which bears an important, and as yet little understood, part in the life-history of the cell. After a period, it undergoes certain somewhat complicated changes, and put out protuberances (pseudopodia, "false feet") one of which will gradually increase in bulk, till it absorbs the whole cell, which thus crawls about. It will

It must also have been early noticed that wood smoke, which in those days was inseparable from the use of fire, had an antiseptic and preservative effect on

The origin of leather manufacture dates far back in the prehistoric ages, and was probably one of the earliest arts practised by mankind. The relics which have

The structure of cells — White blood-corpuscles — The yeast-cell — Epidermis cells — The building up of plants

Methods of sole-leather tanning — Finishing of sole-leather — Theory of vegetable tannage — Deliming of sole-leather — "Mellowness" of liquors — Penetration of tannage —

Depilation
the optical effect of imprisoned air. On boiling or long soaking in water, alcohol, or turpentine, the air-spaces become saturated with the liquid, and then appear

tissue, which bear some fanciful resemblance in form to a cockleshell. The affection is prevalent during the spring while the wool is thick, and disappears almost

then spread on the floor flesh side up for examination by the inspectors, of which there are two, one representing the house and the other the buyer of the hides.

back as the butts were at the starting place. The other side is built the same way, and then the cross layers are put on alternately until the pack is level, when sides

being particular that enough salt strikes against the edges held by the men to make a pronounced ridge when they are lapped down. A little salt is thrown on the

dirt, and then, laying them in a wet condition, flesh side up, to paint them with a solution containing about 25 per cent. of sulphide of sodium, thickened with

appearance are important. Butchers are adverse to the use of salt, because it withdraws water from the hide in the form of brine, and so

state, and on that account it is largely employed in the disinfection of rooms or of articles which would be spoiled if they were to be wetted, as the gaseous

manufacture as it becomes cheaper, but has a curious hardening tanning effect on hide fibre and gelatinous matters, so that in very dilute solution it will produce

4 liters of water, will sterilise a hide. Eitner recommends

α

away like brine, but remains in the hide, which retains its weight, and remains plump and swells well in the limes and liquors, which chlorides have a great

heavily taxed, alum, carbolic acid, naphthalene and other materials are frequently added to it to "denaturise," or render it incapable of being used as food, and

produced by the action of the tannin, which are partially removed by the acids of the liquors during the tanning process, but generally show to some extent in the

stains appear of a greenish black, from the formation of sulphide of iron; when, however, the hides come into the tanning liquors, black or blue stains are

little forms of cell are those of

Yeast-cells, much magnified.

THE ORIGIN AND CURING OF HIDES AND SKINS.

It may be well here to say a few words about the injuries and defects to which hides and skins are liable, although some of them are not strictly due to the cure.

Drying is a very common method of preserving hides as well as other putrescible matters. It has no effect in killing bacteria, but putrefaction can only go on in

Hides are not unfrequently cured by steeping in salt brine, instead of strewing with dry salt. This method is principally resorted to in order to give fictitious

Carbon disulphide.

Copper sulphate

Bisulphites

Gerber, 1889, p. 98.

, "pure crystallised carbolic acid," is hydroxybenzene C

dissolved in iodide of potassium solution was patented by Messrs. Collin and Benoist as an antiseptic in tanning, but it is ineffective for the

calcium butyrate. If the nourishment fails, or the conditions become less favourable for one

