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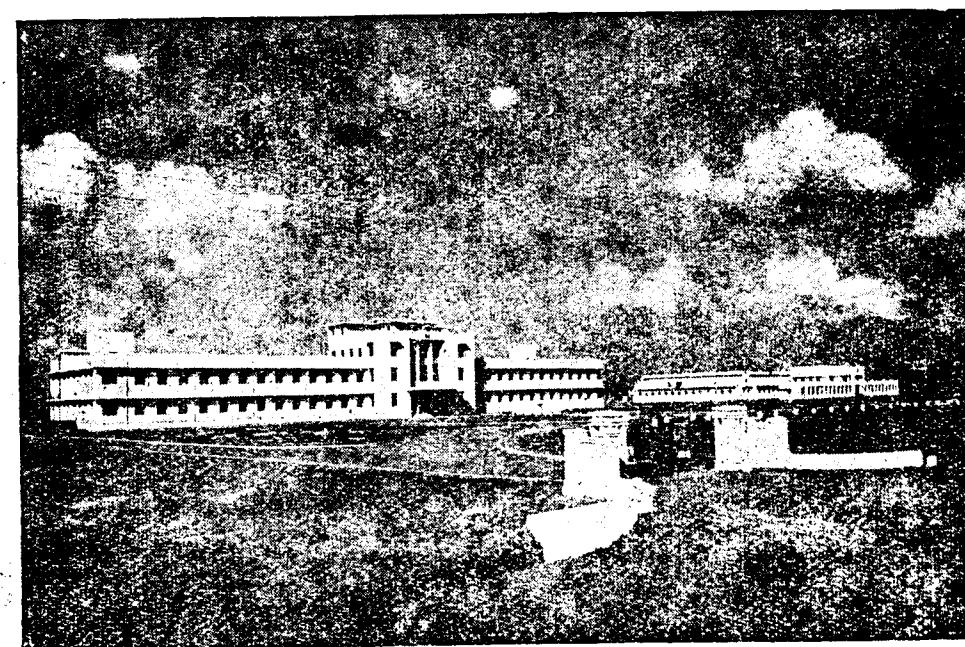


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No. 12

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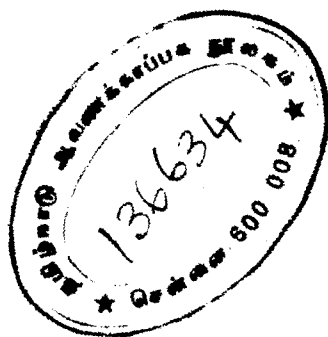
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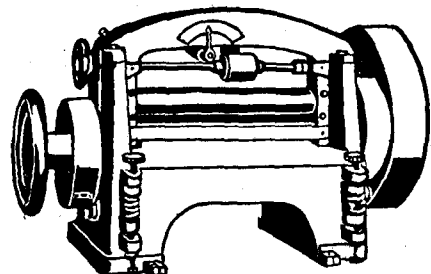
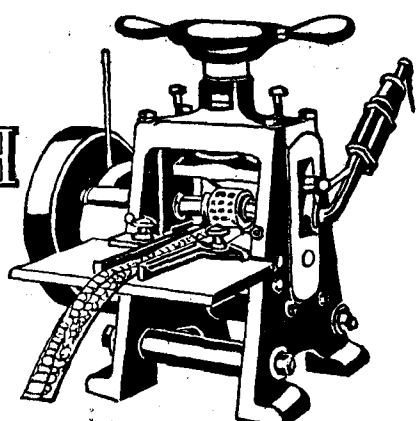
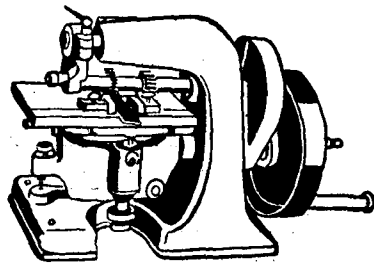
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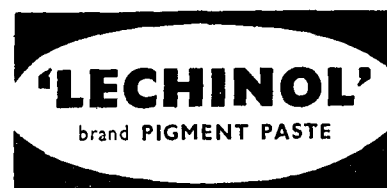
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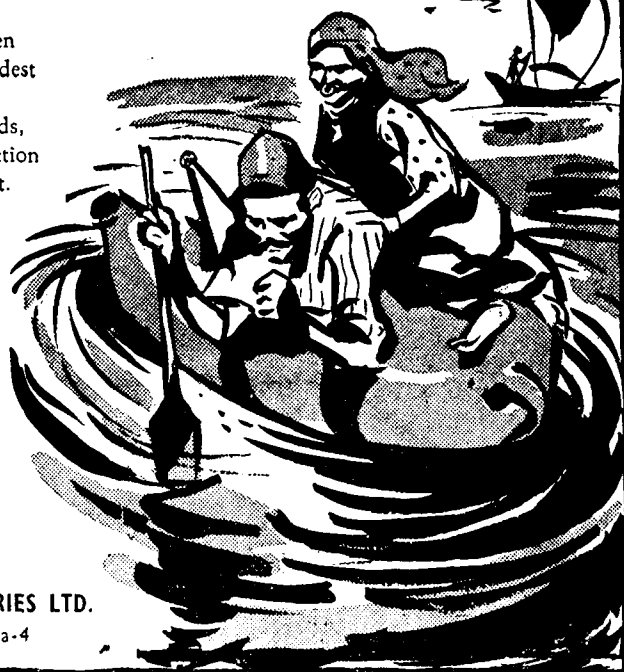
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INSECTICIDAL TESTS ON HIDE BEETLE—(DERMESTES MACULATUS DEGEER) WITH ALDRIN AND DIELDRIN DUSTS

BY

R. BHASKARAN & S. N. SEN

Central Leather Research Institute, Madras

Received on December 27, 1960.

