

**DEVELOPMENT OF CRITERIA FOR ASSESSING THE QUALITY OF SKINS AND
HIDES FOR INDIGENOUS LEATHER PRODUCTION IN THE KUMASI
METROPOLIS**

By

KNUST

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DECLARATION

I hereby declare that this submission is my own study towards the Master of Arts in Art Education and that, to the best of my knowledge, it bears no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

There appears to be problems associated with the quality of skins and hides purchased for indigenous leather production. This is due to the fact that, majority of Ghanaian consumers prefers purchasing foreign made leather products rather than the locally manufactured ones. This existing situation brings about the notion that, the locally processed skins and hides are not properly assessed before they are tanned into leather. It is not known whether local tanners have criteria for assessing the quality of skins and hides. The methodology/procedure for assessment has not been evaluated. The research utilized the qualitative research design as the main method of gathering data where descriptive method of research and a case study were employed. Both structured and unstructured interviews and participant observation were tools employed for data collection. It was observed that quality assurance and control factors that should be applied are not mostly well noticed and have less impact on the standard of skins and hides purchased and used for indigenous leather. Well assessed skins and hides had no defaults on them. When assessment was overlooked, tanned leathers showed symptoms of defect such as unnecessary holes, scratches, breakages/cracks, termite attack on grain and flesh side, fading of colour, weakness in poor strength and poor durability. There was therefore the need to use suggested criteria to educate them, prevent and eradicate bad quality skins and hides used for indigenous leather. These defaults can be limited or prevented if tanners work together and adopt standardized criteria for thorough assessment of the quality of skins and hides for leather. Quality assurance and control factors if used frequently by the tanners and adopted will improve upon the quality of skins and

hides assessed for leather. Finally, health and educative programmes, seminars and workshops are recommended to be organized frequently to educate the public concerning the quality of skins and hides for leather.

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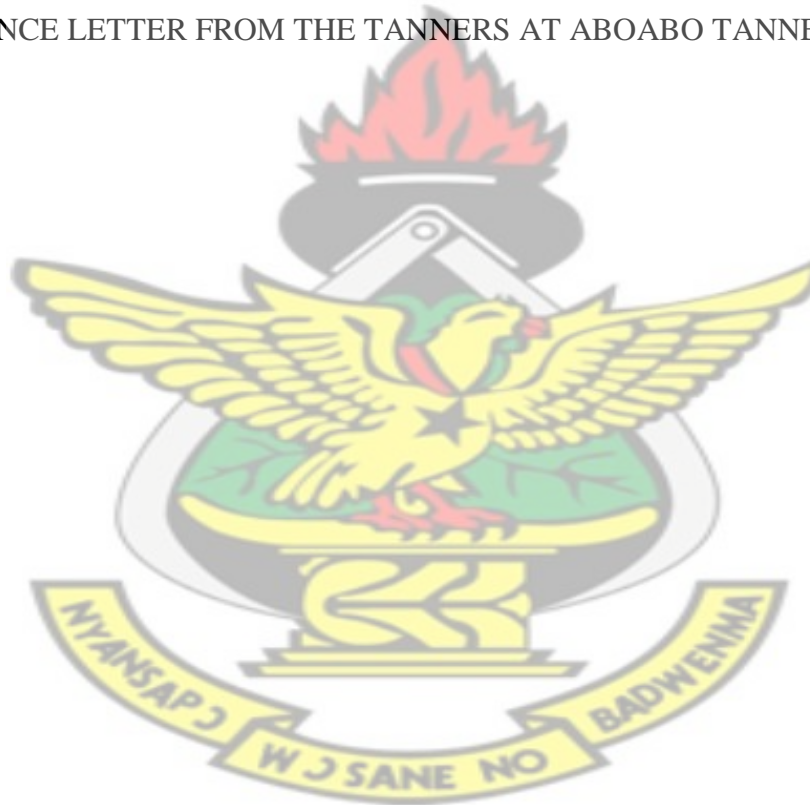
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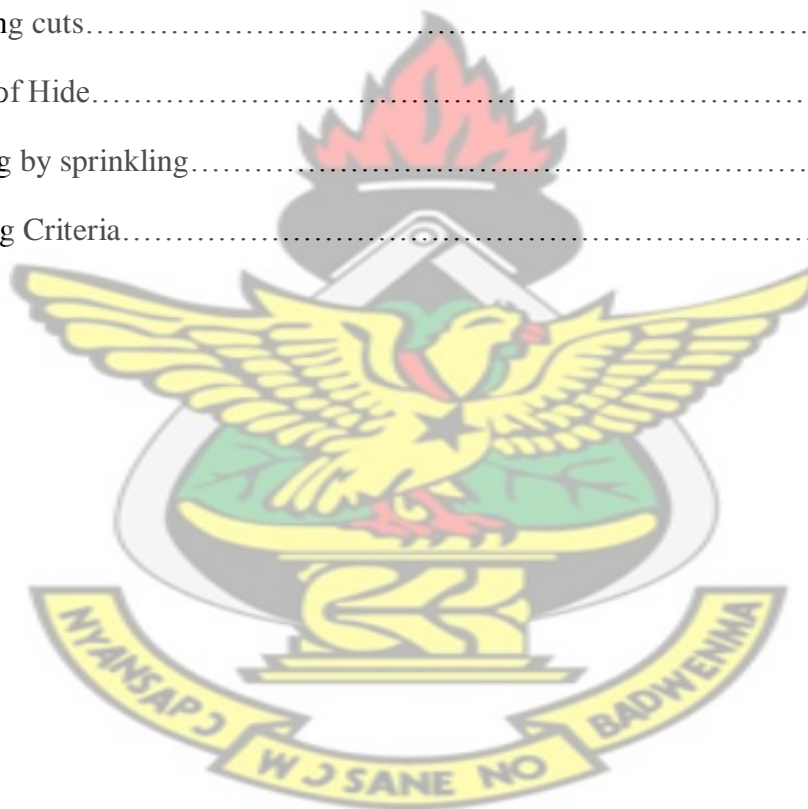
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CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter commences with the Background to the Study, followed by the Statement of the Problem, Research Questions, Objectives of the Study, Delimitation, Limitation, Definition of Terms, Importance of the Study, Abbreviations and Organization of the rest of the Text.

1.2 Background to the Study

The Prehistoric people, who lived during the Ice Age some 500,000 years ago were likely the first to use skins and hides of animals to protect their bodies from the elements. Just as leather today is a by-product, our ancient ancestors hunted animals primarily for food, but once they had eaten the meat, they would clean the skin by scraping off the flesh and then sling it over their shoulders as a crude form of coat (Boahen, 2005). According to Boahen (2005), the main problem that primitive man encountered was that after a relatively short time the skins and hides decayed and rotted away. With his limited knowledge and experience, primitive man had no idea how to preserve these skins and hides. As centuries passed it was noticed that several things could slow down the decay of leather. If the skins were stretched out and allowed to dry in the sun, it made them stiff and hard but they lasted much longer.

Skins and hides when tanned become leather. To earn quality leather, the skin/hide used should be tested and treated well. Leather is defaulted due to the quality of skin/hide used and how it is treated. The problems confronting indigenous tanning have over the years

hindered the popularity and market value of leather articles. However, the expanding taste for quality and more aesthetically appealing goods in this economically competitive era requires the development of innovation in the indigenous leather industry as well (Boahen, 2005).

Raw material quality is a prime concern for tanners the world over. The tanning industry and the downstream industries which it supplies - footwear, furniture, automotive, clothing, leather goods, saddlery - are entirely dependent for their raw material on supplies of cattle hides and sheep skins, plus a small number of goat and other skins. While supplies and quality of hides and skins are vital to the tanning industry, they are just by-products for the meat, dairy or wool industries. For the tanner, the raw hides and skins represent 50-60% of the cost of producing a piece of leather.

In order for many companies in the leather industry to be competitive, they specialize in producing particular types of leather such as high quality and high performance leathers. However, the potential benefits can only be fully realised when the hides and skins available to the industry reach a consistent quality, allowing tanners to buy with confidence that the material will be suitable for the manufacture of leather to meet their target markets. The quality of leather that the tanner can produce is determined primarily by the quality of the raw skins/hides purchased. The quality of the skins/hides cannot be fully assessed until after the hair or wool has been removed, and after the completion of the tanning process when the skin/hide has been turned into leather. The value of the hide depends on the end use to which the leather goes. This eventually has to be reflected in what the tanner pays for the raw material.

The quality of the hide or skin is to a large extent related to the amount of damage to the grain (or "outside") surface. The damage may be due to skin parasites that affect the live animal, related scratch, husbandry practices on the farm or in transport of the live animal (scratches, bruising, or dirt contamination); it may be due to damage during slaughter or removal of the skin/ hide (flaying); or it may be caused by inappropriate handling or inadequate preservation techniques (curing). Most types of damage can be reduced or avoided altogether by better management of the animal or the skin/hide.

The international organisation that specialises in the improvement of hide and skin quality is IHATIS - the International Hide and Allied Trades Improvement Society. As part of a project funded by the European Commission, a network was developed of researchers into improvement in the quality of hides and skins. Areas identified for further research and development are a need for further investigation into the operating methods of delivering clean animals to the abattoir without damaging the hide or skin. Optimum methods of minimising parasite damage to hides and skins, practical and economic methods of identifying hides and skins through the chain from farmer to tanner where quality can be fully assessed are also key factors. The development and evaluation of quality improvement systems, in order to provide some incentive to farmers and/or abattoirs to reflect much more directly the quality and value of the skin/hide in the price for indigenous leather production matters greatly.

1.3 Statement of the Problem

The meat industry is the main provider of skins and hides as raw material which is converted into leather. Since the prehistoric period, leather has been used to provide clothing for mankind. In modern times, leatherwork has become an Industry. Leather therefore serves as the backbone of leatherwork and the production of leather artefacts.

Today, the majority of Ghanaians patronize foreign made leather artefacts more than the locally manufactured ones. The respective producers of leather items normally use imported tanned leathers. Their reasons are, the locally tanned leathers are of low quality. In the light of this problem, they choose to use both imported natural and artificial leathers in their work and go further to imitate the brand names of known foreign leather products. This is done to create an impression for consumers to purchase them.

The increase in the population size of Kumasi and the versatile nature of skins and hides have brought about higher demands which have resulted in a keen competition regarding the acquisition of skins and hides by consumers as food (meat) which is locally called, “wele or kawuro” and also for making leather. This challenge has created a situation where tanners mostly ignore the proper assessment of the skins and hides for the production of leather. Even with the few that are assessed, there may be no specific or well defined criteria to ensure the selection of good quality skins and hides for leather. This problem can affect the quality of leather produced in the country. It is therefore necessary to research into the quality of skins and hides in relation to leathers produced in Kumasi and to develop criteria for their assessment.

It is in light of the above discussions that the research sought to find out whether tanners in Kumasi have any criteria for assessing the quality of skins and hides for leather and how the assessment is done. It also sought to evaluate the existing criteria for assessment, if any, and to determine their relevance to the manufacture of quality leather in Kumasi and finally to develop criteria for the assessment of the quality of skins and hides for leather in Kumasi.

1.4 Research Questions

1. What proves that indigenous leatherworkers in the Kumasi metropolis have specific criteria for assessing skins and hides for leather?
2. What new ideas can be harnessed to develop the criteria for assessing skins and hides for leather in the Kumasi metropolis?
3. When and how do properly assessed skins and hides translate into good quality leather?

1.5 Objectives of the Study

1. To find out whether the local tanners have criteria for assessing the quality of skins and hides for leather and how the assessment is done in Kumasi.
2. To evaluate the existing criteria for assessment, if any, and to determine their relevance to the manufacture of quality leather in Kumasi.
3. To develop criteria for the assessment of the quality of skins and hides for leather in Kumasi.

1.6 Delimitation

This study is limited to development of criteria for assessing the quality of skins and hides as used for indigenous leather production in Kumasi. The research environments selected for the study were the Kumasi Abattoir Company Limited at Ahensan. This is the only official abattoir company in the Kumasi Metropolis where there is a farm market adjacent the company for trading of farm animals to the slaughter house. The Aboabo local tannery is the largest indigenous tannery in Kumasi adjacent Asawase, off the Oforikurom-Anloga road. The indigenous tannery is at the central part of the town near the Aboabo mosque. About 90% of the people in this locality are from the northern part of Ghana. The tannery work there has been passed on from generation to generation.

1.7 Limitation

Several problems were encountered in carrying out the research work. Some butchers and curers at the abattoir who had vital information refused to cooperate. Also, some leather traders in the Kumasi Metropolis were not willing to talk and allow pictures of products to be taken especially those that could be useful for the data analysis.

1.8 Definition of Terms

Farm animal – Livestock or any animal kept for use or profit.

Leather - An animal skin/hide made smooth and flexible by removing the hair and then tanning.

Pelt - Body covering of a living animal, either skin from a small animal or hide from a big animal.

Skin - A natural protective covering of the body of a small animal.

Corium - The deep vascular inner layer of the skin.

Hide - The dressed skin of an animal (especially a large animal).

Flank - A cut from the fleshy part of an animal's side between the ribs and the leg or hip bone.

Flaying – Stripping off the skin/hide of an animal.

Curing - Preparing by chemical processing in order to preserve.

Tanning - Treating skins and hides with tannins so as to convert them into leather.

Putrefaction – decay or decomposition caused by bacterial or fungal action.

Bate - Soak in a special solution to soften and remove chemicals used in previous treatments.

Pickle - Preserve in a pickling liquid; as of vegetables.

1.9 Importance of the study

1. The research findings will contribute to the development of the quality of skins and hides for leather produced in Kumasi.

2. The thesis will serve as a body of knowledge which will be a reference material for other leather researchers, writers, publishers, tanneries and leather dealers in Kumasi.
3. It will provide government with information on the problems faced by the leather workers in general, which hamper the growth of the leather industry in providing better services to the local and international market.
4. It will serve as documentation on skins and hides for leather produced in Kumasi.

1.10 Abbreviations

- (i) **IHATIS** - International Hide and Allied Trades Improvement Society
- (ii) **IULC** - International Union of Leather Chemists
- (iii) **NGO** – Non-governmental Organization
- (iv) **QA** – Quality Assurance
- (v) **QC** – Quality Control

1.11 Organization of the Text

The study is divided into five chapters. Chapter one introduces the study. It consists of the statement of the problem, background statement, research questions, objectives of the study, delimitation, definition of terms, abbreviations, importance of the study and organization of the text. Chapter two consists of the available theories and empirical literature related to the study. Chapter three deals with the methodology used for the study. Chapter four consists of

presentation and discussion of findings. Finally, Chapter five consists of the summary, conclusions and recommendations.

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CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Overview

This chapter deals with theories and empirical literature related to the thesis. For the purpose of this study, the source of the review was textbooks, journals, newspapers and the internet. The review focuses on; Quality Assurance and Quality Control, Skins and Hides and Leather. Various sub topics are discussed under these topics.

2.2 Quality Assurance

According to Godfrey (1999, p.12), “Quality assurance (QA) refers to a programme for the systematic monitoring and evaluation of the various aspects of a project, service, or facility to ensure that standards of quality are being met”. The Wikipedia, the free encyclopedia further explains that, two key principles characterise QA: *“fit for purpose”* (the product should be suitable for the intended purpose) and *“right first time”* (mistakes should be eliminated). In view of this, QA includes regulation of the quality of raw materials, assemblies, products and components; services related to production; and management, production and inspection processes. QA does not eliminate the need for QC: some product parameters are so critical that testing is still essential. QC activities are treated as one of the overall QA processes.

O’Brien (2005, p. 47), states that “Good practice for QA procedures requires an objective review to assess the quality of the inventory, and also to identify areas where improvements could be made”. The author further explains that concerning the steps for a typical quality assurance process, there are many forms of QA processes, of varying scope and depth. The

application of a particular process is often customized to the production process. A typical process may include:

- test of previous articles
- plan to improve
- design to include improvements and requirements
- manufacture with improvements
- review new item and improvements
- test of the new item

The researcher attests to the fact that in assessing the quality of skins and hides for leather production QA processes as explained by O'Brein (2005) should be considered on the products. The previous artefacts produced from the raw materials should be tested. There should be a plan to improve upon the products after testing them. Designing to improve upon the improvement of products should be required in advance. The quality making of subsequent products should be improved. The improved products should be evaluated and examined to meet the required standard of quality.

2.3 Quality Control

According to Godfrey (1999, p.15), “basically, quality control involves evaluating a product, activity, process, or service. By contrast, quality assurance is designed to make sure processes are sufficient to meet objectives”. The author simplifies this statement that, “quality assurance ensures a product or service is manufactured, implemented, created, or produced in the right way; while quality control evaluates whether or not the end result is satisfactory”.

In view of Godfrey's comments, Quality control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer. QC is similar to, but not identical with, quality assurance (QA). QA is sometimes expressed together with QC as a single expression, quality assurance and control (QA/QC). Godfrey (2005) concludes that, "Quality control emphasizes testing of products to uncover defects and reporting to management who make the decision to allow or deny product release, whereas quality assurance attempts to improve and stabilize production (and associated processes) to avoid, or at least minimize, issues which led to the defect(s) in the first place".

The researcher attests to the fact that, the QC process must be ongoing to ensure that remedial efforts, if required, have produced satisfactory results and to immediately detect recurrences or new instances of trouble. This is exactly what the researcher aims at achieving by the end of the study which focuses on the quality of skins and hides as raw materials used for indigenous leather production in Kumasi and their effects.

2.4 Quality control standards of skins and hides for leather production

According to Sharphouse (1983, p. 514):

The basis of good quality control is the sorting and selection of skins or hides at key points during processing, that is; raw stock, beam house, splitting, pickling, wet blue, crust, finishing, etc. The leather is sold on a basis of size, area, thickness and visual appearance or incidence of gross faults usually visible to the eye. A relatively small amount of leather is sold on a basis of physical or chemical tests, which are often specified only as corroboration of the buyer's visual and tactile judgment.

Such quality standards based on physical tests and chemical analyses have been formulated by various authorities. There is no universal agreement on methods of sampling, test methods or interpretation of results, or agreement on acceptable quality standards. In relation to this, Sharphouse (1983, p. 514) continues to say that:

This is to be expected when such a variable raw material is used for such a variety of purposes and the methods of construction of articles from it. One has only to consider the various parts of a shoe upper to realize that in construction and wear they are submitted to vastly different physical forces, that is; stretching, compression, flexing and non-flexing, heat, friction, solvents and permeability. A unique merit of leather as such a construction material is its adaptability to such variations.

The researcher perfectly agrees with Sharphouse's statements made on the quality control standards of skins and hides for leather production. In assessing the quality of skins and hides for the production of leather, the basis is the sorting and selection during the working process. Basically, the purpose of the sorting and selection is to distinguish between the good and the bad skins and hides. The ones which can be best used without any side effects are separated from the ones that need to be rejected or sidelined due to poor quality standard. There are many ways of going about this process. That is why some laid down criteria are to be set in addition to what is already known to the public for the best way of quality control process when it comes to selection and sorting of skins and hides in the tannery for leather production.

2.5 Skins and Hides

2.5.1 Definitions for skins and hides

According to Sharphouse (1983, p. 23), the British Standard definitions of raw hides and

skins are as follows:

Hide: The outer covering or raw skin of a mature or fully-grown animal of the larger kinds, e.g. cattle and horses; also camels, rhinoceroses and whales.

Skin: The outer covering or raw skin of a mature, fully-grown animal of the smaller kinds, e.g. sheep, goats, pigs, reptiles, birds and fishes, or of the immature animals of the larger species, e.g. calves and colts.

In relation to the definitions the British Standard gives on skin and hide as stated by Sharphouse (1983), Boahen (2005, p. 39), also defines skin and hide as: “Large animals are said to have “hides” (e.g. cow-hide, buffalo-hide), while smaller animals have “skins” (e.g. goat-skin, sheep-skin). In either case, the hide or skin as composed primary stage hides are commonly referred to as ‘pelt’”. To confirm these definitions Boahen (2005, p. 28) again states that:

Pelt is the general term given to both hide and skin at their raw state. Hide is the name given to pelt or leather obtained from bigger animals such as; cow, elephant, etc. Skin is the pelt or leather obtained from smaller animals such as; sheep, goat, among others.

2.5.2 The structure of skins and hides

Sharphouse (1983, p. 20) states that:

Fresh hides or skins consist of water, protein, fatty materials and some mineral salts. Of these, the most important for leather-making is protein. This protein may consist of many types. The important ones are collagen which, on tanning, gives leather and keratin, which is the chief constituent of hair, wool, horn and the epidermal structures.