—Yeast-cells, much magnified.
capable of linking with acids, and carboxyls which will combine with bases (see outside and the resisting cohesive force of the gelatine; and will depend not only on the nature of the substances, but on temperature and concentration. For alcohol, and the cohesive attraction of the gelatine is greater than the attraction ions in the solution. As the pressure of the acet-ions and the hydrogen-ions will be greater than the dissociation-pressure of acetic acid, they will combine to form solution of sodium chloride produces an osmotic pressure nearly double that corresponding to the number of molecules of NaCl present; and in fact behaves as if at the same temperature and occupying the same volume as the solution. It acts, in fact, precisely as the “partial pressure” of a vapour. There are several indirect arrangements. They dissolve in themselves no part of the solvent, but are dissolved by it till an equilibrium is reached in which the tendency of further particles of liquids; there is a mutual solubility, a portion of the solid dissolving to a liquid solution, while the remainder of the liquid dissolves in the solid, increasing its velocity of a molecule of oxygen (O equal volumes of all gases have the same number of molecules, the lighter molecules making up for their want of weight by their greater velocity. The average increase rapidly in intensity as the distance of the attracting bodies diminishes, so that in solids and liquids, where the molecules are near together, they are this latter coagulates and becomes insoluble in water on heating to 60° C. This was considered by Rollet to be an albuminoid substance; but powdered potassium persulphate is now added, and the boiling continued till the liquid has become colourless. The operation of boiling should be conducted in a nitrogen which any particular portion of the material may contain, and, as gelatinous fibre, which constitutes by far the greater portion of the true skin, contains experimenting with baryta-water, because, being more concentrated than lime-water, the coriin remained dissolved in the barium salt formed on neutralising with solution with acetic acid, when the substance is thrown down as a flocculent precipitate. This was considered by Rollet to be an albuminoid substance; but containing 10-12 per cent. of hydrochloric acid. The earlier products of putrefaction are very similar. Many bacteria have the power of liquefying gelatin-jelly. This has been shown by Brunton and Casein—The fresh hide contains a portion of actual albumin, viz. that of the blood-serum and of the lymph, which is not only contained in the abundant nitrogen (H (N, resembles phloroglucol in giving a purple-red colour to fir wood moistened with hydrochloric acid (H N, resembles phloroglucol in giving a purple-red colour to fir wood moistened with hydrochloric acid (H p. 186 6·5 6·7 25·9

CHAPTER IX. 6·5 6·7 25·9

Fig. 16

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obviate which, a slight liming is frequently given after the sweating. Hides which have been unhaired in this way require to be swollen by acid in the liquors in

stocking is 10-30 min., according to the condition and character of the hides. Hides should not be stocked until they are so far softened that they can be doubled

steadily over and over. The whole number should not be put in at once, but should be added one after another, as they get into regular work. The duration of

are not only less injurious to the hide than those of greater strength, but they are also more effective in softening. Eitner (Gerber, 1899, p. 584) states that when

constant and careful watching, and the goods must be withdrawn as soon as they are thoroughly softened, for the putrefaction is constantly destroying as well as

stronger acids will not maintain plumpness. Eitner mentions the case of a stream at Vissoko in Bosnia, which was in special repute among the tanners from its

the plumper limed hides remain in it. In soft but peaty waters, hides fall rapidly, from the neutralisation of the lime by the weak organic acids of the peat. Such

contained a considerable quantity of calcium and magnesium sulphates. These facts also indicate the importance of the thorough removal of salt from hides

they are not without effect it is probable that in many cases the water is blamed for troubles

objectionable as a constituent of boiler-waters, as it liberates hydrochloric acid at high temperatures, and corrodes the plates at the surface of the water. This

are necessary in sole-leather tanning.


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acts as a drench and removes traces of lime still left in the hides, so that the liquors have a more even effect on them. Experience has shown that the skins should
in many respects particularly suitable. Sole-leather may be improved in colour by giving a short bath in 1
being used repeatedly, but some of the organic products dissolved from the hide have themselves considerable power of removing lime. Putrefaction should not
lime from used bating liquids containing weak organic acids, or other lime solvents, so as to restore their original activity. Not only is the bate economised by
become dissolved, since, if present in the bating liquid, it is sure to be fixed by the hide, especially if the quantity of acid used is insufficient to neutralise the
plump the skins before tanning, and complete the removal of lime. The drench-liquor is an infusion of bran made with hot water, and allowed to ferment under the

generally arranged right-handed on one half, and left handed on the other, so as not only to scrape the hide in the direction in which the cylinder works, but also to
are to be applied.

reduce the fibre to a gelatinous condition, than there is from too concentrated solutions. No danger need, however, be apprehended in the course of any ordinary
has the property of loosening the hair and epidermis structures with less solution of cement-substance than lime alone, and hence produces a leather of fuller and
action is somewhat uncertain and slow. "Polysulphin" (Polysulphin Co., Keynsham) owes its unhairing power principally to the sodium carbonate, and not to the
If sodium sulphide be added to the caustic soda used for unhairing, the goods will unhair without the use of putrefactive means, but the process is difficult to
experiments on these points are extremely desirable.

been made up entirely with old lime-liquor well charged with ammonia and organic matters, instead of with water. It is also probable that the hides had undergone
charged with it. It is also certain that old limes containing much organic matter, support bacterial life freely, while 25 per cent. of a possibly not very old liquor
and unwashed, and in both cases the pieces unhaired freely in three to four days. These experiments were varied by using 6, 18 and 30 grms. of lime per liter of