SUMMARY

Laboratory tests have been carried out for determining efficacy of aldrin and dieldrin dusts in protecting dried hides from damage by hide beetle (*Dermestes maculatus* Degeer). Concentrations of 0.5, 1.25, 2.5 and 5.0% in the case of aldrin and 0.25, 0.5, 1.0 and 1.5% in the case of dieldrin were tried. All the concentrations tried showed a rapid knock down action on both adults and larvi, when tests were carried out a day after treatment of the hide pieces. With dieldrin, the adults were found to be more susceptible than the larvi. In both cases, the treated hide pieces were toxic to the larvi even after storage for six months, though the rate of kill was a little slower. However, hide pieces dusted with the lowest concentration of aldrin used (0.5%) showed slight damage due to initial activity of the larvi.

Introduction

Dermestes maculatus (hide beetle) and *Anthrenus vorax* (in the larval form) are two common sources of damage to hides and skins in India; dry and dry-salted varieties of the raw materials are particularly susceptible to the attack of hide beetle. While the hide beetle may cause quite extensive damage, the other pest usually restricts its activity to the hairy side of the hide or skin. At times, however, significant damage to grain and hide substance also is attributable to this pest. Effective control and prevention of damage by these pests to hides and skins during storage is necessary for improving the quality of hides and skins.

Literature survey reveals that certain chlorinated hydrocarbon insecticides endowed with residual toxicity have been tried in chemical control of insect infestations of raw hides. Bovingdon and Stock¹ stated that against *D. maculatus* and *D. lardarius*, a

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0.4% gammexane dust was more effective than a 4.0% DDT dust (the dose of application being 1% on the weight of the hides). However, neither gave complete protection at the concentrations tried, a complete control of infestation being obtained with a 1% gammexane dust. Full protection of infested material was obtained in a field trial in Nigeria with a still higher concentration, i.e., with a 2.5% gammexane dust.

Thuau² recommended the use of DDT dust for the control of hide beetle. Jensen and Holdoway³ obtained complete protection against hide beetle with a 10% DDT dust and a 2.5% DDT spray, the skins being treated fresh or after drying. The efficacy of DDT and gammexane was further demonstrated by Furlong⁴ on Uganda goat skins. The same author has also shown that such treatment did not interfere with the tanning of these treated skins.

A comparative study of the rate of action of DDT and gammexane by Williams⁵ revealed that a 0.5% BHC (*gamma* isomer) dust produced rapid knock down of *D. maculatus* adults, while a 5% DDT dust was found to be slower in its action. The larval forms of this beetle were found to react more slowly to BHC, the DDT dust being ineffective against them.

A 2.5% gammexane dust was recommended by Soni⁶ for the control of hide beetle in India. A comparative study carried out by the present authors⁷ with the larval forms of *A. vorax* and *D. maculatus*, revealed that the larval forms of the former were comparatively more resistant than those of *D. maculatus* and for a satisfactory control, a 2.5% gammexane (BHC) dust or a 1.0% Lindane (BHC) dust or a 0.5 Dieldrin dust were necessary.

In view of the low concentration found adequate with dieldrin, studies have been continued with this material and also extended to aldrin. The present article reports the results of laboratory trials carried out to determine the efficacy of dusts of these two materials in prevention of damage to dried hides, by the adult and larval forms of *D. maculatus*.

Experimental

Pieces of flint dried cow hide were dusted with different concentrations of aldrin and dieldrin, at the rate of 1 ounce of dust for a hide of 15 sq. ft. area. The required concentrations of insecticides in these dusts were obtained by suitable dilution with neutral talc. The concentrations of aldrin used in the dusts were

5.0%, 2.5%, 1.25% and 0.5% and those of dieldrin, 1.5%, 1.0%, 0.5% and 0.25%. The treated hide pieces were kept in glass jars using a separate jar for each concentration. Known numbers of *D. maculatus* adults and larvi (i.e., ten numbers for each concentration), were added to the jars containing the hide pieces, 24 hours after treatment. The jars were closed to retain any fumigant action. The control in each case consisted of untreated hide pieces with identical number of insects of about same age group.

Residual effect:—With a view to determine the residual toxicity of these insecticides a duplicate set of hide pieces treated in the same manner as above was prepared. These were rolled up with pieces of paper and stored six months and then tested with larval forms of *D. maculatus*.

Results and Discussions

The observations made are presented in tables I and II.