Sharphouse (1983, p. 20) explains further on the structure of skins and hides with a diagram. The approximate composition of a freshly-flayed hide is as follows:

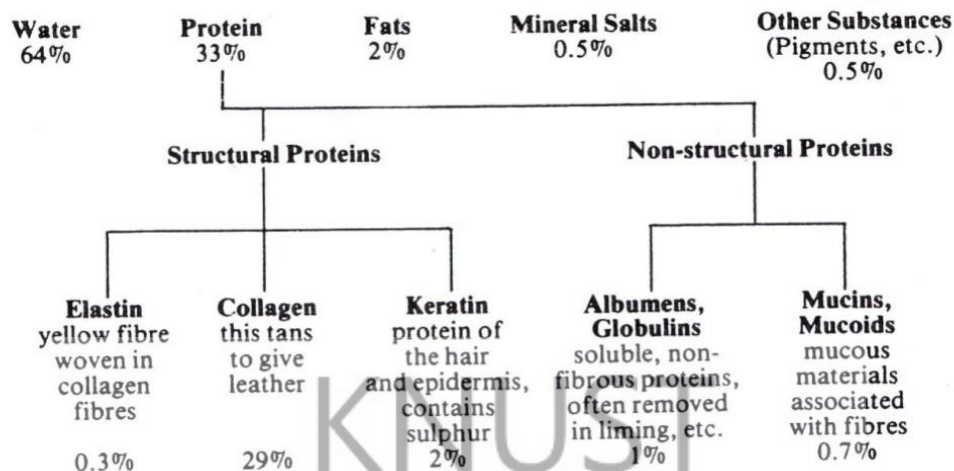


Fig. 1 Composition of hide Source: *Sharphouse (1983)*

The author notes that all animal skins are made up of the above constituents, but the figure for keratin varies widely, depending on the amount of hair present, and the figure for fat also varies. The division between albumens and mucins is debatable.

Sharphouse (1983, p. 21) elaborates on the structure of skins and hides with a diagram on the cross-section of skin. He explains that, one way of seeing the structure is to examine a cross-section of the skin. According to him, starting on the hair side there are:

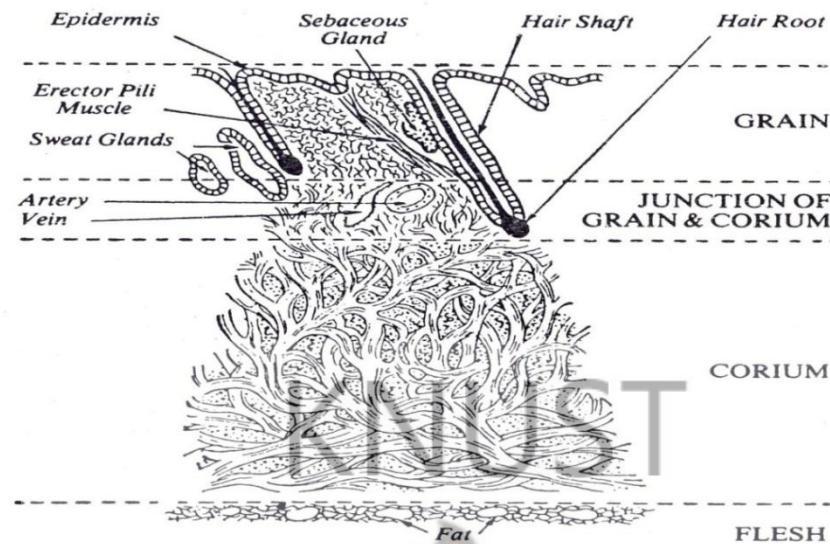


Fig. 2 Cross-section of skin

Source: *Sharphouse (1983)*

The researcher believes that knowledge on skins and hides and their structure forms an integral part on how to differentiate between good and bad quality skins and hides, its nature and how they respond to their environment. These lead to the right way of working with skins and hides and assessing them to achieve the standards of quality aimed at.

2.5.3 Flaying and curing of skins and hides

Flaying is the first step applied in the chief processes used in leather manufacture. The chief processes are mostly in three stages: before tannage (in normal sequence), tannage and after tannage. Sharphouse (1983, p. 6), recommends that not all these processes may be given to a particular type of skin and hide.

According to Sharphouse (1983, p. 6), flaying is simply: “The process of removing the skin

from the animal”. The author explains that flaying is normally carried out by the butcher and the methods used generally give first priority to producing a good quality carcass if the animal is to be eaten. The value of the carcass is often ten times the value of the hide and this ratio will govern the degree of care given in flaying to the hide and to the carcass. The best flayed hides are a by-product of a well-developed meat industry.

The next thing after flaying is “*curing*”, which is preparation by chemical processing in order to preserve something aside healing. This means that in curing a raw material such as skins or hides, one cannot do away with the chemical aspect of preservation applicable.

Sharphouse (1983, p. 11), elaborates on “*curing*” by saying: “The hide or skin can be processed within hours of slaughter and, whilst this is becoming a more common practice near large abattoirs, it is still relatively unusual”.

In relation to the statements made by Sharphouse on “*curing*”, Boahen (2005, p. 78) states that: “The fleshly butchered pelt is cured soon after skinning. This is done to protect the pelt against excessive heat, humidity, rain, pest and decay. Curing consists of dehydration without disturbing the skin structure”.

This suggests that, when skins and hides are not cured with immediate effect from the slaughter house, they will cause putrefaction of the pelts and affects the leathers produced from them.

2.5.4 Soaking and washing of skins and hides

Soaking is mostly the next process applied to skins and hides after flaying and curing them. This process normally goes along side washing since mainly water is used to wash off the chemicals in the skin or hides during the curing. The skins or hides are mostly stored before soaking and washing is done. To confirm this, Sharphouse (1983, p. 76) states that: “Hides and skins may enter the tannery in the various states of cure, and the hide or skin store must be suitably arranged to handle them. Dried hides should be kept in cool, dry atmosphere”.

According to Boahen (2005, p. 20), “soaking” of skin or hide is “the practice where hide or skin is immersed into water in a pit to remove the salt used for preserving the pelt, and the removal of blood and other unwanted nitrogenous matters soluble in water”. Boahen explains how in doing this, the pelt is immersed in water depending on its condition. He indicates that fresh butchered pelts take shorter time to be soaked in two or more successive changes of water. The water helps to rid the skin of salt, dirt, debris, blood and excess animal fats.

Boahen (2005, p. 79) again lays emphasis on how “washing and soaking” can be achieved in a variety of ways. He states that:

Skins may be stacked in revolving drums filled with water. The water removes dirt and blood, washes out most of the salt, and replaces moisture lost in the curing process. Washing and soaking of pelts may also be done by immersing them in ordinary water filled in pits or vessels sunk ground floor level with capacity of holding sufficient litres for water for the purpose.

On the “process of soaking” Sharphouse (1983, p. 80) also states that: “The first process

consists of soaking the skins in water, the aim being to allow them to re-absorb any water which may have been lost after flaying, in the curing process or during transport”.

The researcher attests to the fact that flaying, curing, soaking and washing processes are done in various ways as stated by Sharphouse (1983) and Boahen (2005), depending on the environment and the setting of the tannery. These processes if carried out well with caution are obvious to provide the tanner with good and quality skins or hides for making the type of leathers needed for the market. Sharphouse's (1983) solutions to the soaking faults testify that they can be prevented if the solutions are applied well during the soaking process. This will enable tanners not to go through these related faults which will not yield to quality skins and hides for leather production which are bound to affect the end products.

2.5.5 Liming and unhairing of skins and hides

The researcher believes that these two processes are mostly done alongside each other. They are carried out after the previous processes reviewed and discussed. Most of the leather work practitioners sometimes refer to *unhairing* as *dehairing* or *depilation*. In these working processes, there are also some others involved, such as: fleshing, scudding, splitting, washing and deliming, bating or puering. To confirm this, Sharphouse (1983, p. 104) states that:

Unhairing and liming may be carried out at the same time by immersing the hides and skins completely in lime and water mixtures, often with the addition of other chemicals known as sharpeners. Today, the 'liming process' may be carried out without lime in certain cases, e.g. with greasy skins the lime is replaced by other alkalis, such as caustic soda.

Sharphouse (1983, p. 96) comments on the purpose of ‘*unhairing and liming*’ by saying that:

“The aim of unhairing (or depilation) and liming is to remove the hair, epidermis, and to some degree, the inter-fibrillary proteins, and to prepare the hide or skin for removal of loose flesh and fat by fleshing process”. On *liming*, Sharphouse (1983, p. 104) briefly explains how lime is made and some of its characteristics by saying that:

Lime is made by roasting (burning) chalk or limestone in kilns, and produces quicklime or calcium oxide-unslaked lime, in easily powdered lumps. Impurities may arise from the stone used, e.g. sand, iron or magnesium, or may be due to insufficient burning, leaving some original limestone (calcium carbonate).

In relation to Sharphouse’s (1983) statements, Boahen (2005, p. 21) briefly defines “*unhairing or dehairing and liming*”. He states that: “Unhairing or dehairing is the process of removing the hair from the grain side of the leather after it had been loosened through chemical reaction for 1-10 days”.

Boahen further explains that the ordinary technique practised consists immersing the goods in a mixture of lime or lemon juice and water for varying periods. Other relevant chemicals may be used. These include the juice from pawpaw leaves mixed with water, or wood ash and carbide mixed with water. Boahen (2005, p. 81) concludes by stating that: “During the process of immersion, the pelts are periodically stirred for easy penetration of the chemical used”.

2.5.6 Fleshing and splitting of skins and hides

Sharphouse (1983, p. 114) states on *fleshing* that:

If the hair has not been completely removed by the liming process, it must now be removed, either by machine or by a hand knife on a beam. The latter process is laborious and only used for hides or skins which, for some reasons, cannot be machined. Short or new hair may be difficult to see and may need hand unhairing, particularly on calf.

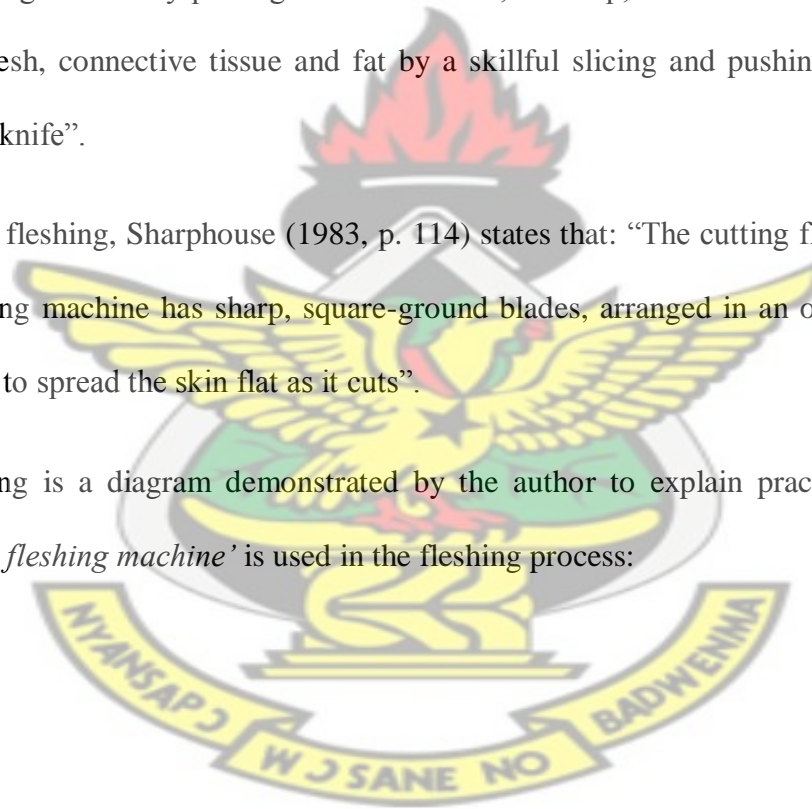
Sharphouse (1983, p. 114) as stated earlier, agrees that there are two main types of *fleshing*.

It is either by machine or by hand. Sharphouse briefly explains the two different processes:

“Hand fleshing is done by placing the hide or skin, flesh up, on a beam and removing the unwanted flesh, connective tissue and fat by a skillful slicing and pushing action with a two-handed knife”.

On machine fleshing, Sharphouse (1983, p. 114) states that: “The cutting fleshing cylinder of the fleshing machine has sharp, square-ground blades, arranged in an opposed double-helical form to spread the skin flat as it cuts”.

The following is a diagram demonstrated by the author to explain practically how the ‘Rubber roll fleshing machine’ is used in the fleshing process:



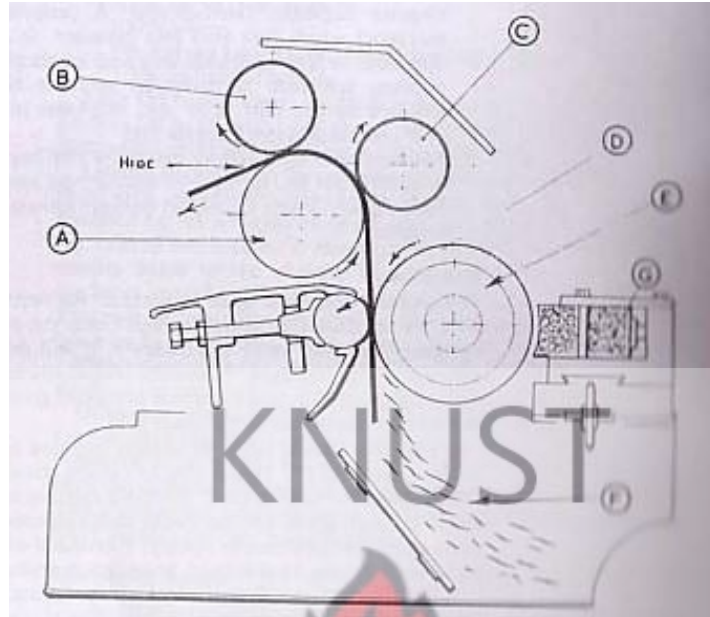


Fig. 3 Rubber roll fleshing machine Source: *Sharphouse (1983)*

A – Rubber-clad feed roller

E – Fleshing cylinder

B – Fluted metal gripping roller

F – Fleshing falling from hide

C – Second fluted metal gripping roller

G – Carborundum block for

sharpening

D – Rubber-clad pneumatic pressure roller

In relation to Sharphouse's (1983) statements, Boahen (2005, p. 21) briefly defines "*fleshing*" as: "The removal of fat and fleshy matters from the underside of the skin either by hand using flesher's knife over the flasher's beam or by machine".

Boahen (2005, p. 82) explains further that fleshing is done by machine or by hand over the

flesher's beam to clear off the flesh side of the pelt by removal of fat and fleshy matters leaving a clean smooth surface.

The researcher agrees that both Sharphouse (1983) and Boahen (2005) share common facts on fleshing. They both agree that, fleshing is either done by machine or by hand with a double handled knife. The by hand method is mostly practiced in the indigenous tanneries since the knife is easy to come by unlike the machine which also seems to work faster than the manual type. It is highly possible that flaying by machine produces materials of better quality than the manual flaying since sometimes the double handled knife used by the indigenous tanners are blunt and rusted which promotes scratches, dirt and poor uniformity in the skins and hides.

On *splitting*, Sharphouse (1983, p. 118) states that:

When the hides and skins are plump in the limed state, this may be an appropriate stage to split them into two or more layers, i.e. a grain layer and one or more flesh layers. This may be desirable because the natural skin varies in thickness, e.g. the neck of calfskins may be twice as thick as the rest of the skin.

Fig. 4 shows a diagram Sharphouse (1983, p. 119) demonstrates to explain practically how the 'Band knife splitting machine' is used in the splitting process:

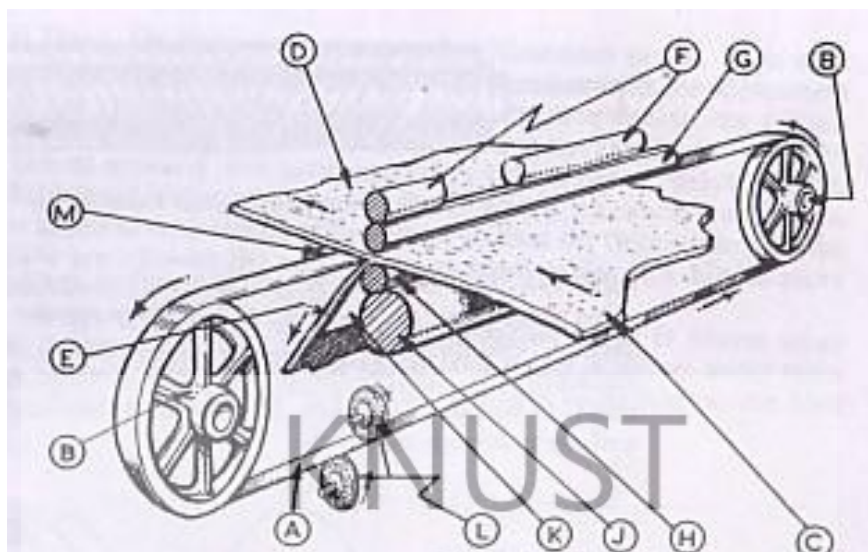


Fig. 4 Band knife splitting machine

Source: *Sharphouse (1983)*

A – Endless band knife

G – Gauge roller

B – Knife wheels

H – Section roller

C – Hide being split

J – Rubber-clad support roller for H

D – Grain (level) split

K – Outlet plate

E – Flesh (unlevel) split

L – Grinder wheels sharpening band knife

F – Support rollers for gauge roller

M – Knife backing plat

2.5.7 Deliming and washing of skins and hides

Deliming and washing in this aspect is the clearing of excess lime from the skins or hides.

This normally involves the washing of the skins or hides with clean cold water. To confirm

this, Boahen (2005, p. 21) comments briefly on the *deliming* process by stating that:

After the hair and debris has been cleaned from the skin, hides are delimed in a vat of acid. After the lime has been pulled from the skin, hides are treated with enzymes, which smooth the grain of the leather and help to make the resulting product soft and flexible.

In relation to Boahen's comments, Sharphouse (1983, p. 126) states that: "Washing precedes the chemical removal of lime from the pelt. The pelt is first washed in cold water. This is preferably done in clean running water and it is so prolonged until it is freed of surface lime". The author recommends that, delimed skins must be taken to the next process immediately. As the alkali has been removed, the putrefying bacteria can thrive once again, causing a slimy feel and giving loose leather with damaged structure.

2.5.8 Bating/Puering of skins and hides

According to Boahen (2005, p. 83), "*bating/puering*" comes after washing. He further explains that, some of the lime solution or astringent used is left on the pelt after washing. Therefore the more complete removal of astringent used is commonly effected by use of suitable acids. The author in relation to this comment recommends that: "Pelts may be placed in a mild acid bath to neutralise the unhairing solution left in them; otherwise they could prevent the tanning solution from penetrating the skin".

In relation to Boahen's (2005) statements, Sharphouse (1983, p. 131) also comments that:

Bating is a peculiar and often unnecessary process. Its origin probably goes back a very long time to days when liming was not a common practice, and when it was found that skins which were badly soiled with dung often gives softer, stretchier, silkier leather.

Sharphouse (1983, p. 131) again states that: "Puering was a term specifically used when

dog dung was employed, whilst bating referred to the use of fowl droppings, which had a somewhat milder action”. In relation to this, the author cautions that: “There is obvious danger of the process getting out of hand and causing over digestion of the fibre structure, giving thinness, looseness, damaged grain or even holes”.

The researcher has learnt from these several technical processes that skins and hides go through before the tanner tans them into leather. In order to acquire good leather from the respective skins and hides, these working processes reviewed earlier need to be taken into careful consideration and done well to prevent traces of default associated with the skins and hides. It is not all these processes that are known to the local tanners in Ghana due to assumption that, it is lack of knowledge and professionalism on the working field and the inability to acquire equipment and machines to carry out these technical processes discussed earlier.

2.5.9 Downgrading of the value of hides and skins due to faults

According to Sharphouse (1983, p. 26):

The value of a hide or skin depends on the value of the leather that can be made from it. This depends on the current market for that specific type of leather and, ultimately, on the market for the particular type of leather article that can be made from it.

Generally, other related researches done have proven that, any one of the faults or defects mentioned in earlier parts of this section is undesirable in a leather article and considerable effort is needed to avoid them, either by skin selection, selective cutting of fault free parts of the leather, or processing techniques to cover or minimize the faulty areas. If grain

leather is required, the faults on the flesh side may be of little import, whilst the reverse will be true if the leather is finished on the flesh side of the suede.

Sharphouse (1983, p.27), concludes that: “In most tanneries ‘sorting’ is also carried out at later stages where faults become more apparent, e.g. after hair and flesh removal, pickling, tannage, drying, etc. and on the finished leather”.

2.5.10 Raw stock Warehouse control

According to Sharphouse (1983, pp. 33-34):

The stock of hides or skins in the warehouse may be worth a hundred thousand pounds, but this value will only be realized if it is kept in sound condition, is carefully sorted and selected to be made into the most appropriate type of leather at the right place.

Sharphouse (1983) gives a caution that: “Warehouse staffs are responsible for checking all goods received for quantity, quality and condition and for immediately reporting any faults. A few infected or putrefying hides can soon infect the whole warehouse stock”.

To buttress on Sharphouse’s point, stock records should be kept so that management may know the quantities and qualities of skins in a particular purchase and have this information available for costing purposes. Stock control is essential in regulating the economic output of the tannery relative to the order book.

In addition to what Sharphouse (1983) comments on, Cope et al., (1979, p. 20) also make a comment on the storage of leather by recommending that:

Keep hides flat rather than rolled up. Grain leathers can be rolled up, grain side outwards, with brown paper. Splits are best kept flat. Always let leather breathe, in other words don’t

enclose in a polythene. Heat and sunlight cause leather to dry out and darken.