It is important that the lactic acid should be free from iron, a dilute solution should give no blue coloration on addition of either potassium ferrocyanide or
Borax has also been suggested as a deliming agent, and as it is chemically an acid salt, it has naturally some deliming effect, but it cannot compare with boric
Acetic, formic, and lactic acids are safer than sulphuric, but are somewhat costly, and must not be used in appreciable excess. Crude pyroligneous acid may be

where the ordinary impure limes from limestone are employed, a somewhat stronger lime-water is often obtained. This is difficult to explain, but
employing lime-water as a standard solution to take care that it is saturated at a constant temperature. The results given in the above table are those from pure

As the manufacture of lactic acid by fermentation is too recent to have a good name, it is necessary to content ourselves with the results of one or two experiments.
On the manufacture of lactic acid by fermentation, see Claflin, Journ. Soc. Chem. Ind., 1897, p. 516. Campbell states that practically pure cultures of the lactic
has suggested the use of compounds of sulphur and arsenic (thio-arsenates, thio-arsenites, etc.), in 5 per cent. alkaline solution. He prefers to add

S·9OH

50°

20°

5

2

1·30

49·86

0·0981

It differs from the one used for

—Jones Fleshing Machine.

for methods of estimation of ammonia,
the alkali used, and on adding sufficient sulphuric acid to combine with half the base, potassium or sodium dichromate (or as it is commonly called "bichromate")

means are found for its preparation, it is of little practical interest. Its salts are blue. On the other hand, salts of the trivalent form, corresponding to the ferric salts

iron, it possesses a divalent and a trivalent form, but the divalent has so strong an affinity for oxygen, and passes so readily into the trivalent form, that until easier

similarity of constitution, iron or chrome taking the place of the aluminium. Iron-alum, in conjunction with salt, can be used for tanning, giving a pale buff-

drying should be rapid, but is best done first at a moderate temperature, or in the open air, and then in a rather hot stove. They may now be allowed to "age" from

the goods allowed to rise two or three times in the drench, which should be conducted with the usual precautions (partial substitute for puering with dung, which is now no longer used on calf-kid. The goods are next drenched in the ordinary way, 3-4 % of bran being used, and

acid, forming sodium sulphate, while the alumina remains in solution as a "basic salt." As the term "basic salt" must be frequently employed in connection with

gives up its acid to the pelt, becoming converted into a basic salt (see

about nine parts in 100 of water, and more easily, and to a much larger extent in hot water, from which the excess crystallises on cooling. It is said that for

group of which aluminium, iron and chromium are representative, and which are capable of producing salt-forming oxides of the formula M

a large quantity (say 100 gallons) of water at 45°-50° C., allowed to settle, and drawn off through a basket, and strained into the puering paddle through a second

steaming nearly but not quite to boiling point, care being taken to avoid the introduction of condensed water containing iron, and the dung thoroughly mixed with

rest undisturbed till required. Clean extract-casks are very suitable for the purpose, if carefully and repeatedly steamed out, and Borgman advises that a regular

which turn black and putrid without softening. Dung should, therefore, be mixed to a paste with water and kept in tanks, so as to be but little exposed to the air,

sample analysed by Wood gave 4·7 per cent. mineral matter, 9·7 per cent. organic, and 85·6 per cent. of water, part of which was no doubt added.

nitrogenous matter and phosphates, together with a lactic ferment, and which only requires dissolving in warm water some little time before use. Its results are

pipe easily screwed on and off, and also furnished with a
importance, that some particulars seem desirable. However, the information provided is not sufficient for a clear understanding of the context. Could you please provide more details or context?
Hamburg, in logs, which are there chipped like logwood, and either used direct for tanning, or made into extract. A very cheap tan. With alum it gives a yellow

and tannin are contained in large and somewhat thin-walled cells, and the sliced material is easily extracted at low temperatures. Greater heat gelatinises the
gives leather a bright orange colour, and, it is said, considerable weight and firmness, and is thus specially suitable for use in retanning and finishing light goods

beaten and acorns left on the ground to dry. They are afterwards gathered, and carried on camels to stores in the towns, and thence by camel and rail to Smyrna,

ordinary oak, but more strongly furrowed. Produced chiefly on Mediterranean coasts, and formerly largely used in Ireland.

flesh-side. All the best oakwood extract manufacturers contract to sell on analysis and colour estimation, and good Slavonian oakwood extract generally contains

bark extracts contain perceptible traces of manganese, but this cannot be relied on as many wood extracts also contain some, probably derived from the twig and

treated with concentrated sulphuric acid in a test-tube, a deep crimson will be produced, especially at the surface of the acid, which remains pink on dilution with

Superheated steam, produced in a small boiler in the woods, is used.

sometimes mixed with quebracho and other materials,

produce the birch-bark tar used to give scent and insect-resisting power to "Russia" leather.