Aldrin:

Tested 24 hours after treatment:—A reference to table I shows that the adults as well as the larvi of *D. maculatus* were highly susceptible to this insecticide when tested soon after treatment. A 100% mortality was obtained within 3 days in all the concentrations in the case of the adults and within 4 days in the case of the larvi. Further, the insects were found to become moribund at all concentrations and continued to be in that state for some days before death. This, in fact, explains the absence of damage in the treated hides. Since all the adult and larvi that came in contact with the treated hide pieces became moribund and died subsequently, it may be concluded that this insecticide is quite effective against them.

Tested six months after treatment:—In this test, only larvi were used, as adults were not available in sufficient numbers. It could be seen from the table that some larvi were active for a day after coming in contact with the treated hides. From the second day onwards, all of them became moribund. More larvi were found active on the first day in 0.5% concentration and some were still active on the second and third days, when compared with the higher concentrations. But subsequently even at this concentration, all the larvi were killed. Thus with storage, the activity (knock down action) of this insecticide was lowered, but was still sufficient to produce complete mortality. The sample treated with 0.5% dust showed some slight damage along the edges. This may be attributed to the larvi which were active upto 3 days, in

TABLE I
ACTION OF ALDRIN DUSTS ON HIDE BEETLE

Concentration of Aldrin in the dust	Tested 24 hours after treatment. Observation on adults.				Damage to hide if any	Tested the treatment. Days	following day 24 hours after Observations on larvi			Damage to hide if any	Tested after 6 months storage. Observations on larvi				Damage to hide if any			
	Days	No. Active	No. Moribund	No. Dead			No. Active	No. Moribund	No. Dead		Days	No. Active	No. Moribund	No. Dead				
5.0%	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil
	1	—	—	4	6		1	—	—	6	4		1	2	8	—		
	2	—	—	2	8		2	—	—	4	6		2	—	4	6		
	3	—	—	—	10		3	—	—	10	3		—	—	10			
	4	—	—	—	—		4	—	—	—	4		—	—	—			
2.5%	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil
	1	—	—	6	4		1	—	10	—	1		4	6	—			
	2	—	—	4	6		2	—	4	6	2		—	10	—			
	3	—	—	—	10		3	—	2	8	3		—	6	4			
	4	—	—	—	—		4	—	—	10	4		—	6	4			
1.25%	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil
	1	—	—	4	6		1	—	6	4	1		—	10	4			
	2	—	—	2	8		2	—	4	6	2		—	6	4			
	3	—	—	—	10		3	—	2	8	3		—	6	10			
	4	—	—	—	—		4	—	—	10	4		—	—	—			
0.5%	At start	0	10	—	—	Nil	At start	0	10	—	—	Nil	At start	0	10	—	—	slight damage along border
	1	—	—	10	—		1	—	10	—	1		6	4	—			
	2	—	—	10	—		2	—	2	8	2		4	6	—			
	3	—	—	—	10		3	—	2	8	3		2	8	—			
	4	—	—	—	—		4	—	—	10	4		—	8	2			
Control without insecticide	At start	0	10	—	—	Present	At start	0	10	—	—	Present	At start	0	10	—	—	damage progressive
	1	—	—	—	—		1	—	10	—	1		10	—	—			
	2	—	—	—	—		2	—	10	—	2		10	—	—			
	3	—	—	—	—		3	—	10	—	3		10	—	—			
	4	—	—	—	—		4	—	10	—	4		10	—	—			
												5	10	—	—			
												6	10	—	—			

TABLE
ACTION OF DIELDRIN

Concentration of Dieldrin in the dust	Tested 24 hours after treatment. Observation on adults.				Damage to hide if any	Tested the treatment. Days		
	Days	No. Active	No. Mori- bund	No. Dead				
1.5%	At start	0	10	—	—	Nil	At start	0
	1	—	—	2	8		1	
	2	—	—	—	—		4	
	3	—	—	—	—		7	
							9	
1.0%	At start	0	10	—	—	Nil	At start	0
	1	—	2	8	—		1	
	2	—	—	10	—		2	
	3	—	—	—	10		4	
							7	
0.5%	At start	0	10	—	—	Nil	At start	0
	1	—	—	6	4		1	
	2	—	—	6	4		2	
	3	—	—	—	10		4	
							8	
0.25%	At start	0	10	—	—	Nil	At start	0
	1	—	—	10	—		1	
	2	—	—	10	—		2	
	3	—	—	—	10		7	
							8	
Control without insecti- cide	At start	0	10	—	—	Damage progres- sive	At start	0
	1	—	10	—	—		1	
	2	—	10	—	—		2	
	3	—	10	—	—		4	
							6	
						8		
						10		
						12		