The researcher agrees with Sharphouse (1983) and Cope et al., (1979) on the information given concerning controlling raw stock in the warehouse or storage room of the skins and hides for leather production. The control process that goes on in the warehouse is very essential in getting the best quality of skins and hides or any other material for production. If the control process is not done well, it affects the quality of materials moved out from storage house for production.

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2.6 Leather

2.6.1 Definitions of leather

Leather is a material created through the tanning of hides and skins of animals, primarily cattle hide. The tanning process converts the putrescible skin into a durable, long-lasting and versatile natural material for various uses.

In relation to this, Sharphouse (1983, p. 3) says on leather that:

In looking for a covering material for himself, his hut and food, primitive man turned either to large leaves from plants or to the skins of animals he killed. The latter were usually chosen for clothing as they were bigger, stronger and warmer.

Sharphouse (1983, p. 3), further states that: “Hides and skins are turned into leather by ‘tanning’. There are many ways of tanning, but all of them cause the following changes in the raw hide or skin”.

Sharphouse (1983, p. 3), gives two basic changes caused by *tanning* of the skins and hides for leather and they are as follows:

- (i) The tanned skin does not putrefy, even after drying and wetting.
- (ii) On drying, the tanned skin does not become a hard, brittle material, but remains flexible and workable. The method of tannage chosen is largely concerned with how soft or hard, tight or stretchy, the resultant leather should be.

Sharphouse (1983, p. 4) concludes by stating that:

The chief methods of tanning used smoke, tanning materials obtained from the barks of trees or from leaves, animal and fish oils and certain salts. The most important of the latter was alum (a form of aluminium sulphate). This has now been very largely replaced by salts of chromium, which give a blue-green colour to the leather. Other materials used today are formalin and variety of synthetic chemicals specially made for tanning and termed 'syntans'.

In addition to what Sharphouse (1983) has explained, Cope *et al.*, (1979, p. 11) also state that:

Slaughtering an animal and putting it in cold storage as a skinned clean carcass takes less than fifteen minutes in a modern abattoir. The raw hide or skin, salted to delay putrefaction, is sent to the tannery. Before tanning it is unhaired, fleshed, washed to remove the chemicals used in unhairing, and pickled. Pickling makes it receptive to tanning agents.

Cope *et al.*, (1979, p. 7) explain that: "Leather is a superb natural material; it looks good, feels good and smells good. In short, it has intrinsic quality and that's what really counts. Not so long ago leatherwork was rather esoteric occupation". If left untanned a skin or hide will rot, just like meat. Tanning is the process which turns a skin or hides into the durable substance we know as leather. So, by definition, leather isn't leather until it has been tanned.

In relation to comments from Cope *et al.*, (1979) Boahen (2005, p. 14), also states that:

Leather, is made from animal skins or hides which have been chemically treated to preserve quality and natural beauty. The chemical procedure used to ready raw animal hides for use is called 'tanning'. A piece of hide or skin which has been tanned produces strong, flexible leather which is able to resist decay or spoilage.

Boahen (2005, p. 39), again states that: “Leather is essentially animal skin protein combined with tannins, small amounts of oils, dyes, finishes and moisture”. The author indicates that the relative proportion and distribution of constituents varies with the type of leather. By suitable choice of raw-hide or skin and tanning method, the tanner obtains leather possessing such properties as the non-stretchiness in upholstery, the drape in clothing and others.

The researcher agrees to the various definitions given and arguments made on leather by these scholars because they seem to be very similar or related. Their conclusions on leather are always about the word “tanning”, which cannot be ignored when defining what leather is. A skin or hide becomes leather only when it has gone through any of the tanning processes; else it will rot like meat and ceases to be leather as stated by Cope *et al.*, (1979).

2.6.2 The structure of leather

According to Cope *et al.*, (1979, p. 12):

Leather is a unique material. Makers of synthetics have tried to imitate it, even to the point of impregnating their products with the smell from leather, and failed. Leather owes its porosity, flexibility, plasticity and low thermal conductivity to its two-layered structure.

The authors indicate that the side on which the wool or hair grew is known as the grain layer. This is usually fairly thin, less than a quarter of the thickness of the skin. It merges

into a much thicker layer, the layer next to the flesh or meat of the animal, which has a honeycomb structure. Cope *et al.*, (1979) conclude this point basing it on the fact that if one looked at this layer under a powerful microscope, there is a possibility that the observer would see composition of bundles of fibres intricately woven together in all directions.

According to Cope *et al.*, (1979):

At even greater magnification you would see that each fibre is itself a collection of finer fibres or fibrils. In between the fibre bundles there are tiny channels which allow the passage of air and water vapour. It is the state of fibrous layer, compressed or filled with oils and other substances during tanning, which determines the quality of the leather.

In addition to the Cope *et al.*, (1979) comments, Boahen (2005, p. 43), also says that:

“Knowledge of the structure of leather is essential for the leather-worker to understand the intricate reactions taken place in manufacturing leather and leather goods”. The author explains that: “Leather is seldom used in its natural state as it is affected by variations in temperature (hard and stiff at low temperatures, soft and limp at high temperatures) and liable to rot”.

Boahen (2005, p. 44) concludes that the mammalian hides and skins for leather are divided into three layers distinct in structure and origin which confirms Cope *et al.*, (1979) statement that: “A thin outer layer of epithelial cells, called the ‘epidermis’ (1% of total thickness), a thick layer called the ‘derma’ (85%) and a subcutaneous layer or adipose tissue known as ‘flesh’ (14%)”.

There is a diagram Boahen (2005, p.44) shows in his leatherwork text book. The author provided this diagram to explain further the structure of leather as shown below:

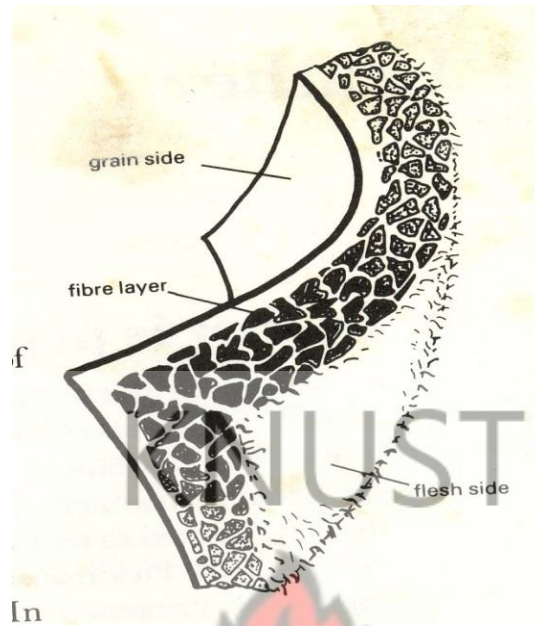


Fig. 5 Structure of leather

Source: Boahen (2005)

In addition to what has been discussed earlier, Boahen (2005, p.45) briefly comments on the variation of fibre structure which forms part of the character of leather in general. He states that:

The variation of fibre structure determines the resulting tensile strength and pliability of the leather produced from it and the satisfactory preparation of skins for tanning depends upon the separation of these white fibres without damage.

In the researcher's point of view, knowledge on the structure of leather as a material cannot be ignored when one is to assess the quality of skins and hides for leather production. The above mentioned authors have explained the manner of construction of leather and the arrangement of its parts with regard to the interior components and how they react to chemical treatment (tanning). These components of leather contribute greatly to the

treatment and assessment of the quality of skins and hides for indigenous leather production.

In conclusion, the researcher decided to review the discussed topics because he believes strongly that they are related to the research topic. In assessing the quality of skins and hides for indigenous leather production, one needs to consider knowing virtually everything about skins and hides such as; quality standards, quality assurance and quality control, the source, nature, structure, qualities and preservation of skins and hides. Finally leather is briefly discussed to bring in light its nature and structure.



CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter discusses the research design, population of study with reference to sampling, data collection instruments as well as data collecting procedures used in the study.

3.2 Research Design

The research utilized the qualitative research design as the main method of gathering data where descriptive method of research and a case study were employed in the study. According to Best (1981:106), descriptive research has the following types: case study, ethnographic studies, exposes fact or exploratory observation studies, among others. For the purpose of this thesis, the type of descriptive research to be considered is case study.

A case study is defined as careful study of some social unit (as a corporation or division within a corporation) that attempts to determine what factors led to its success or failure. It is also a detailed analysis of a person or group from a social or psychological or medical point of view, (WordWeb, 2003). Case studies are not limited to individuals and their behavioural characteristics. They can be conducted in communities as well. The greatest advantage of this method is that it tries to understand the whole individual in relation to his or her environment or their environment if it is certain group of people. However, since the researcher has to investigate deeply into the dynamics of an individual's personality, he/she must be trained in the planning and structuring of the case study, in obtaining the necessary data and interpreting the data, Alice (2006, p.53).

3.3 Qualitative Research

Qualitative research is the study of symbolic discourse that consists of the study of texts and conversations. Qualitative research is the study of the interpretive principles that people use to make sense of their symbolic activities. Qualitative research is also the study of contextual principles, such as the roles of the participants, the physical setting, and a set of situational events that guide the interpretation of discourse (Toomey, 1984, p.3). Qualitative research seeks out the ‘why’, not the ‘how’ of its topic through the analysis of unstructured information – things such as interview transcripts, emails, notes, feedback forms, photos and videos. It doesn’t just rely on statistics or numbers, which are the domain of quantitative researchers.

3.4 Library Research

Library research forms an essential part of the study. The researcher visited the following libraries several times: the Kwame Nkrumah University of Science and Technology Libraries, the Ashanti library and University of Education, Kumasi Campus library, all in Kumasi. In almost all the libraries the source of information for secondary data were; catalogues, books, encyclopedia, dictionary and the internet.

In attempt to find solutions to proper assessment of the quality of skins and hides for indigenous leather production and their significance for Art Education in the Kumasi metropolis, efforts were made to understand the various criteria for assessment identified in the various sources of information to adapt crucial ones for this study.

3.5 Population

The scientific method of population identification and sampling strategies were applied. For example, simple random sampling was preferred and embraced based on the characteristics of the population. The population was homogenous. The identified population was based on the location and characteristics of the abattoirs, tanneries and indigenous leather trading shops in the Kumasi Metropolis.

3.5.1 Target Population

In this study the target population was all the abattoir workers, indigenous leather tanners, indigenous leather traders in the Kumasi metropolis. The recorded statistics are as stated in Table 1.1.

Table 1.1: Target population of abattoir workers, indigenous leather tanners, and indigenous leather traders in the Kumasi metropolis

Population of abattoir workers in the Kumasi metropolis	100
Population of indigenous leather tanners in the Kumasi metropolis	25
Population of indigenous leather traders in the Kumasi metropolis	50
Total	175

3.5.2 Accessible Population

The accessible population was identified as all the workers at Kumasi abattoir at Ahensan, all the tanners at Aboabo local tannery and all leather traders at the Aboabo community, “Laryie Nkoli” community and Central Market in the Kumasi metropolis.

Table 1.2: Accessible population of the various research areas.

Population of butchers at Kumasi abattoir	74
Population of indigenous leather tanners at Aboabo local tannery	15
Population of indigenous leather traders at the Aboabo community	3
Population of indigenous leather traders at the “Lai Koule” market	30
Population of indigenous leather traders at Central Market	5
Total	127

3.5.3 Sampling Strategy

A sample is done when information is collected from a fraction of a population of study. For the purpose of the research, the sampling group was taken out of the accessible group. After identifying the population, simple random sampling was employed because the researcher believed that, each and every member of the population had an equal and independent chance of being selected and providing the necessary information needed for the study. The numbers of respondents in the respected areas of research are shown in Table 1.3.

Table 1.3: Sampled populations taken out of the various accessible populations

Population of workers at Kumasi abattoir at Ahensan	30
Population of indigenous leather tanners at Aboabo local tannery	11
Population of leather traders at the Aboabo community	1
Population of indigenous natural leather traders at the “Lai Koule” railway market	8
Population of indigenous leather traders at Central Market	1
Total	51

3.6 Instruments for data collection

Data can be collected for case study through observation, interviews, questionnaire or recorded data from newspapers, schools, among others. These are techniques used by qualitative researchers and the two major techniques used are: observation and interviewing. This is why the researcher aimed at using both structured and unstructured interviews and direct observation in collecting data needed for the study from respondents

3.7 Validation of Instruments

For the researcher to ensure that the primary source of information by using interview and observation guides to be free from errors, the researcher vetted them, secondly to his colleagues and finally the supervisors before administration. Secondary source of information from various libraries, the information collected are also vetted first by the

researcher. Secondly from colleagues and finally from the thesis supervisor for approval before the information gathered considered to be valid.

3.8 Observation

Qualitative studies according to Best (1981) do not allow the description of observation generally as in quantitative research. In other words, Williman (2001: 91) argues that “descriptive research relies on observation as a means of collecting data. It attempts to examine situations in order to establish what the norm is, that is, what can be predicted to happen again under the same circumstance”.

Observation is the act of making and recording a measurement (WordWeb, 2003). Observation is acknowledged as the most efficient and direct way of examining people for a purpose or an intended course. Data collected through observation may be often more real and true than data collected by any other method. Direct observation is the best preferred method to use mostly if possible (Kulbir, 2003, p. 158).

As the researcher went round the abattoir, indigenous tannery and various indigenous leather trading shops in the Kumasi metropolis he observed the technicalities involved when farm animals are slaughtered and how the skins and hides are removed from the carcass of the animals at the abattoir. At the tannery, he observed how the local tanners select the raw skins and how they work on them to get quality leather as they aim for. Lastly the indigenous leather traders observed educated the researcher on how the trading business is fairing and the technicalities involved in providing quality indigenous leather products to consumers. The validation and reliability of what has been observed was achieved through the

crosscheck of activities and various situations witnessed on interviewees from the various selected groups.

3.9 Interview

Frey and Oishi (1995:01) define it as “a purposeful conversation in which one person asks prepared questions (interviewer) and another answers them (respondent)”. This is done to gain information on a particular topic or a particular area to be researched. Interviews are a useful tool which can lead to further research using other methodologies such as observation and experiments (Jensen and Jankowski, 1991:101).

Kvale (1983, p.174) defines the qualitative research interview as “an interview, whose purpose is to gather descriptions of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena”. Collecting these descriptions can be done in several ways, of which face-to-face interviews are the most common.

“Face-to-face interviews can be tape recorded, of course with the permission of the interviewee. Using a tape recorder has the advantage that the interview report is more accurate than writing out notes. But tape recording also brings with it the danger of not taking any notes during the interview. Taking notes during the interview is important for the interviewer, even if the interview is tape recorded: (1) to check if all the questions have been answered, (2) in case of malfunctioning of the tape recorder, and (3) in case of "malfunctioning of the interviewer" (Opdenakker, 2006, p.12).

In carrying on the interview, an interview guide was made. The purpose of the guide was to direct the researcher get access to the needed information for the study. The structure of interview was quite similar but had some slight differences in terms of specific questions to the different set of samples that the researcher dealt with.

3.9.1 Conducting the Interview

The researcher adopted both the structured and unstructured interviews and dealt with three different groups. This therefore called for preparing three different interview guides for each group respectively. The first group consisted of the local abattoir workers. The interview guide for this group was made up of eleven (11) major questions with some minor questions asked in the process of interviewing. The second group consisted of the local tanners with an interview guide made up of fifteen (14) major questions with some minor questions to buttress some of the major questions. The third group consisted of the indigenous leather traders with an interview guide made up of thirteen (13) major questions with some minor questions to buttress some of the major questions in the interview process.

Workplaces and workshops of the selected skins and hides and leatherworkers were visited several times. The conduction of interview was face-to-face with the indigenous abattoir workers, tanners, leather traders. Most of them were illiterates with few of them being semi-literate. The humble spirit adopted when they were visited and the consistency of the visit enabled the research to commence smoothly.

Both the structured and unstructured interviews were conducted at these places mainly in the “Twi” local language. Since most of the people in the field of the leather business are from

the Northern part of Ghana, some of them expressed themselves well in the “Hausa” language and interpreted in the “Twi” language to the researcher. All interviews conducted were tape-recorded, translated and written down in English.

3.9.2 Interview Guide

Interview guide serves as a pattern of questions set by the interviewee to achieve expected results from conducting an interview. In conducting the interview, the researcher drafted interview questions to serve as an interview guide during the interview the questions period.

Interview guides were prepared by considering the following issues:

- Can the questions be easily understood?
- Are the questions biased?
- Are the questions necessary to the evaluation?
- Will interviewees be willing to provide the information needed?
- Are the questions applicable to all interviewees?
- Do the questions allow interviewees to offer their opinions/expand on basic answers?
- Will the questions be straight forward to analyse?

3.9.3 Validation of Interview Guide

For the researcher to ensure that the prepared interview questions were free from errors he vetted them, secondly to his colleagues and finally the thesis supervisor for approval before the set of questions gathered considered to be valid and administered .

3.9.4 Validation of Interview Conducted

The validation of the conducted interviews was essentially on the convenience of the respondents. Date, time, venue and all necessary arrangements were made in advance before the actual activities took place.

3.10 Primary and Secondary Data

The data were collected in the form of primary and secondary data. The primary data comprised all data from interactions with respondents and their environment. The primary data collection included interviews, discussions, direct personal observation, and the pictures taken. The secondary data comprised the entire literary materials sited and used from internet, books, articles and unpublished thesis that were related to this study.

3.11 The Data Collection Procedure

Data collection procedure was established on the assorted data into primary and secondary data. The primary data was assembled through participant observation at the three research areas, interviews done with the aid of validated interview guides with respondents from the three research areas, discussions made on findings and the results of pictures taken through the field work and interactions made. The secondary data were assembled through the use of materials from books, journals, magazines and newspapers.

3.12 The Data Analysis Plan

The data were assembled, analysed, interpreted, conclusions drawn and recommendations made. These are contained in the next chapter.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Overview

This chapter comprises of Assembly of Results from Interviews and Discussions. The Analysis and Interpretation took the following order; the Results from Interviews and Discussions from all respondents, Results from Pictures taken from the Ahensan abattoir, Aboabo local tannery and from the leather traders in the Kumasi metropolis. The remaining results are from Observation and Suggested criteria.

4.2 Assembling the Data

The assembly of data deals with the results from the interviews conducted, followed by the discussions and the pictures taken. In order to conveniently interpret the data, the results of the interviews conducted are translated and presented as they were recorded and explained statistically in tabular forms where necessary.

4.3 Results from Interviews

The results from the personal and group interviews were assembled systematically as primary data and described in section 4.3.1, 4.3.2. and 4.3.3.

4.3.1 Results from interview at Kumasi Abattoir and discussions

Kumasi Abattoir Company Limited at Ahensan had seventy four (74) workers (butchers) in the slaughter houses. They were always in either blue or orange overall working dresses with the company's name printed behind them. They made sure farm animals brought to the

abattoir are slaughtered and dressed for the respective owners. The researcher had the opportunity to conduct a structured interview with the production manager using a prepared interview guide and unstructured interviews with a chief butcher and twenty eight (28) other workers at the Kumasi Abattoir. This was made possible after an appointment letter was endorsed by the Head of Department of Art Education to the management of the company. A copy of the interview guide was sent days before the actual interview.

The unstructured interviews were adopted when the researcher visited and took pictures of the slaughtering processes in the slaughter house. The researcher used simple random sampling to select the twenty eight (28) workers in addition to the production manager and a chief butcher because he believed that each and every member of the population had an equal and independent chance of being selected and providing the necessary information needed for the study. The following are the various responses from the interview done with respondents:

1. The nature of the abattoir work in general

The abattoir aims at providing the best meat for consumers. One of its aims is to prevent meat offered to the public from looking reddish as a result of poor bleeding of the animals. In the abattoir because of the system there, the meat provided was always properly bled and the carcass did not look reddish to cause harm to public health.

When the animals were brought in for slaughtering, about three or four butchers followed it because some were interested in the liver, others too were interested in the intestines, the hides and other parts of the animal which they buy from the owners after dressing and

slaughtering was done. This was supervised by the technical men in the abattoir to ensure that it was done accurately.

The nature of the work there had been the same since its establishment. The level of patronage of butchers used to be low when the company started but due to gradual education to the public, the butchers had been co-operating gradually even though sometimes it reduced and the company was expecting more growth in the patronage of butchers in bringing their farm animals to slaughter. Good quality was assured when slaughtering was done in the abattoir.

2. Acquisition of the farm animals into the abattoir

There was a place near the abattoir called the cattle market. This market was there to receive farm animals from every part of the country. The three Northern regions are the major producers of these farm animals but in the dry seasons, they had to rely on the neighbouring countries such as Burkina Faso, Mali and Niger where animal farming, especially in cattle, was done on a very large scale.

3. The reflection of the value of farm animals on their quality

The processing fee for slaughtering one animal, as at the time of this research, was GH¢10.00p. Considering the water and electricity needs of the abattoir, the wages it had to pay, the maintenance cost of its machines and other overhead expenses, the slaughtering fee was quite low. Yet since the main goal of the abattoir is good public health and not high profit, it was forced to keep its processing fee as low as an incentive to butchers, who would

otherwise prefer buying and slaughtering the animals at other places where the slaughtering conditions are unacceptable.