11-18 per cent. of tannin.

importance, that some particulars seem desirable.

Rhus coriaria

Malpighia punicifolia

Byrsonima spicata

Persea Meyerina

Polygonum Bistorta.

The beard contains considerably more tannin than the cups, sometimes over 40 per cent. It is often sold separately at the same or a lower price, and in Smyrna

Q. ilex

English bark is sometimes sold in "long rind," and sometimes "hatched" or chopped in pieces about four inches long. Belgian and Dutch barks are generally

Most tannin is contained in the living part of the bark. The yield diminishes in trees over twenty-five years, and coppice barks, from absence of ross, are often

Apart from microscopic characteristics, the external appearance of barks, both to the naked eye and by the aid of a lens, forms a valuable means of recognition.

Q. infectoria

1

Q. lamellosa

Pinus halepensis

Q. sessiliflora

Quercus suber

Saccharum officinarum

S. Adansonia

Gaultheria procumbens

Dentelaire

Filao

Minibari

Weiss-

Traubeneiche

Chêne faux liège

Ackerdoppen

S. Adansonia

Canaigre

—Canaigre (It.

CUPULIFERÆ.
crystalline, but generally amorphous, and of yellowish or brownish colour. When the infusion of tannin is very weak, the precipitate is sometimes only slight, or
by OH groups. Common phenol or "carbolic acid" is their simplest representative. Many of them, including pyrogallol and catechol, are used as photographic
considerable chemical training, and experience, detailed description is outside the scope of the present work, but some particulars
quicker growth, would oppress the slower-growing broad-leaved one. Care should be taken to replace every tree stripped by re-sowing, in order that there should
A. decurrens
the former marked "Green Wattle" showed 36-39 per cent. of tanning matter; another sample marked "Sydney Green Wattle," contained 41 per cent. A sample of
midrib (phyllode). Thus leaves of two very distinct forms are common in the genus, and some acacias, as
contains about 3 per cent. tannin. Its principal use is in dyeing blacks with iron or chrome mordants. (See
locust-bean, derived from Arabic
drying to an S-shape.
fairly rich in tannin.
recently in the Author's laboratory, contained 62 per cent. of tannin. The tannin is a catechol derivative, differing from that of
adulterant of ground myrobalans. A sample of solid extract made from the bark of T. Belerica contained 70 per cent. of tannin.
water for some time. The bark is almost as rich as the fruit, and the tree also yields galls.
Sicily to be used for the adulteration of sumach under the name of "Brusca," and contain about 9 per cent. of tannin. (Cp.
cent. Besides the forms named, various others are made, principally for native use in chewing with betel-nut in the form of small biscuits, or in thin discs ("wafer
leaves has an important influence
this purpose is one consisting of square links fitting into each other and capable of running over toothed wheels. These chains are made by several firms in
extent, subject to the same disadvantage, is the "shaving-mill," in which blades are fixed like plane-irons upon a disc, cones or cylinder, and are rotated at a high
3000 revolutions per minute.
edges. The construction of this class of mill will be easily understood from
appreciably damp. On this account it is always well to run the mill with a fairly slack belt which will slip before exerting
cone rotates within an outer hollow cone or casing, also provided with blades or teeth which are sloped slightly in the
vertical section of the cone, and which are made finer and increased in number towards its lower and wider part. This
converted into percentages by multiplying by 100 and dividing by the weight of substance originally taken. An alternate method, which is frequently convenient
liquid and semi-liquid extracts, and so dilute them that by inclining the basin they can be distributed in a thin layer over its sides, while at the same time the
shown by Paessler and Appelius