II
DUSTS ON HIDE BEETLE

following day 24 hours after Observations on larvi			Damage to hide if any	Tested after 6 months storage. Observations on larvi				Damage to hide if any	
No. Active	No. Mori- bund	No. Dead		Days	No. Active	No. Mori- bund	No. Dead		
10	—	—		At start	0	10	—	—	
—	10	—			1	—	10	—	
—	8	2	Nil		4	—	4	6	Nil
—	2	8			7	—	2	8	
—	—	10			10	—	—	10	
10	—	—		At start	0	10	—	—	
2	8	—			1	4	6	—	
—	10	—	Nil		2	—	8	2	Nil
—	8	2			6	—	6	4	
—	2	8			7	—	4	6	
—	—	10			8	—	2	8	
					10	—	—	10	
10	—	—		At start	0	10	—	—	
2	8	—			1	4	6	—	
—	10	—	Nil		2	—	10	—	Nil
—	8	2			6	—	4	6	
—	4	6			8	—	2	8	
—	—	10			10	—	2	8	
					12	—	—	10	
10	—	—		At start	0	10	—	—	
2	8	—			2	4	6	—	
—	10	—	Nil		3	—	10	—	Nil
—	8	2			5	—	4	6	
—	4	6			9	—	2	8	
—	2	8			13	—	—	10	
—	—	10							
10	—	—	Damage	At start	0	10	—	—	Damage
10	—	—	progres-		2	10	—	—	progres-
10	—	—	sive		4	10	—	—	sive
10	—	—			6	10	—	—	
10	—	—			8	10	—	—	
10	—	—			10	10	—	—	
10	—	—			14	10	—	—	
10	—	—							

contact with this hide piece. Thus, for practical purposes, dusts containing 1.25% aldrin and above may prove quite satisfactory for protecting dry hides for six months, a period which is sufficiently long to cover the time required for transit to tannery or from any producer to a consumer in any part of the world. Further, the toxicity in the fresh treated hides would be sufficient to get over any initial infestation; unless a fresh infestation takes place subsequently, the risk is not so great.

The control samples showed progressive damage. Hence, the treatment may be stated to be quite effective in preventing damage. *Dieldrin* :

Tested 24 hours after treatment:—A perusal of table II shows that in the test carried out 24 hours after treatment with 1.5, 0.5 and 0.25% dusts, the adults of *D. maculatus* became moribund or dead within 24 hours after coming in contact with treated hide. In 1.0% treatment also, the majority became moribund on the first day itself and the remaining were found moribund on the second day. Thus, the adults were highly susceptible to dieldrin and they also died within the third day. The larvi, on the other hand, were comparatively more resistant. At 1.0, 0.5 and 0.25% concentrations, some were still active on the first day, though the majority had become moribund. On the second day, however, all the larvi had been affected at all the concentrations. However, it took 9-10 days before all of them died. Since no damage was caused to hide in any concentration and as the larvi were found susceptible to the treatment, it may be concluded that this insecticide also is quite effective.

Tested after 6 months storage: — In this test, only larvi were used. As was observed in tests carried out on freshly treated hides, some larvi were active on the first day after coming in contact with the hide in 1.0, 0.5 and 0.25% concentrations and even upto the second day at 0.25% strength. With progressive reduction in the concentration, the rate of 100% mortality was delayed from 10 to 13 days. No damage to the treated hide piece was evident at any concentration tested. Hence from the point of view of protection, all concentrations are satisfactory. However, for storage for long periods, it is better to stick to the highest concentration.

The following additional observations were made in the course of the experiments carried out.

The larvi that were left on these treated hide pieces were first found to move about, but usually came down within a day. From the second day onwards, they were lying on their side. Non-co-

ordination of leg movement was evident; however, they responded to needle stimulation. Gradually, they died within some days.

Egg laying females continued to lay eggs; the development of the eggs into young larvi went on. The larvi that emerged from these eggs, however, died soon after emergence on coming in contact with the treated hides. The observation that the larvi reacted less slowly than the adults to aldrin and dieldrin, may be a general characteristic of this species with regard to chlorinated hydrocarbon insecticides. A similar reaction, exhibited by this species to BHC⁵ supports these facts.

With both these insecticides, fumigant action appeared to play a part in the tests carried out one day after treatment.

From these observations, it appears that for storing dry hides for long periods (6 months) 1.5% dieldrin and 5.0% aldrin dusts may be required, while for shorter periods, even lower concentrations may suffice. The usual precaution of using masks etc. while applying these dusts may be followed with advantage.

The present communication is confined to laboratory trials on the susceptibility of hide beetle to these two insecticides. Further studies are under way in the tannery on a small scale, to determine the toxic effect of hides and skins treated as above on the people handling them while processing them into leathers. The results of these and other biological tests on the toxic hazards involved in the use of these insecticides will be reported subsequently.

Acknowledgement

The authors' thanks are due to Dr. Y. Nayudamma, Director, Central Leather Research Institute, for his interest in this work and for kind permission to publish these results.

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TECHNICAL SEMINAR

Some factors which determine the selection and the use of belting leather for machinery*

BY

DR. ING. KURT WOLF

In the course of the practical demonstration of a process of manufacturing vegetable tanned belting leather held at the Central Leather Research Institute, from April 5th to May 11th, 1961, it seemed useful to the participants of this demonstration to summarize the principal factors which influence the efficiency of a leather belt or its life-time.

Provided that the belting leather chosen for any drive conforms to the specifications proposed by the I.S.I., it can be expected that the belt made out of it will work properly under normal conditions. But it should be clearly agreed upon between supplier and customer as to what is meant by "normal conditions."