4. Working period for slaughtering the farm animals

The official working hours of the abattoir was 6.00am to 1.00pm. In the morning before workers were ready for the slaughtering, there were already animals kept at the holding room to be slaughtered. Those animals were dealt with within an hour. After that, there was time made available for other butchers who would go to the farm and purchase animals for slaughtering till the closing time.

5. The kinds of farm animals normally slaughtered in the abattoir

Apart from cattle, sheep and goat, they hardly slaughtered any other animals, but according to the Production Manager, had once slaughtered a camel at the abattoir some years back. Such incident normally happens occasionally.

6. Criteria used to assess the farm animals before they are purchased and slaughtered

The abattoir was privileged to have veterinary services staff and environmental health officers. They were there to make sure that there was proper examination on the farm animals before they were slaughtered. The examination done by them is called the *ante-mortem* inspection. It is an inspection which was carried out before the animal was slaughtered so that the health status of the animal could be known. Apart from that, the animals too had certain diseases called foot and mouth diseases or skin diseases. In the course of ante-mortem inspection they were able to track down those animals with such diseases and put them under

surveillance so that follow up or re-examination was made on them to actually make sure that the right thing was done and therefore they were fit or unfit to be slaughtered. After the ante-mortem examination was done, the animal was slaughtered. *Post-mortem* examination was done on the carcass of the animal before it was finally sent out for human consumption.

7. The average number of farm animals slaughtered in the abattoir each day

In the early days of the abattoir, they used to slaughter between three hundred (300) and three eighty (380) cattle in a day but during the time of the research, they slaughtered an average of two hundred and thirty (230). The abattoir though had the capacity to slaughter five hundred (500) of these animals within the same time frame.

8. Purpose for the carcasses

The abattoir had no authority on the farm animals brought to the slaughter house. It was the owners (butchers) of these animals who decided what purpose the carcass should serve. Mostly, it was the meat of the animal for the market that mattered to them, not really the skins or hides for leather.

9. How the skins and hides were stored at the abattoir before they were purchased

After slaughtering the hides, limbs and head of the animals were taken out in a wheel barrow to a place called the skins and heads bay, where they were sold to consumers. The hides together with the limbs and head of the carcasses mostly meant for food left the bay to the market that very day. The butchers selected the few that were kept for tanners, removed the

excess fat in them and kept them dried at an open space until they were purchased. It was on few occasions that the tanners came to buy the fresh hides which were not yet dried.

10. The nature of trade at the abattoir

In terms of consumers' patronage of the skins and hides, it was quite encouraging because the butchers made money from the skins and hides. Consumers were there every day to purchase them for their various purposes. Each butcher had his customers who bought from him. There was a big competition between those who purchased the skins and hides for leather and those who bought them as meat. Since there was a meat market just close to the bay, those who bought them to sell at the market patronized in purchasing the skins and hides more than the various tanners.

11. What the tanners considered or criteria used in assessing the skins and hides before purchasing from the abattoir

- a) They preferred the skins and hides with no fat on them, because such types were not of good quality for making leather.
- b) They considered buying the fresh ones because they said that those ones produced leather of good quality to them than the ones kept for a long time.
- c) They preferred buying the undried ones which were mostly fresh because the various butchers do not dry the skins and hides to the tanners' satisfaction.

d) The tanners did not like buying the skins and hides with much blood stain on them because they believed blood encouraged easy decay and loss of quality.

e) They preferred buying the ones with no excess knife cuts and holes in them.

f) Finally, they preferred buying thick and large ones since such types were more useful to them than the small and thin ones.

4.3.2 Results from interview with indigenous tanners and discussions

The following section explains analyses done on the set of questions from the interview guide prepared by the researcher for the tanners and their respective responses:

1. The nature of the tannery work in general

All the 11 (100%) indigenous tanners interviewed were males. They were made up of young and middle-aged men. The old men in the profession were no more working effectively as they used to. All the 11 (100%) indigenous tanners interviewed said that their profession used to be very good some years back but now the drive of the work had gone down. The importation of leather from other foreign countries seemed to be the major cause. People do not patronize the local leather anymore as they used to. Most of the indigenous tanners had been in the profession for a very long time. The majority confirmed that the indigenous leather business was gradually collapsing.

Records in Table 2 show that only 1 (9.09%) out of 11 respondents had spent less than 10 years in the tanning business at the Aboabo local tannery. He was the youngest of all of them. He said he had been working at New Tafo in Kumasi and decided to return to his roots

at Aboabo 3 years ago to get into the tanning profession. Three (27.2%) out of 11 respondents had been in the tanning business between 11 and 20 years. Five (45.5%) out of 11 respondents had also been in the tanning business at the Aboabo local tannery between 21 and 30 years. The remaining 2 (27.2%) out of 11 respondents seemed to be the leaders and were well experienced at the Aboabo local tannery. They had been in the profession for more than 30 years. They held a belief that the tanning work was their life, so they could never quit doing that job. They needed to keep alive the profession of their forefathers.

Table 2: Years spent in Tanning and Experience

Number of years	Number of respondents	Percentage (%)
1 – 10 years	1	9.2
11 – 20 years	3	27.2
21 – 30 years	5	45.4
31 – 40 years	2	18.2
Total	11	100

Statistics in Table 2 indicate that the majority of the tanners were between the ages of 21 to 30 years. This implies that majority of the tanners had been in the tanning business for quite a long time and this confirms the fact that they were well vest and experienced in the tanning business. These years spent in the tanning business emphatically meant that they were able to detect the differences between the qualities of the skins and hides they come into contact with for leather.

2. The acquisition of skins and hides into the tannery

Records in Table 3 show where these tanners obtained their skins and hides. Each of the tanners had his own market where they brought the skins and hides they needed. This was because; they did not work together as a group but worked individually most of the time. Nine (81.8%) out of 11 respondents bought most of their skins and hides from the Kumasi Abattoir at Ahensan, while the remaining 2 (18.2%) out of 11 respondents did not prefer going there to buy at all. Even with the 9 (81.8%) out of 11 respondents who bought from the Kumasi Abattoir, they did not solely buy from there but from other places as well such as Wenchi, Prestia, Akwatialine, Techiman, Kintampo, Nkawkaw, Bompata, Tamale, Takoradi, Sunyani, Kumasi Railway Station, Atebubu, New Edubiase, Obuasi, Accra, Yarowa, Bolgatanga, Wa, Edwira, Atebubu, Salaga, Badikurom at the Ivory Coast boarder and from Burkina Faso.

Table 3: Acquisition of skins and hides into the tannery

Source of skins and hides	Number of respondents	Percentage (%)
From Kumasi Abattoir and others places	9	81.8
From other places but not Kumasi Abattoir	2	18.2
Total	11	100

Statistics in Table 3 indicate that, there were no hard and fast rules regarding the choice of place to buy the skins and hides from. Even though there was a wide range of places producing skins and hides locally for tanners to make leather, most of them in Kumasi preferred going to the Kumasi Abattoir to buy because they were produced on a large scale and were of better quality as compared to skins and hides available at other places of production. If majority of the tanners purchased skins and hides from the Kumasi Abattoir then it suggest that they were validating the major source of their raw material for leather. Emphatically, the Kumasi Abattoir is the location the indigenous tanners in Kumasi prefer buying skins and hides from which is a contributing factor to the quality of the skins and hides because of the better processes the pelts go through concerning their acquisition as compared to other locations.

3. The reflection of the value of skins and hides on their quality

Records in Table 4 show responses from the tanners as to whether the value of the skins and hides reflect their quality. Four (36.4%) out of 11 respondents said 'Yes', 4 (36.4%) respondents said 'No', with the remaining 3 (27.2%) out of 11 respondents not being specific or could not answer whether it does or not.

Table 4: The reflection of value of skins and hides on their quality

Reflection of value on quality	Number of respondents	Percentage (%)
No	4	36.4
Yes	4	36.4
Not specific	3	27.2
Total	11	100

Statistics in Table 4 indicate that the market value of the raw materials was not stable and varied in different locations. It depended on where and the price a tanner bought his skins and determined whether the value placed on the skins and hides reflected on the quality of the material purchased to work with. The equality of percentage rate of responses meant that each tanner compared the quality of pelts purchased to determine whether they deserved the price tag on them. The percentage rate suggested that those who were content with the reflection of the value on the quality of raw materials and otherwise were on the same scale. Those who were not specific confirmed that there were some tanners who did not really consider the value of the pelts in relation to their quality. Emphatically, from the responses the reflections of the value of pelts on their quality were unstable.

4. Specific working periods that skins and hides are purchased and used

All the 11 (100%) respondents interviewed said that there are no specific periods in the working calendar set aside for the purchasing of skins and hides. Each and every tanner has his own desired period for buying the raw skins and hides to work with. Most of them said

that it mostly depends on where the individual tanner buys from. If the production rate of where one buys from is high, obviously the buying rate will also be high. This is true because according to most of the tanners, the skins and hides set aside for tanners to do leather are scarce now in terms production so you do not hesitate in buying when they are available. They buy them any time there the opportunity to.

All respondents attesting to the fact that there are no specific periods in the working calendar set aside for the purchasing of skins and hides, suggests that they are confirming and validating that fact. Emphatically there is no specific period for purchase of skins and hides for leather which makes demand for the raw material always on a higher rate.

5. The kinds of farm animals' skins and hides normally tanned in the local tannery

All 11 (100%) respondents work with goat and sheep skins. They are the most commonly used by the indigenous tanners. Even though they do not stick solely to the use of these two types of skins, they prefer them over the other types available. Few of them prefer working with the cow hide because of its nature. Only 1 (9.09%) out of the 11 respondents said that he mostly worked with python and crocodile skins and was an occasional user of sheep and goat skins. The tanners are able to work with any type of skins obtained from sources such as dogs, giraffes, cows, rabbits, pythons, crocodiles, horses, lions, among others, but not elephants because of the thickness nature of their hides.

All 11 (100%) respondents said that the goat skin was more durable than that of sheep and that they preferred working with goatskin. However, they worked with goat skin most of the time because they are produced in large quantities locally and are easier to come by. Besides,

the sheep skins were usually cheaper as compared to the other skins. The tanners generate higher profit mostly from leather made from sheep skins.

These elaborated facts meant that majority of the tanners confirmed they preferred the use of skins from only goats and sheep for leather. This was because they had easy access to such types as compared to skins from other animals. Emphatically, the kinds of farm animals' skins and hides normally tanned in the local tannery were goats and sheep. This situation prevents the indigenous tanners to explore the versatile nature of skins from other animals apart from goats and sheep for leather.

6. The criteria used to assess skins and hides before purchase for tanning

All the 11 (100%) respondents accepted that there were some factors each tanner personally looked at before and after buying the skins and hides. Even though they did not have specific laid down criteria for assessing the skins they work with, they had means and ways of knowing which skin or hide is of good quality and otherwise. Mostly they were able to assess the quality of the skins after soaking them in water at the start of the tanning process.

From the information deduced from question 6, 3 (27.2%) out of 11 respondents said that they considered the fresh flayed skins of farm animals of better quality than the ones that were not fresh. Four (36.4%) out of 11 respondents based their assessment on the skins and hides with no excess fat left in them as better in quality than the ones with excess fat in them. Only 1 (9.09%) out of 11 respondents said that when skins and hides are dried immediately after flaying, they are often of better quality than the ones that are kept for some time before drying. Three (27.2%) out of 11 respondents based their assessment on when the skins and

hides are kept at the abattoir for a relatively longer period of time before selling them to tanners. They said that the qualities of those types are lower than the quality of these that are cured for a relatively shorter period. Two (18.1%) out of 11 respondents based their assessment on unnecessary knife cuts made on skins and hides when flaying is being done. Those cuts reduce the quality of the leather. Three (27.2%) out of 11 respondents said that when skins and hides are sun-dried on the ground, reduces the quality of the skins and hides. On the other hand, skins and hides that are hung to allow blood and fat to drop off come out better than those dried on the ground. Insect attack from the ground is also avoided. One (9.09%) out of 11 respondents said that farm animals that are fed and kept well produce relatively high quality skin and hide, as compared with skin and hide produced from poorly fed animals. Two (18.1%) out of 11 respondents said that skins and hides with tiny holes caused by insects attack were of poor quality. Six (54.5%) out of 11 respondents said that the heavier/thicker and sizeable ones were of better quality than the lighter and smaller ones. Two (18.1%) out of 11 respondents said that the quality of skins and hides provided by diseased farm animals is not as good as that provided by disease free animals. Two (18.1%) out of 11 respondents touched on the issue of adequate salting for preservation of skins and hides producing better quality leathers than the skins and hides with no or less quantity of salt for preservation. Two (18.1%) out of 11 respondents said that insect and worm attack on skins and hides reduce the quality of the leather, as compared to leather obtained from insect and worm-free skins and hides. One (9.09%) out of 11 respondents touched on the issue of skins and hides obtained from carcasses that are singed with fire. They said the quality of such skins is inferior to fire free ones. Such skins have suffered surface burning and are

referred to as *singed skins*. Obviously such skins and hides cannot be used for leather. One (9.09%) out of 11 respondents said that when hairs fall off skins and hides as they are touched, they are of lower quality to those that resist pulling of the hairs.

These statistics show how the respective tanners assess the quality of skins and hides for leather. Each of them had his own ways and means of assessing the quality of skins and hides in terms of their quality. From the statistics elaborated, most of the tanners have several defaults they referred to when considering skins and hides of good and bad quality. The reason for not following specific criteria for assessment was believed to stem from the unavailability of provided standards and lack of knowledge in some of the key factors to consider when seeking for good quality skins and hides for indigenous leather production.

7. The processes involved in the preparation of skins and hides before tanning

According to the tanners, the following steps are what they have been taught and are using to date:

- a) The skins/hides are soaked in a container of ordinary water to soften and wash off dirt and blood stain.
- b) They are transferred one after the other into a drum of water already mixed with wood ash and carbide. Skins are turned over and over in the mixture of wood ash, carbide and water for thorough penetration of the chemicals and left overnight. The purpose is to loosen the hair on the skins.

c) They are moved into a pond of water with pawpaw leaves in them. The purpose of the pawpaw leaves is to tenderize the skin or hide.

c) Dehairing and fleshing is done to get the needed smooth skin for the leather.

d) The skins are washed again in clean water to remove excess chemicals in them.

e) They are immersed in water mixed with pounded seeds and fruits from the “bagaruwa” tree, as locally called. The fruits of this tree contain tannins that transform the skin into leather. This is when the actual tanning takes place. Ordinary salt is also applied to the leather to help in preservation.

f) Oil and lime are also smeared on them to remove excess tannins. When the leathers are dried, they are stretched with the help of a stick. The stick is held in the hands to enable the pulling of leather with one’s feet on a stone to stretch out all folds and crumples. This is done to flatten the leather and make it softer than before.

The above method used has been explained practically on pages 90 to 96 where the researcher took pictures of the various steps involved in the tanning of leather at the Aboabo local tannery. Emphatically, the same process of preparation of skins and hides for tanning was used by all the 11 (100%) indigenous tanners interviewed at the Aboabo local tannery.

8. Average number of skins and hides tanned in the local tannery each day

Records in Table 5 show that about 1030 pieces of leather are or can be produced from the Aboabo local tannery each week by the 11 (100%) respondents. 4,120 can be produced

within a month and 49,440 pieces in a year. This sounds impressive, considering the nature of work done over there. However, this target is currently not met due to the problems the local tanning business is experiencing.

Two (18.1%) out of 11 respondents said they can produce 100 pieces of leather in a week. One (9.09%) out of 11 respondents said he can produce 50 pieces of leather in a week. One (9.09%) out of 11 respondents said he can produce 30 pieces of leather in 5 days. One (9.09%) out of 11 respondents surprisingly said that he can produce 500 pieces of leather within 4 to 5 days. Two (18.1%) out of 11 respondents said that they can produce 100 pieces of leather in 4 to 5 days. Two (18.1%) out of 11 respondents also said that they can produce 100 pieces of leather in 4 days. One (9.09%) out of 11 respondents said that he can produce 150 pieces of leather in 3 days. One (9.09%) out of 11 respondents was not specific with the number of days he spends on production and the quantity of leather he produces. This is because he claimed he could produce as many as his strength permitted him to work. He added that the provision of raw skins determines the quantity of leathers one can produce.

Table 5: Quantity and duration used in producing leather pieces

Number of days	Quantity produced	Respondents	Percentage (%)
7	100 pieces	2	18.1
7	50 pieces	1	9.09
5	30 pieces	1	9.09
4 – 5	500 pieces	1	9.09
4 – 5	100 pieces	2	18.1
4	100 pieces	2	18.1
3	150 pieces	1	9.09
Not specific	-	1	9.09
Total	1,030 pieces	11	100

Statistics in Table 5 show assessment of the tanners' working abilities in terms of the production of indigenous leather. These figures confirm the fact that the various tanners worked individually and therefore each of them had his own limit in terms of the quantity of leather produced. Majority of them produce 100 pieces of leathers within a week. This validates the average number of leathers produced by a tanner within a week. Emphatically, if production rate of skins and hides rises, obviously it will affect the quantity of leathers produced within every week to promote availability of indigenous tanned leathers for consumers.

9. Storage of the leather

Records in Table 6 show the available storage places for the indigenous tanners. Four (36.4%) out of the 11 indigenous tanners prefer to keep their leathers in store rooms or kiosks meant for that purpose. Six (54.5%) out of 11 respondents prefer sending them home and keeping them in their living or bedrooms. The reason given for this situation was that, some of them do not have access to store rooms or kiosks at the tannery and for safety reasons, prefer keeping them home. They also take them to their respective homes to prevent theft and controversies in mix up of leathers. One (9.09%) out of 11 respondents prefers keeping his leathers anywhere indoors provided they are safe from thieves and water.

The storage of leather pieces is very essential when it comes to providing good quality leather to customers. Where they are kept exactly is not what matters most but how they are stored. There are several ways of storing tanned leather pieces depending on the storage option the tanner is left with or has access to.

Table 6: The storage of tanned leathers

Storage places	Respondents	Percentage (%)
In store rooms or kiosks	4	36.4
In living or bed rooms	6	54.5
Anywhere indoors	1	9.09
Total	11	100

Statistics shown in Table 6 mean that, majority of the indigenous tanners preferred storing their leathers in living or bed rooms. If majority of the tanners adopted this method of storage, it confirms the attention and value they gave to their products. They had special places in their living and bed rooms for storing their leathers. Emphatically, the indigenous tanners prefer their leathers closer to them in terms of storage and it is the best way of storage aside storing them in store rooms or in kiosks. This method of storage encourages safety of products and protects them from putrefaction which aims at better quality of the leathers.

10. Purpose of skins and hides

All 11 (100%) respondents confirmed that the skins and hides brought to the tannery are meant for making only leather. They said that the only other thing they are meant for are the goat skins that are treated differently and preserved for the drum makers. The differences between the two are the processes involved in making them. The goat skins for the drum makers are not tanned in the same way as the ordinary leathers but they are given thorough drying, treated and preserved with salt and some other chemicals. They are kept dry to render them tougher than the ordinary leathers. These are not really made at the tannery of late since

the drummers now prefer using the foreign synthetic leather in making their drums. Consumers too now prefer drums made with foreign made leather. For this reason the tanners do not bother themselves anymore in making those types of leather. They concentrate on leather to be used for belts, bags, shoes, wallets, slippers and other leather products.

All respondents confirming that the purpose of skins and hides brought to the tannery were meant for solely leather indicated that leather was the prime aim of the tanners. Emphatically, this validates the fact that all pelts brought to the tannery are tanned into leather.

11. How the tanners in the local tannery trade the tanned leathers

Records in Table 7 show the mode of trade of the locally tanned leathers. Six (54.5%) out of 11 respondents said that the customers prefer coming to the tannery themselves to buy the leathers they need. They do this because each customer prefers coming there and doing his/her own selection of leathers needed. The tanners said they prefer customers coming there themselves because it saves them from time and cost of transportation. Five (45.5%) out of 11 respondents said that their customers prefer the leathers being sent to them at their various work places. This happens when such customers are busy workers and regular customers. In such cases, the tanners are not bothered sending the leathers to them.

All 11 (100%) respondents confirmed that when the customers come to them to buy, they are able to assess the leathers very well for good quality ones unlike when they are sent to them to buy in their respective work places.

Table 7: The mode of trade of the locally tanned leathers

Mode of trade	Respondents	Percentage (%)
Customers coming there to buy from tanners	6	54.5
Tanners sending to customers to sell to them	5	45.4
Total	11	100

Statistics in Table 7 mean that the modes of trade of the locally tanned leathers were in two ways. Customers either went to the tannery to purchase the leathers or the tanners rather sent them to their respective customers to buy. Results from the percentages confirm that both modes of trade were practiced at the tannery, but validate the fact that customers preferred going to the tannery to select and purchase leathers rather than the tanners doing their own selection of leathers and sending them to their respective customers. Emphatically, leathers are best sorted by customers before purchase rather than the tanner doing the selection himself.