The powder is retained in its position in the bell by a piece of muslin held by an indiarubber band, and the bell is then placed in a
are taken, it is desirable that those weights which are in duplicate should receive distinguishing marks (e.g. with a centre-punch), and should always be placed on

should carry 100 or more, it is always possible with a little ingenuity, to manage within 50 grm.; and if a cheap balance must be used, the smaller size will

vacuum-oven; two to three in the air-oven at 105°; and probably about four hours in the water-oven, except in the case of gambiers, which may require somewhat
millboard, which may be attached with rivets, or even with ordinary paper-fasteners. One to one and a half hours will be required to dry to constance in the
freely exposed as possible to the air in the interior of the oven (in no case must basins be set one inside another, except in the exsiccator for cooling), and little or
other hand, so long as it is kept boiling and supplied with water, the temperature is necessarily constant, and there is no danger of overheating, which easily
allow of free circulation of air. If perforated zinc is used, it must be well supported, as it is much softened at the temperature used. The least satisfactory appliance

In many cases the trough is V-shaped with the chain running
Chain-Conveyors.

It frequently happens that the material is delivered from the mill in a very unequal state of division, and it is sometimes necessary to screen it and thus separate

When myrobalans or valonia is to be used for leaching, it is

A new form of disintegrator has been recently brought out in America by the Williams' Patent Crusher and Pulveriser Company, in which a series of discs are

In order to avoid vibration, the discs and beaters of all these high-speed mills must be balanced with great accuracy. This is best accomplished by removing the

Methods of correction for absorption of filter-papers have been worked out in the Author's laboratory, and adopted by the last conference of the International

It must specially be insisted on, that absolute adherence to the methods given is essential to obtaining concordant results, and little points of manipulation

The best method of weighing out exact quantities may be here described for those to whom it is not already known, as much time may be wasted by attempting

sample truly representing the bulk, which is often by no means easy, while failure to accomplish it is

It must specially be insisted on, that absolute adherence to the methods given is essential to obtaining concordant results, and little points of manipulation

necessary to treat, is placed in a water-bath, as shown in

The solution is now cooled, and made up to the mark as has been before described.

It must specially be insisted on, that absolute adherence to the methods given is essential to obtaining concordant results, and little points of manipulation

Hemlock bark
Canaigre

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It must specially be insist
than that of beef. Goat tallow has a characteristic odour, as have the recovered stearines and other waste greases from glue-works. Buck tallow, which is parts of the carcass is known as “rendered tallow,” while that obtained from the region of the kidneys (suet) is harder. A substance commonly referred to as them. Taste and smell however, with practice, often furnish useful indications.

exception to the rule, owing to the large proportion of oxygen which it contains, being readily soluble in alcohol, and very sparingly in petroleum-spirit; and other.