The design of a drive is, in the first place, defined by the speed of the driven shaft or the speed of the prime mover. The speed can be expressed as revolutions per minute (r.p.m.) of the shaft itself or as meter per second (m/s) of the belt. It is always better to calculate the belt speed which depends not only on the number of revolutions but also on the diameter of the driving pulley. For instance, the belt speed of a drive fitted with a motor of 955 r.p.m. and a driving pulley of 3" diameter — 3.81 m/s — is only one fifth of that with the same motor but using a 15" wide pulley — 19.05 m/s. As pointed out on an earlier occasion [vide *Bull. C.L.R.I.* 7, 219 (1960)], belts running with a speed higher than 15 m/s will transmit much less power than that calculated from the torque of the drive due to the consumption of energy by the centrifugal tension. Therefore, the I.S.I. recommendations for the selection of a drive and its components (belts etc.) based on the number of revolutions should be modified according to the belt speed which is more important than the r.p.m. Necessary proposals will be made to the I.S.I. committees concerned.

*Summary of talk given on April 21, 1961.

Generally speaking, flat belts—if correctly designed and manufactured — will serve the purpose well either for very high belt speeds (over 4000 r.p.m. of the driven shaft) or for lower belt speeds (down to 75 r.p.m. of the driven shaft). Detailed instructions for the design of belts running within these limits will be published subsequently.

Secondly, the lay-out of the drive is decisive for the efficiency and the life-time of the belt. The location and the surroundings of the machinery and the available space for the drive itself are as important as the conditions of temperature, humidity, atmosphere (dust, gases, chemicals etc.). Various examples were discussed considering the consequences of the selection and use of belting leather. The supplier should know as much as possible about all these conditions in order to avoid bad results. It should become a common practice that the customer answers a questionnaire of the supplier in each and every case where either the cost of the belt to be delivered is high or the standstill of a machine due to necessary repairs of the belt causes heavy losses. With respect to these external conditions, the main arrangements for a drive were mentioned and the advantages and disadvantages of each of them were discussed, viz., horizontal drive, vertical drive, quarter-turn-drive, crossed-drive, cone-drive, fast and loose pulley-drive and jockey-pulley-drive. The different shapes and sizes of the pulleys were enumerated and the suitability of crowning of the pulley-faces was discussed. Thus it could be shown that a number of local conditions could affect the proper running of a belt.

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Finally, some details of the maintenance of drives and belts were stressed. Belt dressings containing resins have to be avoided because they cause serious damages to the leather without increasing the adhesion of the belt for more than a few hours. Special attention should be given to the end junction of the belt. If possible, the junction should be made by cementing and not by the aid of belt-fasteners which damage the leather and which often produce vibrations and noisy running.

TECHNICAL SEMINAR

Histological study of the fallen hides*

BY

S. K. SARKAR

In India, more than 85% of the total hide production comes from fallen animals, i.e., animals dying a natural death due to diseases or old age. It is the common belief and experience of tanners in this country that leather made from fallen hides is inferior in quality compared to that from slaughtered hides, but no scientific reason has been put forward to explain the cause of inferior condition of the fallen hides from old animals. The only explanation that is being advanced all through is that at old age, the hide texture becomes loose, and because of delayed flaying the hides become partly putrefied. A histological study on fallen buffalo and cattle hides from old animals has shown that in old age, certain degenerative changes take place in the hide tissues; these changes are likely to be reflected in the leather made from them and thus affect their quality. The fallen hides are characterised by thinner substance, emaciated collagen fibres and irregular thickness, these features being more pronounced at the butt and front butt. The emaciated collagenous tissue in fallen hides reduces compactness and this explains why leather made from them is poor in substance and lacks compactness. The congealed blood in the blood vessels makes the fallen hides more susceptible to the attack of micro-organisms; also the thinner and loosely attached epidermis fails to protect properly the underlying tissues from mechanical damages. The contracted, thinner and less tight grain layer in fallen hide is likely to make the grain in the final leather loose and less pliable. The sebum condensed as a result of the thickening of the oily content of the sebaceous glands in fallen cattle and buffalo hides may create difficulties in its removal during liming. Due to the decrease in the interfibrillary amorphous substance in old age and also due to the partial degenerative changes occurring in the fine fibres connecting grain and corium, the merging of the

grain is naturally poor and these fine fibres are liable to get damaged more readily by pretanning processes. Moreover, some changes also occur in the natural arrangement of grain elastin in the old age which also affect the grain quality of the fallen hides. A comparatively smaller amount of reticular tissue at the neck and belly in fallen buffalo hides also suggests that those locations would offer little resistance to pretanning treatments. The presence of bigger blood vessels in fallen hides, especially at the junction of grain and corium is likely to develop veininess appearing as a dark and unsightly pattern on the surface of leather. A noticeable feature of the fallen hides is the very thick and hardened subcutaneous flesh layer appended to the corium and this hardened flesh layer perhaps makes flaying difficult resulting in more knife cuts and may be the cause for inefficient curing also. The above conditions explain why leather made from fallen hides is inferior in quality compared to slaughtered hides. However, these conditions may vary from hide to hide and all the conditions may not be present in all the hides, being dependent on environmental conditions.

Tanner's Corner

The Central Leather Research Institute has been since its inception rendering technical aid to the leather industry through answering technical enquiries on specific problems. The number of such enquiries has been increasing year by year. In order that the information contained in the replies to the technical enquiries may be made available to all those who have similar problems, a new feature, "Tanner's Corner" is being inaugurated from the next issue. Typical questions will be reproduced in this feature with the relevant answers. It is hoped that the industry will fully utilise this new feature and bring more and more of its problems for solution to this Institute.