12. The nature of trade at the local tannery in terms of consumers' patronage and the kind of people, individuals or groups who buy them

Records in Table 8 show the level of consumers' patronage in locally tanned leather. Ten (90.9%) out of 11 respondents said that the level of trade in relation to consumers' patronage is currently low as compared to the level some years back. They indicated that the indigenous leather trade is currently gradually collapsing and faces the prospect of dying out altogether

in future due to the challenges they are facing now. The foreign made synthetic leathers and the natural ones made from Burkina Faso and the other neighbouring countries imported into the country is really killing the locally produced ones at a considerably fast rate. All the local consumers have now turned their back on the local leathers and are buying the foreign imported ones to work with. One (9.09%) out of 11 respondents said that, consumer patronage is average. He explained that sometimes consumers come there to buy from him as expected but at other times too, they do not come there at all. None of the respondents said that consumer patronage is high. Information gathered indicates that trade in locally tanned leather market is collapsing and the solution to it is very essential.

Table 8: The level of consumers' patronage in locally tanned leathers

Level of patronage	Number of respondents	Percentage (%)
Low	10	90.9
Average	1	9.09
High	-	-
Total	11	100

Statistics in Table 8 clearly indicate that the level of consumers' patronage in locally tanned leathers is at a very low rate. Majority stating this fact confirmed that the indigenous leather business was on the verge of collapse. This existing situation had created the notion that the locally tanned leathers were of lower quality as compared to the foreign imported ones. Emphatically, consumers do not patronize locally tanned leather because of their bad quality.

On the issue of the kind of people who buy leather from the indigenous tanners, 4 (36.4%) out of 11 respondents said that they sold mostly to leather workers at the various markets in

the Kumasi metropolis. Three (27.2%) out of 11 respondents said that they sold to students from the second cycle and tertiary institutions. Two (18.1%) out of 11 respondents said that they sold leathers to catapult makers in town. Five (45.4%) out of 11 respondents argued that they sold leathers to royal slippers makers in town. The royal cobblers were the largest buyers of the locally tanned leathers but even with them, they had started using the foreign made synthetic leathers too, so the rate of buying the local leathers from the indigenous tanners was collapsing gradually. Two (18.1%) out of 11 respondents said that they do sell leathers to drum makers as well. One (9.09%) out of 11 respondent said he sells to bag and cobblers in town.

This statistics also show that different groups of people purchase leathers from the indigenous tanners for various purposes. The percentages indicate that majority of the locally tanned leathers are purchased by the royal slippers makers but even with them, they had started using the foreign made synthetic leathers which affected the rate at which the locally tanned leathers were patronized.

13. Daily sale of leathers to consumers from the local tanneries

In response to questions on the number of leather sold within each day by the indigenous tanners, none of the 11 (100%) respondents could be specific. This was because records were not taken at the end of each day and the nature of the business did not enable them to do that. They could go without selling leather for a couple of days which really affected the level and motivation in production of leather.

All respondents not being specific on the daily sale of leathers to consumers confirmed that there were no records taken on daily basis to monitor how sales were carried out. The rate of sales was low which affected the degree of production.

14. How buyers assess the quality of locally tanned leathers before buying them

Seven (63.6%) out of 11 respondents said that buyers mostly reject leathers with holes and knife cuts in them. They mostly prefer the ones with no holes and cuts and regard them as being of better quality than the ones having them. Six (54.5%) out of 11 respondents again said that consumers prefer buying bigger and thicker ones as compared to the smaller and lighter ones. They consider the bigger and thicker ones as being durable, useful and of better quality than the smaller and lighter ones. Four (36.4%) out of 11 respondents said that consumers prefer good looking leathers. They believe such leathers have been chemically treated well and can cope very well with heat from the sun and do not fade with time. Three (27.2%) out of 11 respondents said that the buyers prefer smooth surfaced and soft leathers. They think those ones are of better quality and prefer working with such types. One (9.09%) out of 11 respondents touched on the issue of buyers not accepting leathers with spots or stains on the surface. One (9.09%) out of 11 respondents again said that when it comes to crocodile and snake leathers, consumers prefer clean ones because of the nature and colour of such skins. They normally buy such types to decorate their homes and work places.

Statistics from percentages shown indicate that majority of the consumers who purchased the indigenous leathers accepted the ones with no holes and cuts in them as better in quality. This confirmed the fact that pelts with these defects tanned into leather were considered as of

lower quality. Emphatically, leathers with unnecessary holes and cuts in them were mostly rejected by consumers because such defects affect the quality of the articles they were made into.

4.3.3 Results from the interview with leather traders and discussions

The researcher conducted structured interviews with ten (10) indigenous leather traders. These indigenous traders were selected from the three (3) known areas in the Kumasi metropolis where natural leathers are sold. One (1) indigenous leather trader was met and interviewed inside the Kumasi Central Market. One (1) indigenous leather trader was also met and interviewed at the Aboabo community. The eight (8) other indigenous tanners were selected and interviewed at the “Lai Koule” Railway Market. “Lai Koule” is a Hausa word which means “where materials relating to dead animals are sold” in regards to their preserved parts such as bones, skins/hides and leather as well. The name in English means “those items can be found and sold in abundance at that place” according to one of the interviewees. It is a market but like a community in itself. It is a section of the Central Market located along the railway line outside the main market. The indigenous leather traders are found in this place in their numbers.

The researcher used simple random sampling in selecting each of these traders from the selected areas because he believed that each and every member of the population of the traders had an equal and independent chance of being selected and providing the necessary information needed for the study. The following shows an analysis of results from structured

interviews done with the ten (10) selected indigenous leather traders in the Kumasi metropolis.

1. The nature of the local leather business

All 10 (100%) respondents confirmed that the indigenous leather business is virtually collapsing. This was because, some years back, all leather traders and consumers preferred buying the locally tanned leathers but the influence of the foreign made leather was really killing the market, which did not favour the local traders. They also said that nowadays, they do not have enough money in their pockets and they preferred going in for cheap materials from which they can make enough profit, unlike the average and durable natural ones produced locally. The ones they bought locally hardly yielded profit, unlike the ones purchased from Burkina Faso and other neighbouring countries. They all confirmed that the imported ones were of better quality and were cheaper than the ones produced locally.

2. Source of the leathers

All 10 (100%) respondents said they purchased and sold leathers from Putinga in Burkina Faso, Nigeria, Mali, Tamale and Bolgatanga in the Northern Region of Ghana, in addition to those purchased from the Aboabo indigenous tannery in Kumasi. They added that these were major places they all went for leather to sell. They patronized imported natural leather from these places because they said the chemicals used for the tanning were better and cheaper in those locations and they had the necessary facilities. Emphatically such natural leathers were of better quality and more appealing to the eyes than the ones produced locally.

The researcher strongly believed that this existing situation was one of the major problems affecting the patronage of locally tanned leathers from the Kumasi metropolis. The leathers were acquired via car transportation to the various leather traders.

3. The reflection of the value of indigenous leathers purchased on their quality

Records in Table 9 show the reflection of value of indigenous tanners on their quality. Six (60%) out of 10 respondents said that the value did not really reflect on the quality because they hardly got the expected profit, especially if they considered the quality of leather produced in Kumasi. The prices at which the leathers were sold to them did not merit the quality of the leathers as compared to the ones produced and sold in other places outside Kumasi. The difference in sizes made it difficult to price them to merit the quality of the leather. This was the reason why they mostly went in for leathers produced from outside the country since those ones were less expensive. The locally made ones were costly and the customers did not prefer buying them because of their low quality. Two (20%) out of 10 respondents said that the value reflected because they did thorough selection of good leathers before purchasing them. It enabled them to get the expected profit from sold products. Two (20%) out of 10 respondents said that they could not be specific because sometimes the value reflected on the quality of leathers purchased, while at other times it did not. They believed it was seasonal because they did not get the same quality of leathers all the time.

Table 9: The reflection of value of indigenous leathers on their quality

Reflection of value on quality	Number of respondents	Percentage (%)
No	6	60
Yes	2	20
Not certain	2	20
Total	10	100

Statistics in Table 9 indicate that majority of the leather traders did not accept the reflection of the value of indigenous leathers on their quality. The majority confirmed the fact that the nature of leathers they purchased did not deserve the price tags on them. Emphatically, the quality of locally tanned leathers was not relevant to the price tags on them. This meant that the locally tanned leather were of lower quality as compared to their value.

4. Specific working period when leathers are purchased from the local tannery

All 10 (100%) respondents said that they did not have specific working time for purchasing leathers. Anytime they were ready financially and were in need of leathers, they went in for them. The consumers came in anytime to purchase them whenever they were able and this situation placed them in the position of having products to sell all the time. They were mostly tempted to buy the leathers on credit and paid back after selling them.

5. The types of leathers normally purchased from the local tannery

Records from Table 10 show summarized statistics of the types of leathers purchased by the indigenous tanners from the local tannery. Four (40%) out of 10 respondents said that they purchased only sheep and goat skins since such types were the commonly known and used ones. Consumers frequently bought such types because they preferred using them. Four (40%) out of 10 respondents also said that they did not confine themselves solely to sheep and goat leather but that of cattle hide too. This was because they had some customers who patronized cow leather. The remaining 2 (20%) out of 10 respondents said that they did not deal in sheep and goat leather because they wanted to be neutral and dynamic in their leather trading business. They had noticed that almost every indigenous leather trader dealt in the sheep and goats type, but they were more interested in leather from animals such as pythons, crocodiles, leopards, lions, cheetah, among others. They also said that, they went to the local tannery occasionally since they were not mostly found tanning hides and skins from other animals apart from the sheep and goats.

Table 10: Types of leather normally purchased from the local tannery

Types of leather	Number of respondents	Percentage (100%)
From only sheep and goat	4	40
From sheep, goat and cattle	4	40
From other types	2	20
Total	10	100

Statistics in Table 10 show majority of the indigenous tanners patronize leathers made from the skins of goats and sheep with few patronizing types from other animals like cattle pythons, crocodiles, leopards, lions, cheetah, among others. The majority's patronage in the sheep and goats skins confirms that those types had been accepted and well known to the indigenous tanners. They were not really familiarized with the use of skins from other animals for leather. Emphatically, the use of skins from goats and sheep were on a higher rate as compared to others for leather production. Such types are more durable and easily acquired by the leather merchants.

6. The criteria used to assess the quality of local leather

Records in Table 11 show the criteria for assessing indigenous leathers before they were purchased by the indigenous traders from the local tannery. Four (40%) out of 10 respondents said that they hardly did thorough selection of leathers before purchasing them because the leathers were sent to them. Even though it was obvious they could not have all the leather in a satisfactory state, they just had to find ways and means of selling them off to get their profit. They accepted any kind of leather and sold them out. Two (20%) out of 10 respondents said that they considered leathers without holes in them. According to them, this was very important because it was a highly noticeable indication that disqualifies a piece of leather from being considered as of good quality. They regarded leather with holes in them not as durable as those without holes. Three (30%) out of 10 respondents said that they preferred purchasing leather that had bright surface and bigger in size as well. They said such

types were more useful and durable than the smaller ones, which were hardly bought. One (10%) out of 10 respondents made a comment on the thickness of the leather. He said that the heavy types were of better quality and more durable than the light ones. These were the existing issues the indigenous leather traders were familiar with when it came assessing the quality of leather.

Table 11: Criteria for assessing quality of indigenous leathers before purchasing

Criteria for assessment	Number of Respondents	Percentage (%)
No thorough assessment is done	4	40
Unnecessary holes in leather	2	20
Bright face and sizeable leathers	3	30
The thickness of leathers	1	10
Total	10	100

Statistics in Table 11 indicate the criteria used by the leather traders in assessing the quality of the leathers they purchase for sale. The percentages mean that majority of the leather traders hardly did any thorough assessment of the leather they purchase for the market. This confirmed the fact that leathers on the market were not well assessed because they found means and ways of selling any leather they purchased from the tannery. Emphatically, majority of the indigenous leathers on the market were not properly assessed and were of lower quality.

7. The difference between good and bad leathers before sold to consumers

Records in Table 12 show how the leather traders differentiate between good and bad leathers. Two (20%) out of 10 respondents said they considered goat leather better than sheep leather. They added that goat skin leather was more durable than sheep leather. They preferred to sell the goat leathers than the sheep leathers. Two (20%) out of 10 respondents also said they considered leathers that were not sun dried instead of the sun dried. They explained that the sun dried ones mostly had their skin fibres affected. The colour appearance faded off unlike the air dried. If they were shade air dried, these defects could be prevented. Four (40%) out of 10 respondents said that they preferred working with holes free leather. They added that holes free leathers were comfortable to use and were sold faster than leathers having holes. Two (20%) out of 10 respondents said that leathers with adequate tannins were of better quality than those with inadequate tannins. They added that when leather was well tanned and preserved, its durability was well assured. It could be kept for as long as a trader preferred. Leather not tanned with enough tannin experienced symptoms of decay, smell and wearing off.

These responses showed how the traders had several ways of differentiating good and bad leather. From the statistics shown, greater numbers of the indigenous traders considered leather with holes of lower quality than holes free leather. This was so because it was the most common defect found on the locally tanned leathers. This was caused by several actions noticed and pointed out by the indigenous tanners and from the flayers at the abattoir.

Table 12: Differentiation between good and bad leather

Qualities of good leather	Number of Respondents	Percentage (%)
Leather made from goat skin	2	20
Air/shade dried leather	2	20
Leather with no excess holes	4	40
Leather with adequate tannin	2	20
Total	10	100

Statistics in Table 12 depict that majority of the indigenous leather traders considered leathers with no excess holes in them of lower quality. Responses from the majority on this confirm that leathers with excess holes in them were not really entertained by most of the leather merchants. Emphatically, holes free leathers are of higher quality than the other types even though other defects are also contributing factors to lower quality leathers such as inadequate tannins in leather.

8. Storage of leather

Records in Table 13 show how the indigenous tanners stored their leathers. Four (40%) out of 10 respondents said they tied the leathers with rope and kept them in friends' stores after work. Early every morning, they sold them together with other items. Four (40%) out of 10 respondents kept them in big wooden boxes close to where the leathers were sold. These

boxes were not reliable because their padlocks could easily be tempered with. Two (20%) out of 10 respondents said they kept the leathers in their respective homes. The reason was that, they lived few miles away and did not own any store rooms or wooden boxes at the trading centre to keep leathers. They again said sending them home after work every day was more reliable than keeping them in stores and boxes. They brought a few number of leathers to their selling spots every day and sent for more if the need be.

Table 13: Storage of leathers by the indigenous leather traders

Method of storage	Number of respondents	Percentage (100%)
Keeping in store rooms	4	40
Keeping in big wooden boxes	4	40
Keeping in their homes	2	20
Total	10	100

Statistics in Table 13 depict that majority of the leather merchants preferred storing their leathers in store rooms and big wooden boxes as compared to storage in their homes. This meant that storage in the store rooms and in big wooden boxes were the best storage options for the leather traders. Emphatically, it was the safest and reliable way of keeping their leathers.

9. Average number of leathers purchased from the local tannery and sold out each day

Records in Table 14 show the average number of leathers purchased and sold out each day. Two (20%) out of 10 respondents said that they hardly ordered for leathers because the ones they had in their possessions had been kept for several months without being purchased. Not a piece of leather was sold within a week, due to the influence of the foreign made leathers. Three (30%) out of 10 respondents said that, they hardly sold more than three (3) pieces of leather in a day. They said it was not encouraging to sell locally tanned leathers and even tempted to sell other products apart from leather. Four (40%) out of 10 respondents said that they bought leathers in bulk but did not sell more than ten (10) pieces in a day but occasionally sold close to that number. One (10%) out of 10 respondents said that he ordered fifteen (15) to twenty (20) bundles of leather every week but not on daily bases. Each bundle comprises ten (10) pieces of leather which sum up to one hundred and fifty (150) to two hundred (200) pieces of leather every week. When this number was calculated on daily bases, it meant that he purchased and sold twenty one (21) to twenty eight (28) pieces of leather each day. This was possible for him due to the fact that, he moved from place to place to sell. He added that, leather trading was more effective when he had large number of customers he could reach all the time.

Table 14: Average number of leathers purchased and sold out each day

Leathers purchased & sold out	Number of Respondents	Percentage (%)
None	2	20
Not more than 3 pieces	3	30
Not more than 10 pieces	4	40
Between 21 to 28 pieces	1	10
Total	10	100

Statistics in Table 14 demonstrate that majority of the leather traders bought leathers in bulk but did not sell more than ten (10) pieces in a day. This confirms the low rate of sales of locally tanned leathers on the market. Those who sell not more than three (3) pieces in a day were averagely closer to the majority. Emphatically, the sales of the local leathers were very minimal.

10. How the leather traders transport the purchased leathers from the local tannery to the respective places of supply

All 10 (100%) respondents said that, purchased leathers were transported from the local tannery to their respective places of supply by land in vehicles. This method of transportation had been accepted for many years. They added that, sometimes there were risks involved because there could be accident occurrences, loss of products, failure and delay in delivering

of leather. Emphatically, the mode of transportation of products by the leather merchants was solely carried out by land.

11. How consumers patronize the locally tanned leathers

All 10 (100%) respondents said that, customers' patronage were very low. Some years ago, almost all the royal slippers makers and the other users preferred buying the natural local leathers unlike during the research period. Business had reduced because of low market conditions. They added that they had customers who still bought from them but the quantity they purchased kept reducing drastically since they went in for other types as well. Emphatically, the purchase of locally tanned leathers was almost collapsing due to their low quality.

12. Customers' assessment of leather before purchasing them

Records in Table 15 show the mode of assessment by consumers before leathers were purchased. Three (30%) out of 10 respondents said that they mostly preferred the bright looking ones and with good colour appearance. Four (40%) out of 10 respondents said that they hardly bought leathers having holes. They claimed such leathers were not useful unless they cut them into pieces to work with. One (10%) out of 10 respondents said that his customers preferred selecting the big and sizeable ones which were more useful. Two (20%) out of 10 respondents said that customers hardly assessed the materials before buying. They just pay for the quantity they can afford and used them without assessment.

Table 15: Consumers' assessment of leathers before purchasing

Consumer's assessment	Number of Respondents	Percentage (%)
Preferred bright ones with good colour appearance	3	30
Preferred leather without holes	4	40
Preferred big and sizeable leather	1	10
No thorough assessment done	2	20
Total	10	100

Statistics in Table 15 depict that majority of the consumers considered leather with holes in them as of lower quality. This confirmed what the indigenous tanners and traders said earlier on the quality of leathers produced. Emphatically, holes free leathers were considered by the respective consumers because they had influence on the quality of products they were used for.

4.4 Visual data collected from study areas

Photographs taken by the researcher were printed as primary data. These are shown in Plates 1 to 31.

4.4.1 Pictures taken at the Kumasi abattoir, Ahensan are as follows:



Plate 1: A cow yet to be slaughtered by two butchers in the slaughter house.

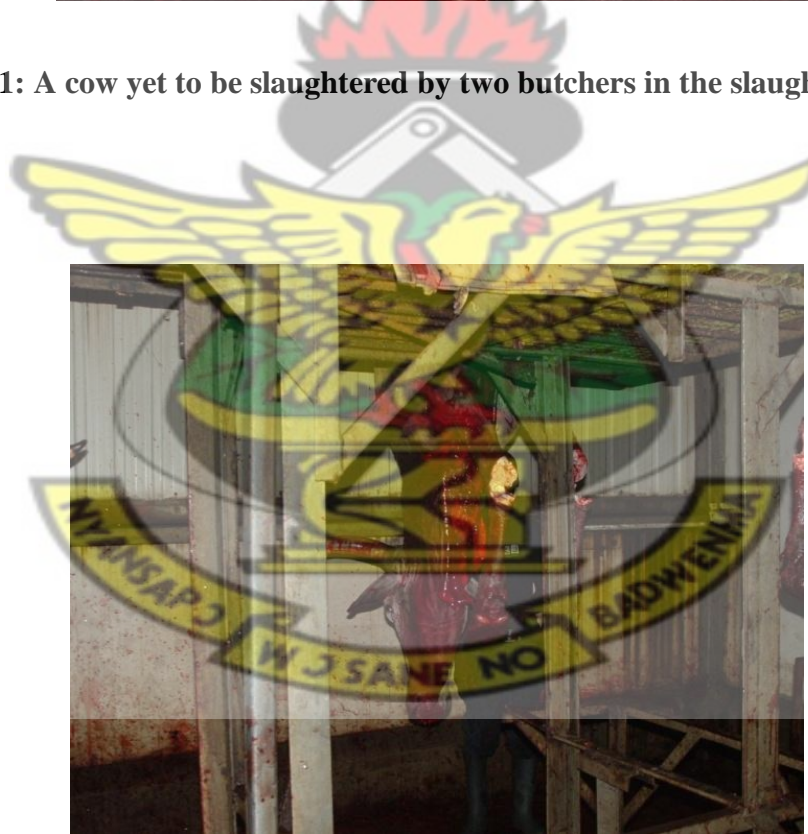


Plate 2: Slaughtered cow at the bleeding section with detached fore limbs and loosened head to allow for easy bleeding.



Plate 3: A butcher flaying the carcass hanging on the mono rail after thorough bleeding is achieved.



Plate 4: Pulling of carcass on the mono rail for the hide to be removed.



Plate 5: Removal of hide by pulling with the aid of a sharp knife.



Plate 6: Removed hide left on a bloody floor at the slaughter house.



Plate 7: Fresh hide with fat and excess flesh yet to be scraped off.