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are important proximate products of its decomposition, it contains both acid and basic groups, and is therefore capable of attracting both bases and acids. It is well
explanation in all cases. One holds that the action of dyeing is mechanical rather than chemical, the colour adhering to the fibre by surface-attraction; another, that
way, very considerable quantities of oil may be introduced into leather without giving it the least greasy feel. Egg-yolk contains about 30 per cent. of an oil
not only because the free acids oxidise more freely than the neutral fats, but because their presence is an evidence of the tendency to rancidity and change in the
The exsuded matter consists of the oxidised products of oxidisable oils, but the cause of its appearance is not always easy to explain. The currier generally
would prove an efficient remedy, as it has little odour, and its antiseptic properties are very strong, but it has not been tried by the writer. (Cp.
during slow and warm drying is very troublesome. This may be prevented by the addition of antiseptics to the stuffing grease. Carbolic acid and creasote are
must be stirred continuously till this has taken place, as otherwise the mixture separates into little globular masses of crystals with liquid oil between them,
their adherence after they are once separated by the mechanical treatment. At the same time some chemical change takes place in the fibre itself, which has a part
kneading and stretching it as it slowly loses moisture and absorbs the fat. Under these conditions, the fibres become coated with a greasy layer, which prevents
in water. The rosin acids are not so strong as many of the fatty acids, and rosin soaps are therefore somewhat strongly alkaline. Rosin soap, precipitated among
hardness and melting point vary according to the extent to which the pressing has been carried, and the temperature at which it has been done. Some,
sometimes substituted for birch tar, but it may readily be distinguished from the latter by the odour and the difference in the specific gravity. Birch tar has a
temperature reaction" (L.I.L.B., p. 169) which is about 306. It is not a good leather-oil, being very liable to "spue."
of the best filters for this purpose is a table of wire-gauze covered to a depth of 3 or 4 inches with loose wool. Hair or cheaper fibrous materials may be substituted reserved for drying off the finished leather. A disadvantage of this plan is that open air drying can seldom be utilised except in an elevated building; and even note that the table refers to steam-pipes in still air, and that if placed in a powerful draught, (as immediately before or behind the fan), their heating effect may be and to maintain its temperature 30° F. above the atmosphere at 1·2 cal. per sq. foot would require 4800 cal. per hour or 80 cal. per minute, a very small amount the same temperature of an equal weight of steam in the heating pipes, and this, as we have meter of air; but for practical purposes, all that is necessary is to find by experience the temperature and difference between the wet and dry bulbs, which gives the remedied by a proper circulation of the air by a fan without too frequent change with the colder air outside. On the other hand the use of a little artificial heat in of mercury at 100° is mixed with 1 lb. of water at 0°, though in this case, owing to the small capacity of mercury for heat, the common temperature would only be form, as from heat to work, but that it cannot be destroyed, diminished or increased; and therefore the whole of the work performed in converting the water into let us first imagine a liquid sealed in a glass flask, which contains no air, but which is only partially filled by the liquid. It has been pointed out that the motion of leathers are also grained by printing from engraved or electrotype rollers, or by "boarding," or a combination of the two. "Boarding" consists in pushing forward a dye is often very useful. The colours are used in solutions of from may contain. It must thus coloured leathers of vegetable tannage. Peach-wood, with a tin mordant (generally a so-called "tin spirits" made by dissolving tin in mixtures of hydrochloric and is important in dyeing blacks. Fustic and Brazil-wood (peach-wood) are not quite gone out of use among old-fashioned dyers, even for dyeing moroccos and other organic acid. Many acid colours, however, dye quite satisfactorily from a neutral bath. The acid colours are used in somewhat similar quantities to the basic, but carbonate, it is important that "temporary" hard waters should be neutralised with acetic or lactic acid till they faintly redden litmus; and in the case of colours be fixed, often with addition of some common salt), which produces no alteration in the colour. For browns, yellows, deep reds, or yellow-greens, it is dyed to shade. The second tray is much reduced in strength by the skins, and now serves as the weak liquor for a fresh pair, which in its turn passes into that from heated to 60°, as they will cool it sufficiently. maintaining the temperature complicate the apparatus, and require great care to avoid overheating. It is usually best to work at the highest temperature which the that, if desired, the grain sides only of the skins can be coloured, by "pairing" or "pleating" them before dyeing. For this purpose two skins of equal size are laid volatile at a low temperature, and therefore liable to "mark off" or stain any materials with which the dyed fabric, even in a dry state, is placed in contact. precipitation of loose colour on the surface, either by the too free use of mordants, or the dyeing of basic colours on leathers which have not been sufficiently comes in contact. being produced in the former case by the addition of colours, and in the latter by their subtraction. know knowledge of the subject is insufficient to justify theorising. (See, however, overlook in practice, that if ferrous salts are mixed with bichromate solutions, the latter are reduced, and the iron is oxidised to the ferric state. of in combination with the fibre, and is particularly obvious where "inks" or one-solution vapour —Capel Centrifugal Fan. —K.-calories per hour
be made on the solution used for analysis, but must be calculated to one containing 0.5 per cent. of tanning matter, in a centimetre cell.

...oven, at a temperature of 100° to 105° C., or at a temperature not exceeding 100° C.

...that of a liquid extract.

...boiling water and well shaken, and the flask shall be filled to the mark with boiling water. The neck being covered with a small beaker, the flask shall be placed...

..weighed out with as little exposure as possible, to avoid loss of moisture. Where extracts are partly dry and partly pasty, so that neither of these methods is...

...much lime as to make them distinctly alkaline. In this way most of the disinfectants will be either precipitated or rendered inactive. Where arsenic is used in the...

...as well (Koenig). The tan, after being used for this purpose, contains so much lime in its pores that it is said to be useful as manure.

...in working order, the liquid is much purified by the process, and most of the solid organic matter has become liquefied and disappears. It not unfrequently...

...the lowest layers are very coarse, the surface of the filter-bed should be of the finest material. As soon as this has become covered with so thick a layer of solid...

...drawn in great quantities from the furnace, and the gases then returned through the tubes of the boiler, afterwards passing down the sides and going to the...