Tamil Supplement to Bull. C.L.R.I.

From the August 1961 issue, the Bulletin of Central Leather Research Institute, will have a supplement in Tamil. For further details please write to Director, C.L.R.I.

*Summary of talk given on June 23, 1961.

CLASSIFIED ABSTRACTS

PROCESSES PRIOR TO TANNING

Studies in fellmongering-II. Further observations on the sweating process: The influence of curing and soaking conditions, and of temperature of sweating.

G. H. Green, *J. Soc. Leather Trades' Chemists*. **45**, 167 (1961). The influence of temperature on the rate of sweating and solubilisation of skin protein has been studied. The time required for complete wool loosening is reduced considerably over the range 10-20°C, but rather less over the range 20-35°C. The proportion of the skin nitrogen rendered soluble is of the order of 25-35% and is independent of temperature. This amount is less than the estimated non-collagenous nitrogen based on hydroxyproline determination, indicating that under normal conditions no appreciable attack on the collagen necessarily occurs. This is supported by hydroxyproline determinations over the course of sweating.

Curing and soaking conditions influence the rate of sweating considerably. Drying retards sweating, either because complete soaking back cannot be achieved or because coagulated interfibrillary protein is less available to the bacteria. Soaking in 10% brine is disadvantageous, due to removal of globular proteins. More dilute solutions may be helpful since bacterial growth is stimulated. The sweating time is reduced by one-third when 1% salt is present. It is preferable not to resoak dry-salted skins after breaking-over, as the salt content after the first soak is optimal under usual works conditions.

The warm water digestion of sheep skin pieces for wool recovery is also accelerated by salt, but not sufficiently to warrant its deliberate addition.

The influence of bacteria on depilation of hides by enzymes.

Theone C. Cordon, A. L. Everett, and W. Windus (Eastern Regional Research Laboratory, Philadelphia 18, Pennsylvania), *J. Amer. Leather Chemists' Assoc.* **56**, 164 (1961). Hides and skins as received in a tannery are contaminated with bacteria, and

the reduction in salt content after soaking makes them susceptible to degradation. The conditions used for enzyme unhairing also favour the growth of bacteria, a factor ignored by some investigators.

Of a number of disinfectants studied, several were found to control bacterial growth at concentrations which were not harmful to the hair-loosening enzymes.

Although the unhairing solutions were not sterilized, there was no apparent damage to the hide, no putrid odor, and no change in the unhairing action, if the bacterial population was kept under about 100 million per ml.

TESTING

The correlation between wear trials and abrasion tests on sole leather: A report on co-operative experiments organised by the Physical Testing Commission of the International Union of Leather Chemists' Societies.

R. G. Mitton (Chairman of the Physical Testing Commission), *J. Soc. Leather Trades' Chemists* **45**, 130 (1961). The paper describes experiments made in various countries to compare various types of abrasion machines as guides to the durability of sole leather. Seven leathers were included in wear trials and abrasion tests, and the following conclusions are drawn from the results.

Abrasion tests can be misleading if the possibility of clogging of the abrasive is overlooked, but many machine tests give good correlation with actual wear, and some machines can even abrade impregnated leathers satisfactorily.

Machines may use as abrasive an abrasive paper, an abrasive wheel, or loose sand. The machines which use paper or a wheel are generally simpler than sand machines, and are compact, less noisy, faster in action, and readily adaptable for wet tests. The abrasive of wheel and paper machines tends to clog when they are used with impregnated leathers, but the clogging can be greatly reduced (and possibly avoided altogether) if fresh abrasive is fed continuously to the paper type machines. The sand using machines are less liable to clogging of abrasive. One machine uses a sand jet to abrade the specimens, but gives a negative correlation with actual wear, and so is worthless.

Independent wear trials made on the same leathers in different countries show moderate correlation with one another,

but the closeness of the correlation depends upon the method of measuring the worn soles. The correlation between abrasion and wear cannot be expected to be appreciably better than that between independent wear trials, and, judged by this criterion, several machines seem extremely good (apart from difficulties with impregnated leathers). There is a need, however, for further tests of this point, using a few selected abrasion machines and many more leathers.

The type of motion of the specimen relative to the abrasive (e.g., reciprocating, planetary, etc.) seems to be of no importance in an abrasion machine, and any movement that is simple to control is probably as good as any other. The speed of motion and size of abrasive particle are not critical, but there is evidence that the pressure between specimen and abrasive may be important for some machines at least. However, machines whose rates of abrasion differed by a factor of 100 or more gave equally good correlation with wear.

Because of irregular variations from place to place in bend leather, it is necessary to make measurements on several specimens to obtain a satisfactory assessment of abrasion resistance. A single large specimen seems less satisfactory than several small ones. Tests made on a constant fraction of the total thickness of the leather, however, give a fairly satisfactory guide as to the abrasive resistance of the whole thickness, despite the fact that abrasion resistance varies considerably with distance from the grain surface.

Measurements of the energy required to abrade leathers give poorer correlation with durability in wear than do measurements of abrasion resistance, and are not to be recommended.

Rapid moisture determination in leather.

