyl) ester, the ester of reduced linseed oil acid and phthalic acid, train oil, soybean oil, olive oil and neat's foot oil. In producing white leather, untreated skins are tanned, shaved, retanned, and neutralized with a mixture of $\text{Na}_2\text{S}_2\text{O}_3$ solu-

tion and TiO_2 . The leather is then fatliquored as described above and finally finished in a conventional manner. The final product is light-fast even in direct sunlight.

SYNTHETIC TANNING AGENTS. *Farbenfabriken Bayer A.—G. Brit. 787, 347, Dec. 4, 1957; Chem. Abst. 52, 9638 (1958).* Water-soluble resins are obtained by mixing suitable synthetic tanning condensation products with alkali-pretreated sulphite waste liquor and salting out with $(\text{NH}_4)_2\text{SO}_4$ and NaCl. Thus 3,600 parts 2-naphthol is sulphonated with 3,000 parts H_2SO_4 at 115° , and $\text{C}_6\text{H}_5\text{OH}$ 1800 $\text{CH}_3\text{C}_6\text{H}_4\text{OH}$ 1800, and H_2O 2600 parts are added. The mixture is condensed with 2900 parts 30% HCHO at 80° . To this condensation mixture is added 13,200 parts 32° Bé. sulphite waste liquor, previously boiled with 2,000 parts 50% NaOH for 3 hours and 460 parts resin, obtained by boiling 330 parts $\text{CH}_3\text{C}_6\text{H}_4\text{OH}$ with 196 parts 30% HCHO in 400 parts 1.6% H_2SO_4 . The mixture is adjusted to pH 3.1 with H_2SO_4 . The tanning resin is recovered by addition of 10,000 parts $40\times (\text{NH}_4)_2\text{SO}_4$ and 3,800 parts NaCl. The resin is separated from adhering liquor by pressing.

CHROMIUM SOAP REMOVAL FROM THE WOOL OF CHROME-TANNED PELTS. *Böhme Fettchemie G.m.b.H. Brit. 787 138, Dec. 4, 1957; Chem. Abst. 52, 9638 (1958).* Suitable complex-forming compounds are water-soluble acid esters of di- and polybasic acids or their Na or NH_4 salts with high-molecular aliphatic, cycloaliphatic, or aliphatic aromatic hydroxyl compounds, of chain length $\text{C}_{10}\text{--C}_{18}$, alkoxylated with 5-10 mols. ethylene oxide per alcohol mol. These compounds are applied in conjunction with surface-active compounds. Thus, Cr-tanned wool sheepskins containing Cr. soaps are treated in a bath liquor containing 0.6-1.0 g/l. of the mixture of Na salts from monophosphoric acid esters of an aliphatic alcohol fraction of chain length $\text{C}_{12}\text{--C}_{18}$ alkoxylated with 8 mols. ethylene oxide per mol. and 0.5 g/l. Na alkyl sulphate mixture ($\text{C}_{12}\text{--C}_{18}$) for 1-1.5 hours at $40\text{--}50^\circ$, rinsed, rewashed with a bath liquor containing 1.5 g/l. ammonium alkyl sulphate mixture at $40\text{--}50^\circ$, and finally rinsed again with water.

NOTES & NEWS

DR. R. L. ERNST VISITS THE INSTITUTE

Dr. R. L. Ernst, consulting Chemical Engineer from Australia visited the Institute on the 29th July, 1958. After going round the tannery and the laboratories, he addressed the technical staff of the Institute. Dr. Ernst, who had left Australia about three months back, had toured in the U.S.A., U.K., and the continent.

Giving his impressions, Dr. Ernst said, leather had not so far been substituted by any other material although researches were being carried out with plastics. As long as the problem of respiration was not solved, no suitable substitute could be found. However, in some countries like England, men and women, particularly the latter, were buying two or three pairs of shoes every year; the amount of leather produced was not enough to make all these.