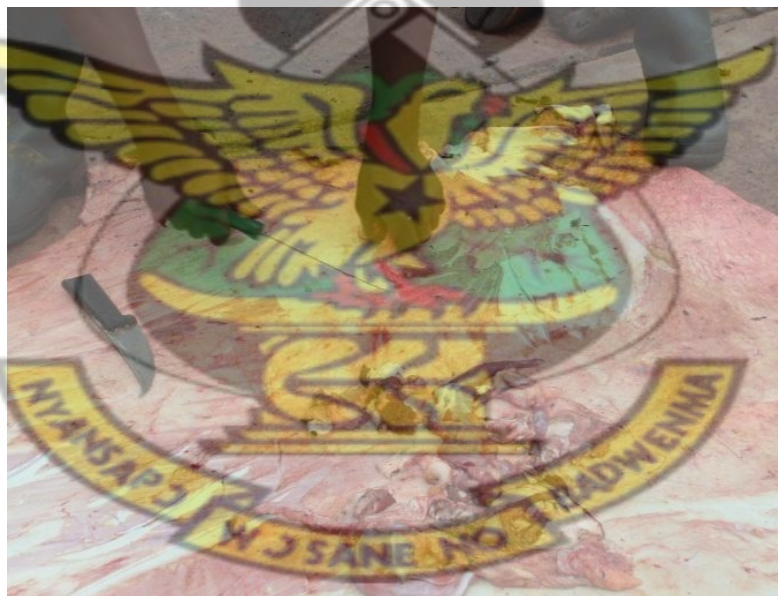


Plate 8: Removal of fat and excess flesh.



Plate 9: Fresh hide yet to be purchased by a tanner for leather.

4.4.2 Pictures taken at the Aboabo tannery in Kumasi are as follows:



Plate 10: Fresh goat and sheep skins hanged on metal wires.



Plate 11: Skins washed in a pit of water to soften and remove excess dirt and blood stain.



Plate 12: Skins soaked in mixed ash and carbide water for thorough penetration of chemicals.



Plate 13: Demonstration of hair falling off skins after a day of soaking.



Plate 14: Transfer of soaked skins into a pond of water mixed with pawpaw leaves.



Plate 15: Dehairing and fleshing skin for leather.

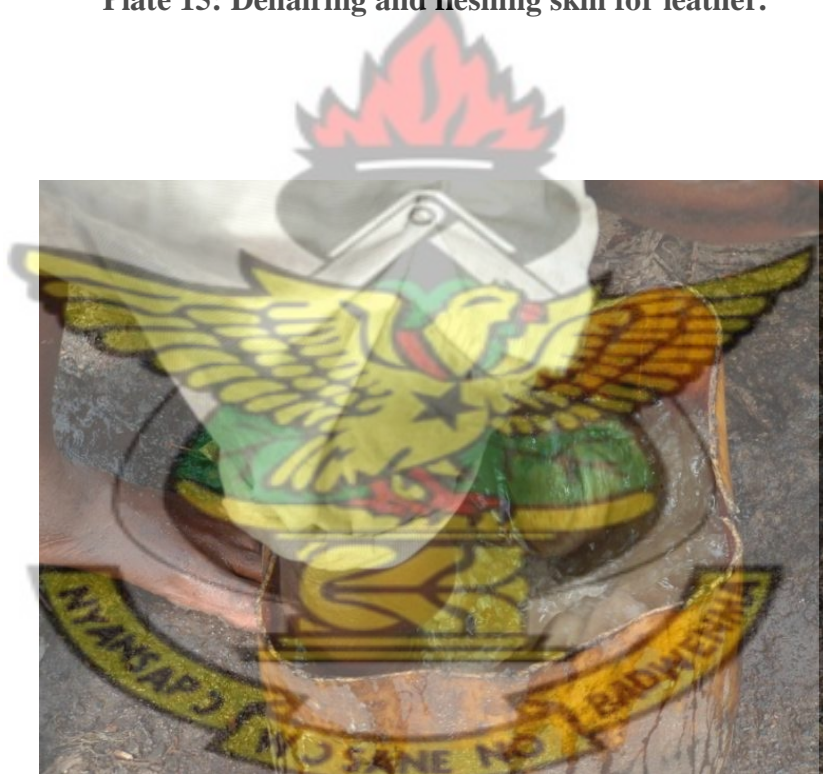


Plate 16: Skins washed to remove excess juice from pawpaw leaves.



Plate 17: Immersion of skins in water mixed with pounded “bagaruwa” seeds and fruits from the sumac tree, as locally called.



Plate 18: Excess “bagaruwa” chemicals washed off the skins.



Plate 19: Floor drying with nails and mallet to stretch leathers.



Plate 20: Pounding of dried guinea corn leaves and dyeing leather into red colour.



Plate 21: Dyeing of black leather in water mixed with rusted metal pieces.



Plate 22: Red and black dyed leathers yet to be dried.

4.4.3 Pictures taken from indigenous leather traders in Kumasi are as follows:



Plate 23: Displayed sheep leathers for sale



Plate 24: Tied goat leathers for sale



Plate 25: Displayed hyena leather for sale



Plate 26: Displayed leopard leather for sale



Plate 27: Displayed monkey leather for sale **Plate 28: Displayed duiken leather for sale**



Plate 29: Displayed hyena leather for sale **Plate 30: Displayed antelope leather for sale**



Plate 31: Students assessing the quality of leathers before purchasing

4.5 Results from Observation

This section deals with what the researcher observed during the research period using participant and non-participant observation strategies to study in-depth the working processes involved in the nature of skins and hides production, how selection was done in assessing the quality of raw materials and its effectiveness by the tanners, how the nature of the raw materials transformed into finished products and how the various tanners and leather traders defined quality leather.

The findings from the observations were conceived as the constituents considered as crucial to the effect of investigation. These comprise the field trip observations and the studies made in the library. The results of observation from the various research fields visited were as follows:

4.5.1 Results from the Kumasi Abattoir

During several visits to the Kumasi abattoir at Ahensan, the researcher observed that, the abattoir had got divisions such as the Administration office, meat processing unit office, and the slaughter houses where slaughtering of the farm animals were done. The Production Manager supervised the working proceedings at the slaughter houses and the welfare of the butchers. There were chief butchers who were leaders of the general butchers' body. They saw to the smooth running of the butchery work among the butchers. There was a farm market where trading of cattle was done. There were various landlords at the farm market who secured places for the various cattle owners to run their trading business. The farm market served as the source of cattle for the slaughtering house at the abattoir.

The researcher observed that each section of the abattoir had specific duties. A section did not interfere with the other in terms of work. There was co-operation between the various sections. From the farm market, the farm animals were prepared and brought to the slaughter house followed by the respective owners and others who were interested in other parts of the animal after slaughtering is achieved. Carcasses which were not purchased right after slaughtering and dressing were kept in a cold storage place inside the slaughter house. The safeties of carcasses were assured when they came out of the slaughter house because of the series of test and working procedure.

With the skins and hides of carcasses, the researcher observed that at the mini slaughter house where sheep and goats are mostly killed, the skins were hardly removed. Mostly, owners of such farm animals prefer leaving the skins on the carcasses. It was only on few

occasions that they were removed and sold to the tanners. This situation seemed to be the reason why the tanners did not solely relied on the abattoir for skins but from other butchers as well. The cattle hides at the main slaughter house were always removed but were not given much attention unlike the meat of the carcasses.

At the skins' and heads' bay, there was always a display of several hides spread open together with the fore and hind limbs and heads of slaughtered farm animals. There was keen competition for the acquisition of skins and hides between tanners for leather making and consumers for food. The butchers preferred selling the skins/hides to those purchasing for the market as food than selling to the tanners for leather. This was because they sold to the market people as food at a higher price than to the tanners for leather. This put the various tanners in a situation where they did not get easy access to the best skins and hides for leather. Mostly it was the rejected and less quality ones that were left for the tanners to purchase, since promoting of leather making was not really a priority of the butchers at the skins and heads bay.

4.5.2 Results from the Aboabo local Tannery

During several visits to the Aboabo local tannery, the researcher observed that, even though the various tanners worked individually, they adopted the same method of tanning known as “vegetable tanning”. They had been adopting this method of tanning because that was the type they had grown up to understudy from their forefathers years back.

The nature of environment at the local tannery was not appealing to the eyes even though there was a mosque positioned in the centre of the tannery. There were refuse dumps all over

the place with effluent achieved after tanning which created erosion all over. The local tannery had several pits of water for soaking, washing, tanning and preserving. There was a sumac tree beside the tannery which produced fruits for tanning locally called “bagaruwa”. Just a sumac tree was not producing enough “bagaruwa” seeds for tanning, so they rather purchased large quantities from the Northern part of Ghana where they were found in abundance and cheaper.

The tanners were mostly found hanging skins and hides on metal wires and in the sun. This practice was not really encouraging because though it gave better ventilation and quicker drying, but mostly resulted in heat damage and pole or rope marks, showing as hard creases down the skins/hides. Such skins and hides happened to lose their quality. Sun-dried and ground-dried leathers were observed as the common methods adopted by the tanners. These practices also had their side effects on the skins/hides or the tanned leather. Excess heat from the sun mostly shrank the materials whiles dirt and poor ventilation on the ground also affected the types dried in that way.

It was observed that because the level of tannery work was on a low scale now, most of the tanners were seen sitting idle under shade of trees chatting, playing cards, arguing, among others. Others were into other jobs such as security men, mechanics, selling car spare parts, among others. The quantity of leathers produced there were very low unlike some years back when the researcher used to purchase leather from. The raw skins and hides were not made available to them as it used to. The researcher occasionally saw some young boys bringing dried skins to the tanners to buy. Not knowing where they came from, they just negotiated

the amount and bought them without any thorough assessment done. Once the raw materials got there, the tanners considered them useful somehow so they ended up tanning all kinds of skins into indigenous leather. Good quality was questionable in this situation because attention was not really given to some extent. This practice reflected in the kind of leathers produced from the tannery.

Finally it was observed that, consumers do not patronize the locally tanned leathers as they used to. This situation observed confirmed the major problem the tanners said during interview sessions. Even though the local tanning business was not totally dead, it was not as encouraging and motivative to the tanners and the people of the Aboabo and Asawase communities.

4.5.3 Results from the various shops of the indigenous leather traders

During several visits to the various shops of the indigenous leather traders, the researcher observed that, these traders were into the trading of other related items apart from the indigenous leathers which was the main material they originally traded in. Due to the circumstances the locally tanned leathers were facing, the indigenous traders had indulged in trading other materials in addition to leather. They traded in several preserved parts of different kinds of animals at the “Lai Kuole” railway market where they are in their numbers. They sold animals’ bones, heads, tail, teeth, legs, among others for certain uses such as rituals and others related purposes.

The researcher again observed that with those who were solely into trading leather, they dealt in different types of them. Some of them had been influenced in the foreign made synthetic

leathers. These types were mostly used for catapults, bags, belts, slippers, shoes, wallets, among others. This was so because the patronage of the locally tanned leathers was collapsing. The indigenous traders sometimes sold these types of leathers too to enable them survive and cater for their respective families. Those who solely traded in the indigenous leathers did not stick to one type of leather but several types. From observation, leathers made from animals such as; sheep, goats, hyena, leopard, monkey, wolf, duikens, snake, rats, birds, among others were found. They dealt in a large range of types of animal leather. Most of the leathers were fur (fine silky hairs left on mammals). They were displayed at vantage spots in front of their various shops to catch the attention of customers to buy. Some of them left their shops at the end of the day without making any sales while others too were lucky to make enough by the end of the day.

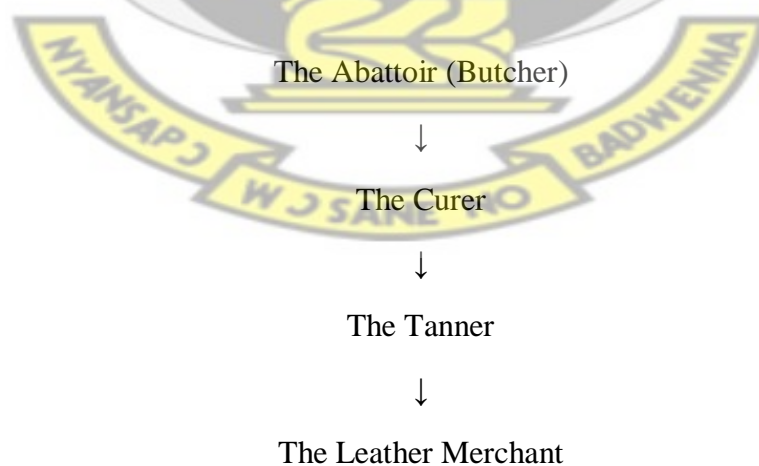
It was finally observed that what the various tanners and the leather traders confirmed on the collapsing of the locally tanned leather was true. Few customers noticed hardly came to the traders to buy the locally tanned leathers but preferred buying other types such as the synthetic ones and the imported natural leathers based on the assumption that the ones produced locally were not of good quality and durable. It was only on few occasions that the researcher found customers buying some indigenous leathers from certain traders.

4.6 The Suggested Criteria for assessing the quality of skins and hides

The purpose of the development of criteria for assessing the quality of skins and hides for indigenous leather production in Kumasi is to educate the public and leather producers on the standards of assessing the quality of skins and hides and the things to consider before

transforming them into leather. This is also to help improve upon the quality of leathers produced in the Kumasi metropolis.

On hide and skin defect, what was observed and heard from the study, respondents seem to reflect Sharphouse's idea that "certain of the defects marring otherwise beautiful leather have arisen in the life of the animal; others develop in the preparation of hides and skins and although still outside the tanner's control, could, with proper attention, be avoided; yet others can be caused during tannery processing. It is important to be able to recognize the various types of defect so that those that can be are avoided" (Sharphouse, 1983 p. 24). If the suggested criteria are accepted and followed as executed across the various concerned sections, the quality of skins and hides for indigenous leather production in the Kumasi Metropolis can be assured. The criteria developed by the researcher have been divided into four sections. The developed criteria will benefit the slaughter houses, preferably the abattoir where the butchers are found, the curer after slaughtering is achieved, the tanner who purchases the skins/hides, and finally the merchant who trades in the leather produced by the tanner. In a diagram, the developed criteria are executed under the following categories:



4.6.1 Suggested Criteria for Butchers

1. Thorough assessment and proper examination of the health status of farm animals known as ante-mortem inspection should be carried out by professional veterinary services personnel and environmental health officers before slaughtering is carried out. This should be supervised by the Production Manager or the one in charge of operations at the slaughter house to prevent passing through of farm animals with defects such as mouth and foot rots, scars, boils, cockle, among others.

2. Slaughtering of examined/inspected farm animals should aim at the better acquisition of the skins and hides. The farm animal should be in a dung-free, healthy condition and the slaughter rapid and efficient. Bruising, etc., should be avoided. Proper positioning and firm gripping of the farm animals should be adopted to prevent movement during slaughtering. If the need be for more butchers around a farm animal to achieve this, it should be embraced. This application becomes very necessary in the absence of stunning box system which virtually needs only one butcher to operate.

3. The correct type of knife and way of slaughtering should be considered greatly. Since the neck shape of farm animals is cylindrical, straight shaped knives are not advisable but rather curved or 'C' shaped knives are recommended especially with smaller animals. Very sharp halal knives are to be used to prevent much pressure, difficulty and longer slaughtering period. These factors if adopted prevent damage to the fibres and tissues in the skin/hide at the neck part of the farm animal.

4. Bleeding off blood from a carcass should be carried out adequately. Bleeding should not only aim at draining blood off the carcass but also from the small arteries and veins of the skin/hide. The two hind limbs of the animal should be hanged up well on the mono/transporter rail with the neck and head part including the fore limbs faced down with the carcass straightened and uninterrupted for easy drainage of blood. Bleeding should aim at avoiding blood clots therein, readily putrefying. Giving rise to blue-black markings in the skin/hide and areas of putrefaction in these regions.

5. Flaying should not be carried out by any butcher, but by experts/skilled flayers and the methods used generally give first priority to producing a good quality carcass and skin/hide. Flaying should be carried out with immediate effect and carefully after bleeding is achieved. The skin/hide should be removed by flaying whilst the carcass is warm; its removal is much easier, so that the skin/hide and carcass lose the body heat more quickly. The quicker loss of body heat reduces the chance of putrefaction. Flaying is best achieved by making ripping cuts in the skin/hide only with a pointed knife as shown in this diagram:

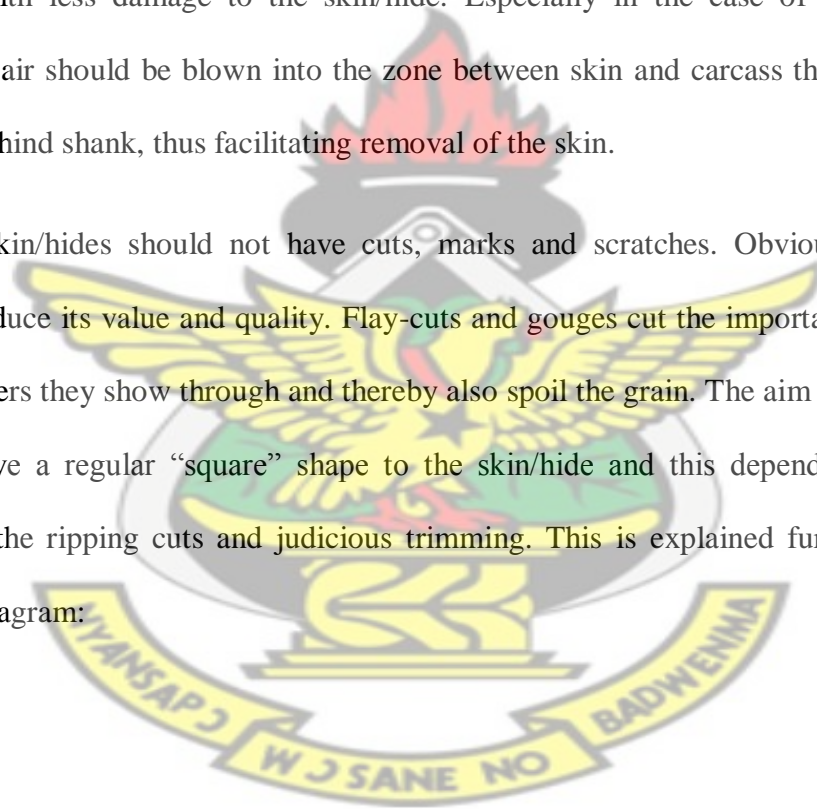


Fig. 6 Ripping cuts

Source: *Sharphouse (1983)*

This is the best way of making ripping cuts when flaying a carcass. The legs are severed at the knee joint and the ripping cut should be up the inside of the leg. The skin/hide should be peeled away from the belly rip line with the aid of rounded blade knives, which minimizes the danger of cutting either the skin/hide in the belly areas. The limbs of the animal should be flayed subsequently. The animal should be hung up by the rear shanks and pulled or punched away from the carcass gently with as little use of the knife as possible. A flaying machine is best recommended. It does not only reduce the manual effort required but gives a cleaner operation with less damage to the skin/hide. Especially in the case of smaller animals, compressed air should be blown into the zone between skin and carcass through small hole made in the hind shank, thus facilitating removal of the skin.

6. Flayed skin/hides should not have cuts, marks and scratches. Obviously, cuts in the skin/hide reduce its value and quality. Flay-cuts and gouges cut the important corium fibres. In thin leathers they show through and thereby also spoil the grain. The aim of flaying should be to achieve a regular “square” shape to the skin/hide and this depends on the correct location of the ripping cuts and judicious trimming. This is explained further through the following diagram:



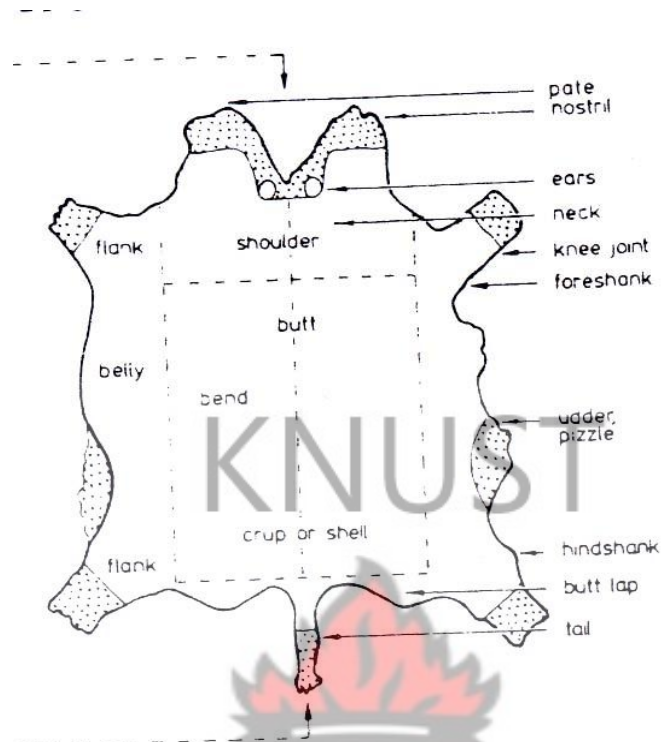


Fig. 7 Parts of Hide

Source: *Sharphouse (1983)*

The shaded/dotted areas should be trimmed off by a butcher or preferably the flayer. The skin/hide is often segmented, according to its thickness or firmness of fibre structure, and its consequent suitability for the ultimate use of the leather made from it.