Robert Stubbings and Louise Ambrose (Institute of Leather Technology, Milwaukee School of Engineering, Milwaukee I, Wisconsin), *J. Amer. Leather Chemists' Assoc.* **56**, 148 (1961). A comparison of dielectric constant and resistance as a measure of the moisture content of leather has been made. The development of a d.c. resistance meter for leather moisture is described, and the operating parameters are evaluated. A commercial instrument for the rapid measurement of moisture content nondestructively is described covering the range of 9% to 40% moisture.

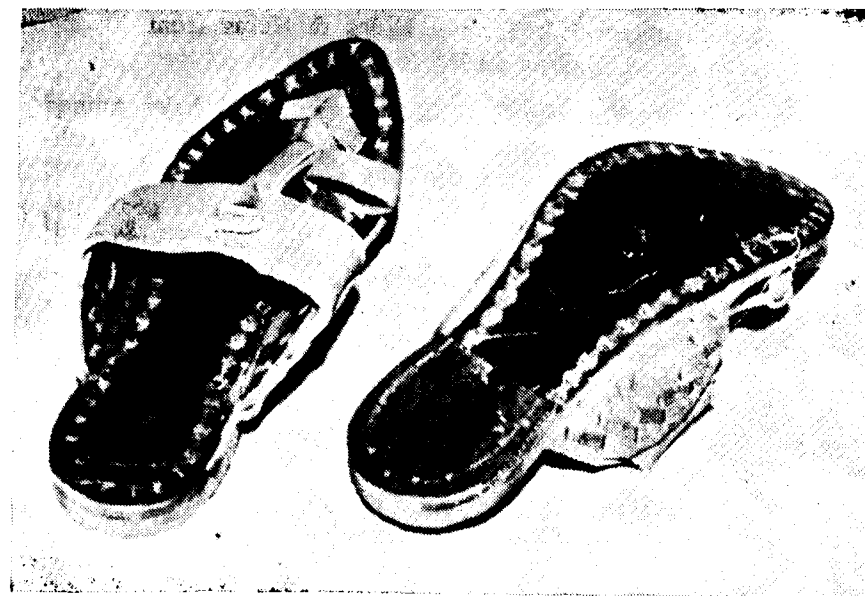
NOTES & NEWS

Distribution of Heavy-dutywear Chappals to Cart Pullers in Madras City

The hand cart puller, his feet shod in pieces of gunny bag and his body glistening with sweat, tugging heavy laden carts along the busy thoroughfares in the hot midday sun is a common sight in Madras. Obviously the extreme conditions of weather and usage rule out for him the chappals worn by the ordinary pedestrian. The Central Leather Research Institute has given thought to this problem that is both human and technical.

A few pairs of chappals made from Central Leather Research Institute leathers made to suit their special needs, have been distributed to some of the deserving cart pullers.

The design of the chappals and the choice of materials used therefor, have been effected keeping the above in view. The



upper is of heavily curried chrome cow, that has excellent strength and durability. It can stand sudden and severe strains and is

at the same time soft enough to yield to the changing contour of the foot. It is highly resistant to humid heat, and possesses appreciable water-repellency. The bottom is made from impregnated chrome buffalo and is light and hard working. The sole is of the moulded type, sufficiently thick, and very similar to the one specified for army use. It is shaped with an upward bend near the toes to protect the latter from physical damage. The cross-strap is reinforced at the sides near the sole in order to support the instep. The lace, linking the cross-strap with the toe loop is adjustable, and this facilitates a firmer grip of the foot irrespective of the variations in the size of its arch.

The wear and tear and usefulness of these chappals will be periodically tested with the kind cooperation of the Commissioner of Police, Madras, and the cart pullers using these chappals.

It is sincerely hoped that this techno-human experiment will prove successful and that civil and social bodies would come forward to help these hardworking people who go barefoot.

Sri S. Krishnaraj, Deputy Commissioner of Police, Law and Order, distributed the chappals to deserving hand cart pullers at 10 a.m. on 22nd June 1961 at the Periamet Police Station.

Shipments of E.I. Tanned Hides & Skins from Madras during May 1961

Shipments for the month of May were: 2,542 bales tanned cow hides, 221 bales calfskins, 30 bales buff hides, 450 bales calfskins, 440 bales goatskins, 438 bales sheepskins to the U.K.; 107 bales cow calfskins, 47 bales buff calfskins, 1,031 bales goatskins, 439 bales sheepskins to the Continent; 116 bales buff hides, 331 bales buff calfskins, 59 bales goatskins to the U.S.A.; 50 bales sheepskins to Japan; 47 bales goatskins to Australia; 13 bales sheepskins to New Zealand; Total 6,361 bales.

—The Mail: June 4, 1961.

C.L.R.I. NEWS

Dr. Y. Nayudamma, Director, attended the Ninth Directors' Conference at Mysore on June 29 & 30, 1961.

Dr. Y. Nayudamma, Director (or his representative) has been nominated to serve as a member of the Working Group on Leather and Allied Industries, constituted by the Uttar Pradesh Government.

Dr. T. J. Devassy, Senior Scientific Assistant, who has been deputed to Eastern Europe for training in 'Leather processing' under the United Nations Technical Aid Administration Programme, left Madras on June 5, 1961. He will undergo training in Hungary, Yugoslavia, Czechoslovakia and the U.S.S.R.