Synthetic tanning materials were coming to be used more and more as there were not enough natural tanning materials. Some countries, however, had still these materials available. In Yugoslavia, reafforestation of chestnut and oak plantations was going on. In Australia the extract manufacture from the gum tree was being successfully used. Mimosa bark and mimosa extract also were being produced, but were expensive due to high labour cost. They were also trying to find out new tanning materials. The Speaker was actually at the present time engaged with the problem of manufacturing extract from a tanning material containing about 20-25% tannin.

Dr. Ernst next proceeded to deal with the synthetic tanning materials and he traced the development in their utilisation. Synthetic tannins were used for clarifying tan liquors, instead of acids, for the ideal pH to get proper plumping was, according to him, between 3.5 and 3.7. The other uses of synthetic tanning materials were by way of filling up spaces making leather waterproof but not air proof stabilising the colour. Sole leather could be produced using syntans. Synthetic tanning materials from starch dialdehyde, and rosin, were now coming to the fore.

LEATHER AND LEATHER GOODS INDUSTRY

Seminar at Hyderabad

The first All India Seminar on Leather, Footwear, and Leather Goods Industries, convened by the Ministry of Commerce & Industry, Government of India, was held at Hyderabad from July 31 to August 2, 1958. Mr. A. Bhagavantha Rao, State Minister for Small Scale Industries inaugurated the Seminar.

Welcoming the gathering, Mr. Syed Ashfaq Husain, Development Commissioner, Small Scale Industries, Ministry of Commerce & Industry, pointed out that Leather Industry occupied an important place in the economy of the country. However, it was a paradox that with enormous cattle stock in the country, the industry should suffer from scarcity of raw materials. While the development of the leather industry has taken place both in the large scale and small scale sector, its importance was perhaps greater for the small scale sector, for as many as 650 out of 734 tanneries (about 90%) were in this sector.

About 2/3 of the entire leather produced was utilised for footwear. The production of footwear of all types during 1957 had been estimated at about 93.95 million pairs and it was bound to go up as people were educated into using footwear as a necessary health safeguard and with rise in their purchasing power. There was considerable scope for manufacturing leather belting also in the small scale sector. The E.I. kips which were at present being exported to U.K., if processed properly within the country, would fetch considerable amount of foreign exchange and also provide employment. There was a large potential export market for leather goods if they could improve production and marketing methods.

The Government of India had decided to set up a development panel for leather and leather goods industry. The footwear training centre similar to the one now functioning in Madras, was proposed to be established at Agra.

Mr. Bhagavantha Rao, hoped that the Seminar would suggest ways and means of how best development schemes could be better implemented for the purpose of rehabilitating the tanners and building up rural economy. The leather industry was the only one, which was entirely depending upon price fluctuations and foreign markets for price stabilisations. Fashions and other eco-

nomic conditions of overseas buyers rather than the quality of leather determined the prices.

The Minister later declared open an Exhibition, got up by the Department of Commerce & Industries, Andhra Pradesh.

Mr. R. K. Chickerur, proposed a vote of thanks.

—The Hindu, 2-8-1958

RESEARCH BEARS FRUIT

Practical Demonstration No. 6

(Second Series)

Process: Manufacture of White glove and lining leather from sheep skins using basic aluminium sulphate.

Period: 29th September to 15th October 1958.

Place: Central Leather Research Institute, Madras-20.

A process for the manufacture of White Glove and lining leathers from sheep skins, using basic Aluminium Sulphate has been worked out at this Institute. It is proposed to demonstrate this process as the next in the Second Series of practical demonstrations from 29th September to 15th October.

If you are interested in this line of work, you are most welcome to send your representative(s) to get trained in the manufacture of this type of leathers. You may kindly intimate the name(s) of the representative(s) who is/are likely to attend this demonstration. After following the process, we would request you to try this process in your Tannery and give us your valuable comments.

C. L. R. I. NEWS

Mr. N. Subramanian, Senior Scientific Officer, has proceeded to Afghanistan on an assignment by the International Labour Organization, to make a rapid survey of the Cottage Leather Industry in that country.

Editor Y. Nayudamma. Published by N. Subramanian, on behalf of the Central Leather Research Institute, Adyar, Madras-20. Printed by G. Srinivasachari, B.A., at The G. S. Press, 21, Narasingapuram Street, Mount Road, Madras-2.