7. No fat should be left on skins/hides during and after flaying. Endo skeletal animals have their structure composed by bones with tissues, veins and fibres in addition to the flesh covering before the skin/hide itself protects the body from bacteria attack. Fat separates the flesh from the skin/hide. When flaying is done by leaving fat on skin/hide, it encourages rapid putrefaction and does not encourage the production of quality leather. This should be noticed to enhance the value and durability of the skin/hide.

8. As soon as the skin/hide is removed (flayed) from the carcass it should be taken immediately from the slaughter-house floor where it is always a potential source of infection of the carcass by dirt, blood, dung and bacteria with which it is contaminated. It should immediately be removed and washed in a plentiful supply of cold water to remove dirt, blood, etc., and to cool it. It should be drained afterwards to achieve quality skin/hide for leather.

9. Skins and hides produced from the slaughter house should aim at being used for leather. If the high rate of competition between skins and hides for food and for leather is controlled well, quality will be assured since there is no standard or quality needed for the consumers of skins and hides meant for food. Butchers at the slaughter house or abattoir should aim at reserving the best flayed skins and hides for tanners who purchase them for leather rather than promoting and focusing on the consumers who purchase them for food.

4.6.2 Suggested Criteria for Curers

1. Flayed and washed skin/hide should be taken out of the slaughter house immediately to the curer who can happen to be a butcher to prevent contamination with dirt, insect or rodent attack, but most common and immediate danger is by putrefaction which causes the desirable protein fibre structure to be degraded or, in extreme cases, to become rendered completely water soluble (Gelatinisation).

2. The curer should work on the skin/hide with immediate effect since the freshness of the material is greatly considered by the tanner for quality leather production. The condition of the skin/hide matters most since tanning is a soaking process. Rehabilitation is made possible

and helps dehydration process when the skin/hide is in its fresh state. The skin/hide must come back to rehydration state.

3. The curer should not aim at skins/hides which have been singed. All skins/hides used as food are singed with the aid of a sharp knife. It is highly impossible that a tanner will purchase singed skin/hide for leather. If that is tried, he puts himself in a position of discomfort and not possible for tanning to go smoothly in achieving leather.

4. Excess fat and flesh left on the skin/hide by the flayer should be scraped off adequately by the use of a curved or “C” shape and well sharpened knife. This should be done carefully to prevent excess cuts and scratches on skin/hide. In achieving this correctly, the cold, flayed skin/hide should be spread out well. The flesh side up on preferably on a dry concrete floor.

5. Methods of curing skins and hides should aim at keeping them fresh and to fight against rotting or putrefaction to achieve good quality skins/hides for leather. Putrefaction is caused by the digestive action on the skin/hide of micro-organisms called bacteria. These bacteria are living organisms and in this case they secrete their digestive juices on to the skin/hide. The active ingredients of these are called enzymes. The living bacteria cell then re-absorbs such of the digested substrate (on the skin/hide) as it requires for nourishment, leaving the enzyme still on the skin/hide. Thus all the bacteria may be removed or killed. But the enzyme digestion system may still function and putrefaction continues.

It should be noticed that most bacteria are fairly sensitive to their habitat and if conditions are favourable they may be killed or go into a dormant spore form until conditions are suitable. Under ideal conditions they can multiply very rapidly and cause harm.

6. Chemicals used by the curer for preservation of skins and hides should aim at killing the existing bacteria and consequently preventing any subsequent breeding. Chemicals are known as bactericides, whilst those that stop or inhibit their active life are known as bacteriostats. In some cases the already deposited enzyme could continue to putrefy whilst the bacteria is dead or inactive.

It is cautioned that there are very many types of putrefying bacteria which can be identified by their shape, breeding habits, the nutrient material they live on, the conditions of temperature, moisture content, and the chemical nature of their surroundings. Adverse conditions which inhibit one bacterium may be acceptable to another type. Some bacteria can develop immunity to conditions which were originally adverse.

7. Putrefaction only occurs in the presence of free water and the presence of dissolved substances. Simple removal of water by drying and high quantities of salts, acids or alkalis, bactericides or other toxic chemicals are obvious methods of preservation. The curer should be well informed on the several methods of preservation of skins/hides to maintain their quality and durability.

8. In curing, short term preservation should aim at preserving the skin/hide against putrefaction damage for at least 3 to 4 days so as to allow for collection and transportation from the slaughter-house or skins and heads bay to the tannery, using inexpensive systems which will not damage the skin/hide or involve the use of chemicals which may be toxic to workers or involve subsequent effluent problems in their disposal, e.g. large quantities of salts.

9. The best and recommended method of preservation is by salting. Salt is very concentrated, it penetrates the fibres and tissue layers of the skin/hide and captures the water contents in it and not favorable for bacteria to survive. Salting can be achieved in three main ways; these methods are: wet-salting, brining and dry-salting. Each of them can be adopted by the curer.

Wet-salting should be done by first spreading out the cold flayed skin/hide. The flesh side up on a concrete floor and well sprinkled with salt (sodium chloride). Coarse or round-grained salt is preferred to fine salt, as the former spreads better, whilst the latter forms patchy, wet cakes. A second skin/hide should be placed on the first one and also sprinkled well with salt. This should be repeated until stacks 5-8 metres high are formed with the top skin/hide overlaid with salt.

The stack should be left for days, when the salt dissolves in the moisture in the skin/hide and the brine permeates the pile. The amount of salt used should be 25-30% of the raw skin/hide weight. Less salt is used in the case of sheep and goat but in all cases the salt content of the damp slated skin/hide (less wool/hair) should be of the order of 15-25%. During salt piling, the skins drain, lose some moisture, and therefore lose some weight. In the case of hides this amount to 10% of the drained flayed weight. Drained salted hides contain about 50% water.

The following figure and plates explain practically these preservation points:

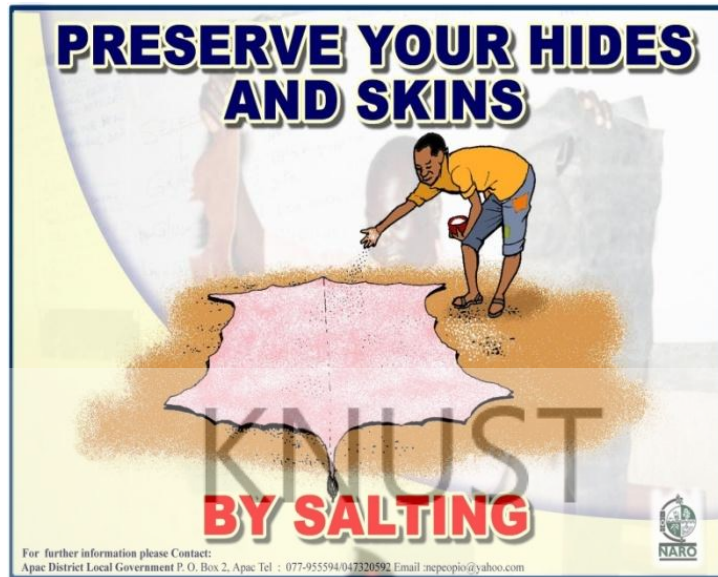


Fig. 8 Salting by sprinkling

Source: www.hidesandskins.ca



Plate 32: Skins and hides well overlaid with salt

Source: www.hidesandskins.ca



Plate 33: Stacks 5-8 metres high of salted hide kept for the tannery

Source: www.hidesandskins.ca

A merit of salting is that the salt fully penetrates the skin/hide structure and by the above dehydration effect on the fibre structure, together with the coagulation of the inter-fibre protein, renders the hide more porous to subsequent process such as soaking. A major disadvantage can be that the tanner has a problem in disposing of the subsequent washing effluent containing quantities of salt.

Attention should also be drawn to the merits of pre-fleshing the skins/hides prior to salting to remove unwanted flesh, fat or meat, which impair salt penetration, and any excess water. Fleshing machines are available equipped with a de-manuring cylinder which is an obvious advantage. A good square trim allows a neater stack to be made with more uniform distribution and penetration of salt.

Brining is a more efficient method and can be practiced as well. The skins/hides should be cleaned well by hosing with water and then hung in pits or run in large paddles in a very strong salt solution (brine) containing about 30 lb salt to every 10 gallons of cold water (210°Bk). This if done correctly gives very good and uniform salt penetration in 12-14 hours for heavy hides. The skins/hides should be drained and piled, and may have a further sprinkling of salt, as in the wet-salting process. Care must be taken to check the purity and strength of the brine liquor before re-use, as it may become contaminated with halophilic bacteria. Both brining and wet-salting require large quantities of salt and the cured skin/hide still damp (50% water).

Dry-salting is also accepted. The flayed skin/hide can be salted by either, or both, of the above methods and is then hung up to dry. This reduces the weight and the cost of transport, but care must be taken that, drying is carried out gradually and evenly. If the skin/hide gets too hot it may partly gelatinize, or turn to glue, giving it a horny fell. When it is put in water these parts dissolve away leaving holes in the skin/hide and this should be prevented.

A naturally occurring salt known as “Khari” salt can be used in dry-salting. This consists largely of sodium sulphate plus earthy impurities, and is locally much cheaper than common salt (sodium chloride) but behaves in a similar manner.

10. Drying is another preservation method that can be practiced by the curer but should be done adequately. As bacteria must have a certain amount of free water moisture if they are to attack skin/hide, putrefaction can be stopped by removal of water so that the skin/hide contains only 10-14% moisture. Their activity then ceases, and some types are killed, whilst

others dry up into a spore form, in which they can remain a long time until there is enough water for them to be active again.

Curing by drying requires care, especially with thick hides because:

(i) If drying is too slow (as in cold, wet climate), putrefaction may occur before the moisture content is low enough to stop bacterial action.

(ii) If drying is too fast and the temperature is too high, part of the wet skin/hide will start to gelatinize to a glue-like material. This makes the skin/hide hard and brittle and prevents drying of the inner layers. It is difficult to see this fault in dried skins/hides until they are soaked back in water, when holes appear or the smooth grain is lost or has a blistered appearance, owing to the gelatinized part of the skin/hide dissolving in water.

Drying is advised and best practiced in countries with hot, dry climate, such as India, in Africa and South America, where the latter danger is real. Drying can be achieved in several ways, such as; ground-dried, sun-dried, frame-dried and shade-dried.

Shade-dried is the best method of drying because it hardly has side defects. The skins/hides should be dried in an open-sided, covered shed, designed to keep off the direct heat of the sun but allow good ventilation. It also protects the skins/hides against occasional rainfall.

Frame-dried is equally a good and recommended method because the skins/hides are loosely strained out on frames, which are arranged so that they do not receive the direct rays of the mid-day sun. This gives less danger of heat damage and a better, flatter shape. The skin/hide shrinks on drying and tightens up in the frame, and if it is put in too tightly, over-straining or

stretching may cause weakness and thinness. Frame-dried skins/hides are of better shape, more uniformly dried and less liable to putrefaction or heat blisters than ground dried and sun dried.

Sun-dried is when the skins/hides are hung or laid over poles, ropes or wire in the sun. Though this gives better ventilation and quicker drying, but mostly results in heat damage and pole or rope marks, showing as hard creases down the skin/hide. This method is not the best because it causes skins and hides to lose their quality.

Ground-dried is when skins/hides are simply spread out on the ground, sometimes on a bed of twigs or stones. This can be dangerous as well owing to poor ventilation of the ground side and high temperature of the exposed side, plus contamination with dirt. This is mostly not encouraged because it causes skins and hides to lose their quality as well.

11. The curer should be cautioned that dried skins/hides are susceptible to insect attack (e.g. beetles, larvae and maggots). A common method of prevention is either to dip or to spray the skins/hides in a solution of white arsenic and caustic soda (approximately 1/5% of the weight of water). This liquor is poisonous. Other methods use naphthalene, sodium silicofluoride, D.D.T., or benzene hexachloride, as sprays, dips or dusting powder.

12. Freezing is also a preservation method but not really encouraged to be adopted by the curer. This technique as used for the carcass meat is relatively expensive and also involves problems in transport and subsequent de-freezing in the tannery. Unlike the carcass meat, the skin/hide is likely to be heavily contaminated with farmyard dirt and bacteria and its hair or wool gives an insulating resistance to rapid temperature changes. Formation of ice crystals

within the fibre structure causes micro-distortion, resulting in leather which is softer and looser than normal. It is considered too expensive for common use.

Rapid chilling removes body heat of the skin/hide quickly and thus rapidly reduces the rate of autolytic or putrefaction changes. The simplest required method is by hosing, dipping, etc., in cold water, e.g. 3°C. A plenty supply is necessary, otherwise the chilling will be inadequate, and washing in lukewarm water may only spread the dirt and putrefactive organisms from the dirty hair side to the “clean” flesh side.

A current practice is to stack the freshly-flayed skins/hides, flesh side out, in small piles not more than 5 or 6 deep on pallet trolleys, and expose them overnight in a chilling tunnel to an air blast at 1°C so that they rapidly reach a temperature of 2-3°C. They may be stored satisfactorily for two weeks in a cold store.

13. Preserved skins/hides should not be kept or stored by the curer for a longer period of time since putrefaction can take place again by bacteria such as borers who create holes in flesh side of skins and hides if preservation agents begin wearing off. These borers eat into the flesh of skins and hides affecting the hair roots which hold the hair or wool. This causes hair slip on skins/hides when soaked in ordinary water by the tanner and does not encourage quality leather production.

14. Skins/hides may enter the tannery in the various states of cure, and the skin/hide store must be suitably arranged to handle them. Dried skin/hides should be kept in a cool, dry atmosphere and precautions should be taken against insect attack. Dry-salted skins/hides require similar conditions but should be kept separate from dried skins/hides.

Vegetable-tanned crust stock should be dried by airing off if necessary to prevent mould growth, and protected from sunlight which causes dark stains; or iron contamination. Wet blue chrome-tanned stock is usually packed in airtight bags, to prevent, which would make wetting-back and subsequent processes difficult.

Wet-salted skins/hides also need a cool store, preferably of uniform temperature, e.g. 10°C, free from draughts and with a suitably constructed concrete floor to give good drainage and ease of cleaning. As in other store, records should be kept of all supplies and deliveries, sorting, grades and weights. Infection by moulds or bacterial putrefaction should be prevented by a thorough clean-out and the application of a suitable fungicide or bactericide.

4.6.3 Suggested Criteria for Tanners

The tanning process converts the protein of the raw skin/hide into a stable material, which will not putrefy and is suitable for a wide variety of purposes. There is a vast array of tanning methods and materials and the finished leather, the cost of the alternative materials, the plant available, and the type of raw material. It must however be emphasized that the method of using these materials is itself a factor influencing the resultant leather.

The chief differences between the tanned skin/hide (leather) and the raw skin/hide (pelt) are that with raw skin/hide the latter dries out to a hard horny material which on re-wetting putrefies, whilst leather dries out to a flexible material which does not putrefy on rewetting.

The quality of leather that the tanner can produce is determined primarily by the quality of the raw skins/hides that he buys. The quality of the hides cannot be fully assessed until after

the hair or wool has been removed, and after the completion of the tanning process when the skin/hide has been turned into leather. The value of the skin/hide depends on the end use to which the leather goes. This eventually has to be reflected in what the tanner pays for his raw material.

The following are the key factors to be considered by the tanner in assessing the quality of skins/hides for indigenous leather production:

1. The tanner should be the personal assessor or right person to do selection of skins/hides when purchasing for leather production but not the curer who does the delivery. The tanner should do thorough selection of skins/hides before using them for leather. The tanner is cautioned that bad quality skins/hides obviously transform into bad leather and this can be prevented if selection is done on the contrary.
2. The tanner should aim at fresh flayed skins/hides for leather production. Skins/hides kept with the curer for a longer period of time should not be encouraged by the tanner because they are mostly not favourable when tanning is carried out. Putrefaction easily takes place on skins/hides when kept for longer period without tanned on time especially if not given the best preservation method. This affects the quality of the raw materials.
3. The tanner should aim at wet-salted skins/hides for leather production. These types are preferred because when the skins/hides have to be tanned, they must be soaked in water until they have taken up as much water as it had on flaying. Dry-salted skins/hides obviously require longer, stressed and more careful soaking than wet-salted skins/hides.

4. The tanner should aim at skins/hides that are not sun-dried. This is when the skins/hides are hung or laid over poles, ropes or wire in the sun. Though this gives better ventilation and quicker drying, but mostly results in heat damage and pole or rope marks, showing as hard creases down the skin/hide. Such skins and hides mostly lose their quality.

5. The tanner should aim at skins/hides that are not ground-dried. This is because when skins/hides are simply spread out on the ground, sometimes on a bed of twigs or stones, they can be dangerous owing to poor ventilation of the ground side and high temperature of the exposed side, plus contamination with dirt. Such skins and hides mostly lose their quality as well.

6. The tanner should aim at shade-dried skins/hides. It is the best method of drying because it hardly has side defects. The skins/hides should be dried in an open-sided, covered shed, designed to keep off the direct heat of the sun but allow good ventilation are stretched and aired on clean supports. It also protects the skins/hides against occasional rainfall and quality leathers are assured when such skins/hides are tanned.

7. The tanner should also aim at frame-dried skins/hides. It is equally a good and recommended method because the skins/hides are loosely strained out on frames, which are arranged so that they do not receive the direct rays of the mid-day sun. This gives less danger of heat damage and a better, flatter shape. The skin/hide shrinks on drying and tightens up in the frame, and if it is put in too tightly, over-straining or stretching may cause weakness that should be assessed by the tanner when purchasing the raw materials. Frame-dried skins/hides

are of better shape, more uniformly dried and less liable to putrefaction or heat blisters than ground dried and sun dried. Such skins/hides are of good quality.

8. The tanner should not use skins/hides that have been attacked by bacteria such as borers who create holes in flesh side of skins/hides if preservation agents begin wearing off. These borers eat into the flesh of skins and hides affecting the hair roots which hold the hair or wool. This causes hair slip on skins/hides when soaked in ordinary water by the tanner and does not encourage good quality skins/hides for leather production.

9. The tanner should aim at skins/hides with no fat and flesh left on them. This is well achieved when the flayer does his work well during flaying. Scraping should be redone by the curer thoroughly until the skin/hide is free from unwanted fat and flesh. In achieving this correctly, the cold, flayed skin/hide should be spread out well. The flesh side up on preferably on a dry concrete floor. If these are done and checked adequately, it saves the tanner from discomforts during tanning and good quality leathers are produced.

10. The tanner should aim at skins/hides with no cuts, marks and scratches. This should not be looked down upon because obviously, cuts, marks and scratches in the skin/hide reduce its value and quality. Flay-cuts and gouges cut the important corium fibres. In thin leathers they show through and thereby also spoil the grain. As the aim of flaying should be to achieve a regular “square” shape to the skin/hide, so should the aim of the tanner. Skins/hides without these defects are considered as of good quality.

11. How skins/hides in large quantities are packed and transported to the tannery should be considered as well since this can also cause harm if not carried out well. Before processing,

the skins/hides, preferably of uniform size or weight, are made up into suitably sized packs and the weight and number of each pack noted.

Attention should be given to Factory Safety Precautions concerning safe passageways, lighting and such handling equipment as hoists, pallets and stacking trucks. Tanners must be made aware of any dangers of infections such as anthrax by display of notices emphasizing initial symptoms which can lead to rapid diagnosis.

Good quality dried skins/hides require careful packing or baling for transport. They become very hard and must not be bent or creased unduly, as this will cause them to crack. If they are to be folded, this should be done whilst they are slightly damp and still flexible enough. Overtight baling ropes can cause similar damage and therefore should be prevented. The skins/hides must, of course, be kept dry during storage and transporting to the tannery to prevent putrefaction. An advocated example of transporting preserved skins/hides in large quantity is shown in the picture below:



Plate 34: Carefully packed/baled preserved skins and hides for the tannery

Source: *www.hidesandskins.ca*

13. Since tanning begins with soaking, the tanner should consider using clean water and changing it time after time when the water begins catching dirt and excess blood if any. Soaking and washing requires much water because the more water attracted to the protein molecule of the skins/hides, the more they become separated from the adjacent molecule, so that the molecules are pushed apart. Such skins/hides are said to swell. Thus flint-dried hard skins/hides soaked well in water imbibe water, swell and become softer. By increasing the ionization of either the acid or basic groups by the addition of alkali or acid respectively, the attraction for water should be increased and the skin swells or plumps more.

14. Pickling method should be adopted adequately by the tanner. Pickling of skins/hides should be encouraged and practised in situations where tanner has facilities for unhairing, liming, fleshing, deliming and bating the skins/hides. If this is done adequately, it relieves the tanner of costly and difficult effluent disposal.

This method must preferably always be used for skins/hides after they have been unhaired or dewoolled, limed and fleshed, particularly in the case of sheepskins, where the more valuable wool is removed and the remaining skin is then pickled and drained ready for marketing. In the case of woolled skins/hides the removal of the wool is often known as fellmongering.

15. The tanner can adopt any of the methods in tanning provided it is done correctly and adequately. There are several tannage materials that are accepted and can be used such as; vegetable tans, synthetic tans, mineral tannages, aldehyde tannages and other tannages depending on the tanning method adopted. Tannage may be conducted by laying and immersing the skins/hides in pits full of tan liquor, which gives slow and sometimes uneven

tan penetration but tends to produce flat leather. Suspending the skins/hides in pits or, even better, rocking the suspended skins/hides gives faster and more uniform tannage.