Sri N. Subramanian, Senior Scientific Officer, left Madras on June 13, 1961, for Czechoslovakia for training in the field of 'Production Management' under the Czechoslovakian Government Aid, sponsored by the National Productivity Council, New Delhi.

The following have been promoted as Junior Scientific Officers with effect from June 19, 1961.

Sri G. S. Rama Iyer
Sri K. J. Scaria
Dr. D. Ghosh



Shri D. Sanjivayya, Chief Minister, Andhra Pradesh (centre), visited the Institute on 23-6-1961.

BULLETIN OF THE CENTRAL LEATHER RESEARCH INSTITUTE

Dr. K. S. Krishnan passes away

We regret to record the sudden demise of Dr. K. S. Krishnan, F.R.S., Director, National Physical Laboratory, New Delhi, and National Professor, at New Delhi, on Wednesday June 14, 1961.

The staff of the Central Leather Research Institute held a meeting on the same day to condole the sad demise of Dr. K. S. Krishnan. The following message was sent to the bereaved family and to the staff of National Physical Laboratory.

"The staff of the Central Leather Research Institute express their profound sorrow at the sad and sudden demise of Dr. K. S. Krishnan, Director, National Physical Laboratory, New Delhi and National Professor, and convey their heartfelt condolence to the members of the bereaved family and to the staff of National Physical Laboratory".

The Institute was closed on June 14, 1961, as a mark of respect to the departed soul.

Kariamamikkam Srinivasa Krishnan was born on December 4, 1898 in the village of Watrap near Srivilliputtur in the Ramnad District. He had his college education in the American College, Madurai and the Christian College, Madras. Dr. Krishnan was later associated with Sir C. V. Raman in the brilliant investigation which culminated in the discovery of Raman Effect. After holding the office of Professorship at Dacca University, the Indian Association for the Cultivation of Science and the University of Allahabad, he was appointed Director of the National Physical Laboratory in 1947.

Dr. Krishnan's outstanding contributions to physics brought him numerous Honours—Fellow of the Royal Society (1940); Foreign Associate of the National Academy of Sciences, U.S.A. (1956); Padma Bhushan (1954); National Professor (1958) and the Shanti Swarup Bhatnagar Memorial Award (1961).

Dr. Krishnan was a member of several national and international scientific bodies. He was also a great Scholar in Tamil and Sanskrit and Hindu religious lore.

Volume VII, 1960-61

AUTHOR AND SUBJECT INDEX

The abbreviations used in the author and subject index indicate as follows:

(A): Abstract;	(N): Notes and news;
(P): Patent;	(T): Technical Seminar.

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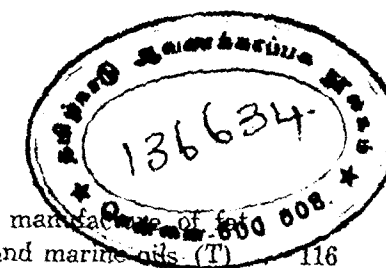
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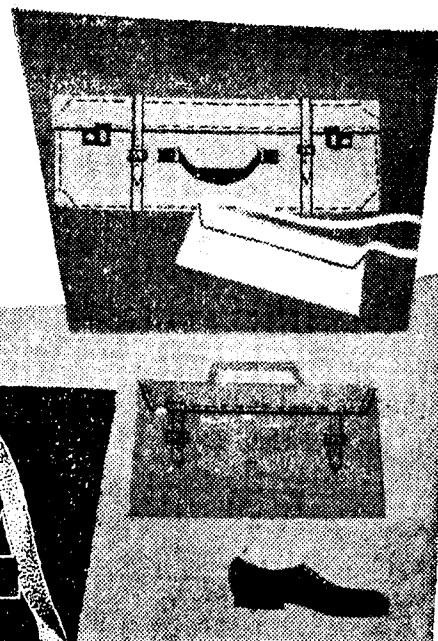
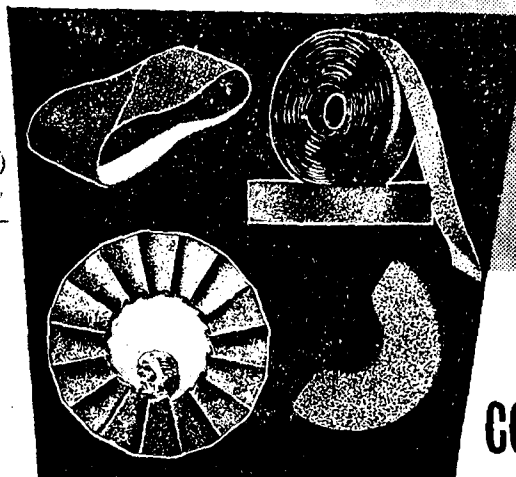
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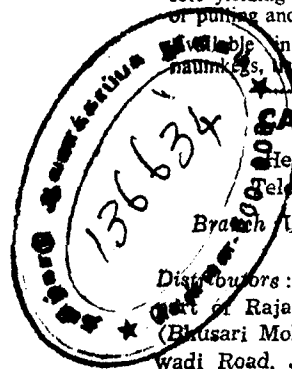


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