...heated liquor, and should afterwards be freed from gelatinous matter by washing it with hot water in a tub and running off the upper layer after allowing the water...

...when the skin has been through the lime-pits.

...apt to "hammer"; and they are also costly in steam, which cannot be used expansively. Steam-pumps with fly-wheels, operating the steam-valve by an eccentric,

...which are sufficiently raised to allow it to be run from them into the horizontal distributing troughs which have been mentioned. This is specially important with...

...middle, so as to become fixed in the lead. To prevent adhesion, the tin must be previously burned off, and the basin well blackleaded. This weight forms the valve,

...often be used satisfactorily in place of the chain.

...up ground bark, even from a hopper; and in any case such elevators are apt to be troublesome. In a grinding plant designed by the writer, the unground material...

...toughness of belts, and they may also be rendered tender by the heat evolved in slipping on a pulley.

...they vary inversely as the size of the pulleys. Thus a 3-feet pulley running at 100 revolutions will drive a 2-foot pulley at 150 revolutions, and a 12-inch one at...

...the temperature rises beyond a given point. There are two or three recognised patterns approved by the Fire Offices Committee after patient investigation and...

...advantage when the source is at such a level that the water can flow into the tan-yard, or at least into the beam-house, without pumping. Filtration too, when...

...costly and troublesome, and apt to leak, and may in many cases be avoided by suitable arrangement of the pipes. Thus instead of having the pipes rigidly fixed at...

...no steam-trap is desirable, but any steam not condensed should escape freely into the open air or a chimney (after separating condensed water), and it is well to...

...of the best filters for this purpose is a table of wire-gauze covered to a depth of 3 or 4 inches with loose wool. Hair or cheaper fibrous materials may be substituted...

...Coloured hair is sometimes washed and treated like the white hair, but is usually sold direct to plasterers, in which case there is no necessity to remove all the...

...Such quantities shall be weighed as will give an infusion of the strength already prescribed. (p. 97.)

...—The various scraps of fat and flesh, more or less free from actual hide substance, are usually worked up for glue, though if they...

...—Such quantities shall be weighed as will give an infusion of the strength already prescribed. (p. 97.)

...the mould being soaked with hot paraffin wax to prevent adhesion. Means must be provided for the ready clearing of the...

...If possible, both leaches and handler-pits should be provided with plugs and underground pipes, communicating with a...
devoted much time to testing the various dyes with regard to their permanence and suitability for leather. Many of the colours have also been tested and found
drying to constant weight. Treat 200 c.c. of the solution with hide-powder exactly as described in paragraph 6. The hide-powder must absorb at least 95 per cent.
remaining three-fourths carefully and add them to 200 c.c. of the original solution; shake ten minutes, throw on funnel with cotton plug in stem, return until clear,
to until the wash-water does not give a precipitate with barium chloride. Squeeze thoroughly by hand, and remove as much water as possible by means of a press,
Chemists, 1901 (A.O.A.C.), should be employed in the detannisation of used tanning liquors, as with these the filter method is apt to give too high results owing

Leon.
C.
B.S. Spl.

VIII.
VIII.
VIII.

VII.
VII.
VII.

Paris violet o. (D.)
Methyl green G ext. fine. (D.)
Auramine 2. (S.C. Ind.)
Canary 2. (R.H. & S.)
Auramine conc. (M.L.B.)
Philadelphia yellow R. (Ber.)
Emerald green cryst. (By.)
Neutral violet ext. (O.)
Chrysoidine. (C.)
Azo-flavine RS. (B.A.S.F.)
Light green SFYS. (B.A.S.F.)
Bavarian blue DB, or Guinea green G. (Ber.)
Napthol brown. (Leon.)
Cuba yellow. (W. Bros.)
Resorcin brown. (W. Bros.)
Fast green blue shade. (By.)
Fast brown G. (Ber.)
Naphtol blue black. (C.)
Pure soluble blue. (C.)
Indian yellow G. (C.)
Azo-yellow o. (M.L.B.)
Corvoline B. (B.A.S.F.)
Methyl violets. (Ber.), (By.), (M.L.B.), (R. H. & S.), (B.S. Spl.), (C.) (S.C. Ind.), (P.) and (D.).
Methyl green cryst. (Ber.)
Cannella G. (W. Bros.)
Patent phosphine R. (S.C. Ind.)
Rheonine A. (B.A.S.F.)
Bismark brown 3762. (W. Bros.)
Bismark brown RS. (B.S. Spl.)
Bismark brown 2B. (K.)
Erioglaucine. (G.)
Acid green (R. H. & S.)
Bordeaux cov. (Ber.)
Orange 2. (M.L.B.), (S.C. Ind.), (C.) and (B.A.S.F.)
Turmeric yellow. (C.), (G.)
Indian yellow R. (C.)
Phosphine subst. (B.S. Spl.)
Acid brown. (Ber.)

The temperature of solutions shall be between 16° and 20° when measured or filtered. All dryings should be made in flat-bottomed dishes of at least 6 cm.

In the case of bark and similar material, use such quantity as will give about 0·35 to 0·45 gram tannins per 100 c.c. of solution, extract in Soxhlet or similar

Barks, woods, leaves, dry extracts, and similar tanning materials should be ground to such a degree of fineness that they can be thoroughly extracted. Fluid

The Centigrade or Celsius thermometer divides the difference between the freezing and the boiling points of water into 100°. The following table gives the

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Degree Centigrade</th>
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<tbody>
<tr>
<td>0</td>
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<td>90</td>
<td>90°</td>
</tr>
<tr>
<td>100</td>
<td>100°</td>
</tr>
</tbody>
</table>

All dryings called for, after evaporation to dryness on water-bath, or others, shall be done by one of the following methods, the soluble solids and non-

Greens.
Yellowish Oranges.
Russian red (Ber.)
Russian red G. (B.A.S.F.).
Magenta 4128. (B.S. Spl.)
Magenta. (M.L.B.)
Magenta RE. (Leon.)
Magenta WB. (Leon.)
Methyl Violet 6B. (Leon.)
New methylene blue. BB. (C.)
Malachite green. (C.A.)
Brillt. green cryst. (M.L.B.)
Cannella P. (W.)
Bismark brown o. (M.L.B.)
Vesuvine conc. (M.L.B.)
Vesuvine (C.)
Vesuvine B. (B.A.S.F.)
Capri green 2G. (Lev.)
Acid green 225. (By.)
Acid violets 3BN. (Lev.)
Acid violets R. (B.A.S.F.)
Water blue N. (B.A.S.F.)
Bavarian blue DB. (Ber.)
Acid violets 3BN. (Lev.)
Acid violets R. (B.A.S.F.)
Water blue N. (B.A.S.F.)
Bavarian blue DB. (Ber.)

Procter and Blockey quoted experiments at the Leeds Conference, proving that gallic acid and some other non-tanning substances were largely absorbed by the

W  
N  
L. C

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Basle, Switzerland.

O

AYER

Huddersfield.

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Given:—
transferring to the dye-bath without washing. Equal weight of bisulphate of soda to that of the dyestuff is added to the dye-bath.

bright the albumen solution may be reduced to half-strength.

skin, for a few hours in order to allow the goods

chrome leather well, but merely representative.

paddling in a tannin solution; for dark shades 3 per cent. gambier and 3 per cent. fustic extract (the weight being calculated on the leather struck out after

Anthracene brown GG. (By.)
Jet black cryst. (C.)
Acid anthracene brown R. (By.)
Orange 2. (M.L.B.)
Water blue 4B. (Leon.)
Blue R. (Lev.)
Acid green ext. GG. (By.)
Acid green (Uer.)
Guinea greens G and B. (Ber.)
Azo-flavine. (B.S. Spl.)
Cuba yellow. (C.) and (W. Bros.)
Quinoline yellow. (Ber.)
Turmeric substitute (W. Bros.).
Phosphine substitute. (B.S. Spl.)
Golden brown Y . (W. Bros.)
Brown 2Y . (R.)
Acid brown 5210. (W. Bros.)
Resorcin brown. (W. Bros.)
Paris violet o. (D.)

As regards the permanency of the various colours to light, the reader

In addition to the dyestuffs mentioned above many basic colours may be employed after the treatment with titanium, some of these producing a colour lake

Scarlets and Reds.

— effects on tanning,
— effect on dyeing,
— -muscle,
— chemical constitution,
— mixtures for leather,
Dyes, acid,
— kid,
Dye-testing,
— hides,
Drying, effect on skin,
Driers for oils,
— leathers,
Dog-dung,
Djaft,
Disintegrators,
— solid, analysis,
Essential oils,
— -cells,
Elastic fibres,
Egg-albumin,
East India skins,
— mixtures for leather,