16. The characteristics of each tannage and their effects should be well known by the tanner to achieve quality leathers. Thus for a firm, solid leather, vegetable tanning will be first choice. The quality and softness of the leather will be determined by the correct, type and quantity of vegetable tan given.

The tanner should know that the physical properties of a given leather will depend on the type of tannage used, the quantity fixed and the drying technique used. A further modification can be made by the application of oils.

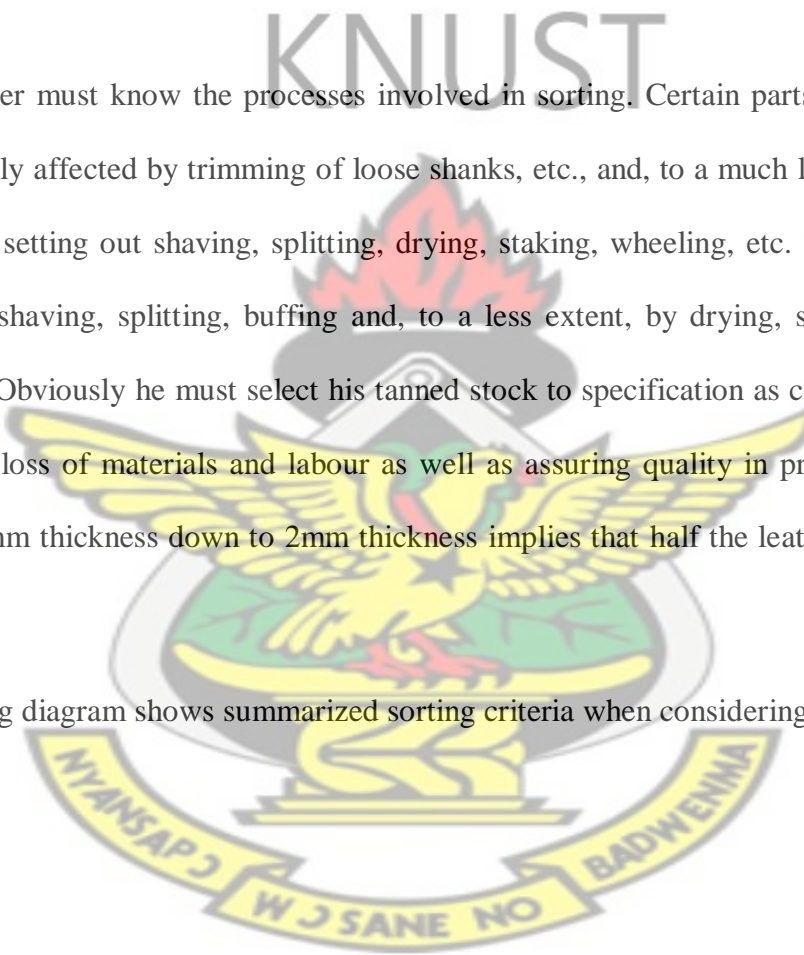
It has been implied that most tannages cause some degree of fibre shrinkage, and rapid tan fixation (astringency) may cause such shrinkage of the skin/hide surface, as to cause wrinkling, pebbling and interfere with further tan penetration. The tanner should be cautioned of this to enable him achieve good quality leathers.

17. After tannage, leathers should carefully be inspected and sorted into various selections before dyeing or finishing. The customer will usually demand a degree of uniformity in the parcel of skins/hides delivered to him to satisfy a particular order. There may be considerable variations in the pack of skins/hides as tanned. Often these variations are difficult to see before the skins/hides are tanned due to the presence of hair, or the wet flaccid nature of the raw skin/hide, or wet tanned skin/hide.

The process of sorting is most important for the economic running of the tannery and should be carried out by skilled operators who have knowledge of the particular skins/hides being processed and also of the customer's particular requirements. Absolute uniformity is not possible and the sorter must be aware of the degree of latitude which is permissible for the customer's purpose. Consequently, selections of a high degree of uniformity command a higher price.

18. The tanner must know the processes involved in sorting. Certain parts of the skin/hide may be greatly affected by trimming of loose shanks, etc., and, to a much less extent, by the processes of setting out shaving, splitting, drying, staking, wheeling, etc. Thickness can be adjusted by shaving, splitting, buffing and, to a less extent, by drying, staking, finishing, plating, etc. Obviously he must select his tanned stock to specification as closely as possible to minimize loss of materials and labour as well as assuring quality in products. To shave leather of 4mm thickness down to 2mm thickness implies that half the leather substance has been wasted.

The following diagram shows summarized sorting criteria when considering quality leather:



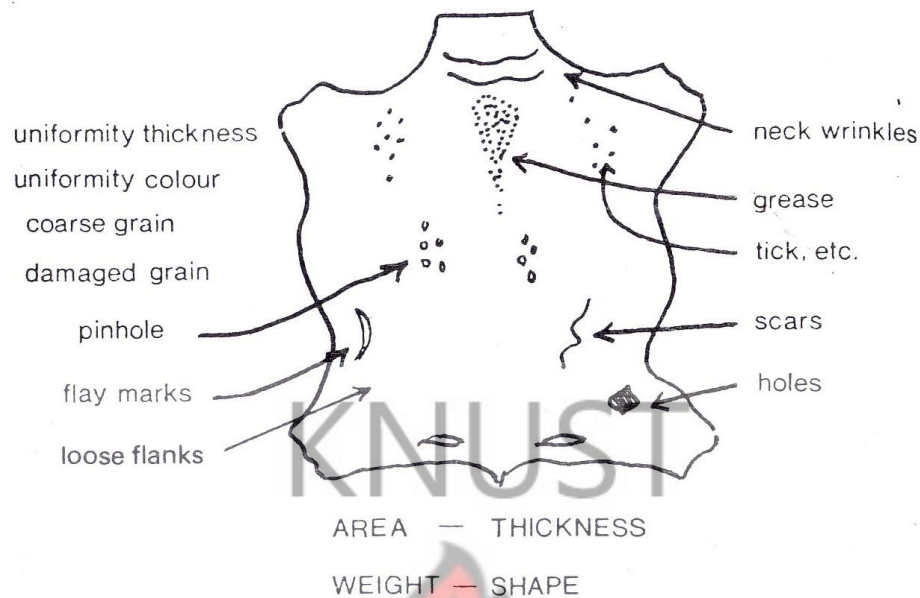


Fig. 9 Sorting Criteria

Source: *Sharphouse (1983)*

19. Where the surface appearance of leather is important, the sorter (tanner) must concern himself with the colour of the tanned stock, the uniformity of this colour, and, in particular, how these properties may affect the subsequent processes of dyeing, finishing, buffing, plating, etc. Variations in appearance of colour of tanned stock may be due to the variations of tanned materials used, their unequal distribution on the skins/hides, the effect of light or oxidation, the presence of grease or damp or dirt, faulty processing resulting in lime blast, mould, iron stains, etc. They may also be due to variations in the physical form of the fibre structure or insect damage may give light coloured areas, or damaged grain may give darker areas.

20. The skins/hides may be sorted after tannage in the wet condition before drying. This is not easy to do accurately and it must be remembered that the colour will change on drying. If

the tanned leather has been brought to a dry flat crust or pearl condition the selection can be made much greater discrimination. The correct way of drying tanned leather should also be considered as well since the improper way of drying can change the required quality of leather expected from the skins/hides used. Processes of drying conform to that of the curer in drying preserved skins/hides.

21. Oil should be applied to the damp leather, ideally in a condition where the leather fibres are fully hydrated but little free water exists in the spaces between the fibres. Application of the oil to completely dry leather results in rapid absorption into fibres, often resulting in dark-coloured, greasy patches. Moreover, the resultant leather is not soft, resilient or full as when the oil is applied to the damp, hydrated fibre. This is due to the fact that, when oil-free leather dries, the fibres shrink due to loss of water and come closer together, when cohesive forces come into play, cross-linking the fibril or fibre structure, making it firmer, harder and less flexible or “crusty”.

22. The correct storage of tanned leathers should be adopted by the tanner. Tanned leathers are best stored in store rooms or in kiosks meant solely for that purpose. The temperature for good storage rooms should be cool and dry. Well cleaned large wooden boxes are also accepted. If leathers are to be kept in rooms with other storage materials, they should be tied well together and packing positions should be separated. Tanned leathers should be aired gradually if kept for a longer period to prevent excess heat and fungi attack which affects their quality.

4.6.4 Suggested Criteria for the Leather Merchant

“Leather is a unique material. Makers of synthetics have tried to imitate it, even to the point of impregnating their products with leather smell, and failed. Leather owes its porosity, flexibility, plasticity and low thermal conductivity to its two-layered structure”, Cope *et al.*, (1979, p.3). The unique nature of leather should be well noted by the leather trader as well as its quality in terms of the characteristics it should bear.

If the quality of leather is considered greatly by the leather trader before purchasing them from the respective tanners or places of supply, the assurance of quality will be achieved at all cost. Since traders do not have access to and no business with the nature of skins/hides used for the leathers they trade in, it is advocated that they assess the quality of the leathers instead without hesitation.

Leather is sold on a basis of size, area, thickness and visual appearance or incidence of gross faults usually visible to the eye. A relatively small amount of leather is sold on a basis of physical or chemical tests, which are often specified only as corroboration of the buyer’s visual and tactile judgment.

Such quality standards based on physical tests and chemical analyses have been formulated by various authorities. There is no universal agreement on methods of sampling, test methods or interpretation of results, or agreement on acceptable standards.

These set of criteria for assessment should be known and followed keenly for the assurance of quality leather from traders to consumers:

1. The leather merchant should aim at leathers without unnecessary holes and pinholes in them. This is very important because it is a highly visible symptom that disqualifies a piece of leather to be considered as of good quality. Leathers with holes in them are not as durable as the holes free ones. These are caused by bacteria called borers who attack the skins/hides and eat of the inner fibres from the flesh side to the grain side and create holes in affected parts. Pinholes are caused by small punctures that might have been made by pins of any kind or any close pointed metal. The value of leathers with holes in them is also affected because consumers do not prefer buying such types as useful enough and of good quality.

2. Leather traders should not aim at leathers with wrinkles especially at the neck part, scars, flay cuts/marks and loose flanks. These defects cause the low quality of the leather as a material. Wrinkles at the neck part can hardly be used by the consumer and therefore go wasted. Scars and flay cuts/marks also degrade the beauty and durability of leathers and also reduce their worth. Loose flanks are situations where cuts from the fleshy part of an animal's side between the ribs and the legs are faulty and transforms into leathers with such parts weakened. Quality leathers should not have such characteristics.

3. The leather trader should consider leathers that have been tanned to perfection. Such leathers are types that have inadequate tannins used on them and the method of tanning does not really count provided it is done well. Leathers without enough and required tannins easily grow moulds, smells and experience cracks when they are kept in storage places. It makes the materials weak and not durable when used.

4. The leather trader should aim at leathers with good surface appearance. The colours do not really matter in this respect but rather how bright and smooth the surface (grain side) of the leather is. Such fine looking leathers are mostly achieved when the tanner prefers the adaptation of shade or air drying instead of sun or sometimes ground drying. Sun-dried leathers especially have the real leather surface colour faded of due to the pressure of heat. Ground-dried leathers can have stain from dirt affecting their real outlook. Such leathers are mostly of less quality to the consumer.

5. The leather trader should aim at spotless leathers. Leathers with black spots spread all over the flesh and grain side affects their quality. These are caused by bacteria called borers. These borers do not only create holes in skins/hides but leave spots in them as well which are made visible when tanned into leather. This affects the beauty of the leather which is mostly not appealing to the eyes of the consumer. Such leathers are advised to be dyed into dark colours not to disclose such defects.

6. The size of leathers does not really important but in cases where comparative studies are done, the bigger and thicker ones should be encouraged than the smaller and lighter ones. They are more durable and of good quality than the smaller and lighter ones. The size and weight of leather is determined by the kind of animal it is made from and how extreme certain parts have been cut off. Thick leathers are more reliable and comfortable when used by the consumer.

4.6.5 Validation and assessment of the Suggested Criteria

For the researcher to ensure the information provided in the developed criteria were free from errors he vetted them, secondly to his colleagues and finally the supervisor before administration was done. The validation of the developed criteria was essentially on the convenience of the respondents. Date, time, venue and all necessary arrangements were made in advance before the actual activities of discussion, assessment and testing took place.

Since the developed criteria were prepared not to benefit only the tanners but the butchers, curers and leather merchants as well, the researcher went to the respondents on several occasions to elaborate on the suggested ideas one after the other. The abattoir was handled first since that was the major source of the raw material (skins and hides). The researcher booked an appointment with the production manager and gave a copy of the developed criteria to him for personal assessment before following up to discuss and reassess what had been proposed. This practice made way for several corrections and further explanations to be done. The researcher was educated as well as the production manager and other administrative members at the Kumasi Abattoir Company Limited. The developed criteria were accepted and certified by the staff members to promote the work of the butchers at the slaughter houses in the acquisition of good quality skins and hides.

With the curers, since most of them were butchers, the researcher met with the chief butcher, interviewed and adopted the same procedure used with the production manager. He was very impressed by the suggested ideas when explained well to him and the other butchers who

were made available. In-depth knowledge was acquired at the end of the discussion, assessment and testing period of ideas.

At the Aboabo local tannery, the same procedure used at the abattoir was applied. Since most of the tanners were illiterates, the developed criteria needed to be interpreted into local languages such as; “Twi” and “Hausa” before better understanding was achieved by all respondents interviewed earlier. The tanners really embraced the suggested ideas because they did not contradict and criticize what they were already practicing even though in some few instances they did. The purpose of the developed criteria was to add to knowledge what was already practiced but not done to perfection and the unknown. The developed criteria really educated the tanners when the practical aspects were really demonstrated through testing of the ideas. All questions connected to unknown ideas were answered and explained further to them.

The leather merchants interviewed earlier were visited individually to discuss and assess the developed criteria with since they operated individually. Most of them admitted that the developed criteria meant for them were really educative and would be very pleased to witness them being adopted within the leather trading bodies in Kumasi and the whole of Ghana if possible. They concluded that if the butchers, curers and the indigenous tanners did their work well by sticking to the suggested ideas meant for them, they would have no problem in acquiring less quality leathers, because good quality skins/hides obviously transforms into good quality leathers for consumption.

4.6.6 Acceptance and adaptation of the Suggested Criteria

The acceptance and adaptation of suggested criteria confirmed that the butchers, curers, tanners and indigenous leather merchants had a better understanding and knowledge concerning the key factors to consider in achieving good quality skins and hides for leather production, since they were well elaborated and explained as well as conforming to most of the ideas they had been practicing already. The intended groups of respondents understood the message conveyed through the developed criteria that would possibly help them to put into practice effectively the suggestions.

Considering the effectiveness of criteria used by the butchers, curers, tanners and indigenous leather tanners when assessing the quality of skins and hides clearly showed that the existing ideas needed to be reviewed to adopt in depth ways of educating them by using suggested criteria. This was demonstrated when the researcher conducted discussion, assessment and testing exercises with some selected butchers, cures, tanners and indigenous leather traders in the Kumasi Metropolis.

From the interviews, observation and developed criteria, it was clear that the project was successful, that the developed criteria could be used to raise the standard of the quality of skins and hides for indigenous leather production in Ghana and beyond.

The letters of attestation and acceptance received from the Kumasi Abattoir Company Limited and from the tanners at Aboabo local tannery after suggested criteria were presented to respondents are shown at appendixes D and E.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

This chapter deals with the summary, conclusions and recommendations to end the study done.

5.2 Summary

This research sought to find out whether the local tanners have criteria for assessing the quality of skins and hides for leather and how the assessment is done in Kumasi, to evaluate the existing criteria for assessment, if any, and to determine their relevance to the manufacturing of quality leather in Kumasi and finally to develop criteria for the assessment of the quality of skins and hides for leather in Kumasi. The researcher was brief to the point, bearing in mind the objectives of the research where all relevant materials that would only serve as distraction to the main message were neglected.

After the study, the researcher found out that, most of the indigenous tanners in Kumasi do not have specific criteria that were constantly adopted in assessing the quality of skins and hides for indigenous leather production even though there are some characteristics considered on the raw materials to prevent the production of less quality leathers. In the evaluation of existing criteria through interview and observation, the researcher noticed that most of the tanners ignore the proper assessment of the skins and hides for leather due to some unaccepted reasons such as; lack of skins and hides, high cost of skins, not likely to get skins without defaults, among others and therefore chose to use them for leather no matter

the condition or state of the skins. Once they could be useful to them, they were accepted. Finally the suggested criteria prompted the respondents on the necessity of proper assessment of skins and hides for leather since the reflection of the end product depends on the raw skin or hide they are made from. Respondents taught it through the need to consider certain minor defects they normally ignored when making leather.

Chapter One is about the background of the study, objectives and statement of the problem. This research sought to find out if indigenous tanners in the Kumasi Metropolis have specific set criteria for assessing the quality of skins and hides for leather and to develop new criteria from findings which will serve as a guide for assessing the quality of skins and hides.

Chapter Two reviewed the related literature which includes definitions, standards of quality, quality control and assurance, quality control standards of skins and hides for leather production, what skins and hides are and their structure, flaying, curing, soaking, washing, liming, unhairing, fleshing, splitting, deliming, bating/puering, downgrading of the value of skins and hides due to faults, raw stock Warehouse control, Leather and its structure.

Chapter Three also dealt with the methodology. The research utilized the qualitative research design as the main method of gathering data where descriptive method of research and a case study were employed in the study. Primary data was sourced through interview and observation and secondary data also obtained through collecting of information from various libraries in the Kumasi Metropolis on the quality of skins and hides for leather.

Chapter Four dealt with the data collected and assessment done, how the research methods were employed, interviews and observations done, data analysis, interpretation of results and

the developed criteria. Finally, Chapter Five dealt with the Summary, Conclusions and Recommendations.

5.3 Conclusions

1. Results from the study confirmed that most of the indigenous tanners in Kumasi had inadequate standardized criteria that were constantly adopted by due to the challenges in acquisition, ignorance of assessment factors and disunity in work, even though there were some characteristics considered on the raw materials to prevent the production of less quality leathers.

2. Quality assurance and control factors were mostly ignored by the tanners which made the quality of skins and hides not properly assessed. The tanners were familiarized with the message of quality but did not always put them into practice. There was therefore the need to use developed criteria to educate them. This was to help prevent and eradicate bad quality skins and hides used for indigenous leather.

3. The evaluation of existing criteria for assessment and determining their relevance to the manufacturing of quality leather in Kumasi was achieved through interview schedules and observation. Skins and hides well assessed before tanning reflected on the quality of leather produced as was confirmed in the results. When assessment was overlooked, tanned leathers showed symptoms of defect such as; unnecessary holes, scratches, breakages/cracks, termite attack on grain and flesh side, fade of colour, weak in strength and not durable.

4. The aim of the developed criteria for assessing the quality of skins and hides for indigenous leather production in Kumasi was to educate the public and leather practitioners on need and the standards of assessing the quality of skins and hides and the things to be considered before transforming them into leather. It was also to help the concerned people to know more about the wellbeing of produced leathers and had been one of the priorities of the world which seeks for quality assurance and control in every finished product. If these set criteria accepted are followed as executed across the various concerned sections, the quality of skins and hides for indigenous leather production in the Kumasi Metropolis can be assured.

5. In the nutshell, the researcher believes that without any developed standardized criteria for assessment of the quality of skins and hides, produced indigenous leather will not yield any better fruits or meet the required standard of quality. Although the research was quite challenging, but at the end the results were good and successful. The suggested criteria for assessing the quality of skins and hides cannot be underestimated. The research is very important to our society especially the source that is where the researcher seeks to achieve. The researcher decided to suggest these criteria and also send a message to the concerned group to help the objectives of the researcher to be realized.

This research is gratifying that after two (2) years of studying at the Department of Art Education, one has been able to come up with a project that goes a long way to help the nation in general and provide standards of quality assessment on skin and hides for leather production.

The researcher finally hopes that such suggested criteria would be used extensively, even to the remotest corner of this country so that producers of skins, hides, and leather can achieve quality production through thorough assessment.

5.4 Recommendations

The researcher believes that the project has been successful and recommends the following:

1. The indigenous tanners should work together and adopt standardized criteria for thorough assessment of the quality of skins and hides for indigenous leather production.
2. Quality assurance and control factors should be used frequently by the indigenous tanners to improve upon the quality of skins and hides assessed for leather.
3. Health and educative programmes, seminars and workshops should be organized frequently to educate the public concerning the quality of skins and hides for leather.
4. The management of abattoirs should make arrangements with owners of farm animals. If there are negotiations made concerning the abattoirs buying the skins and hides directly from the butchers at a good price for the tanners, it will help solve the issue of high rate of competition between consumers for food and for leather.
5. The government should find strategies to control opened illegal borders which allow the entry of foreign made natural and synthetic leathers that have taken over the local market and affecting the patronage of indigenous leathers.

6. If there are loan grants from the government and non-governmental organizations (NGO's), it can help aid the tanners and indigenous leather traders to patronize effectively in the locally tanned leathers to control its virtual collapsing.

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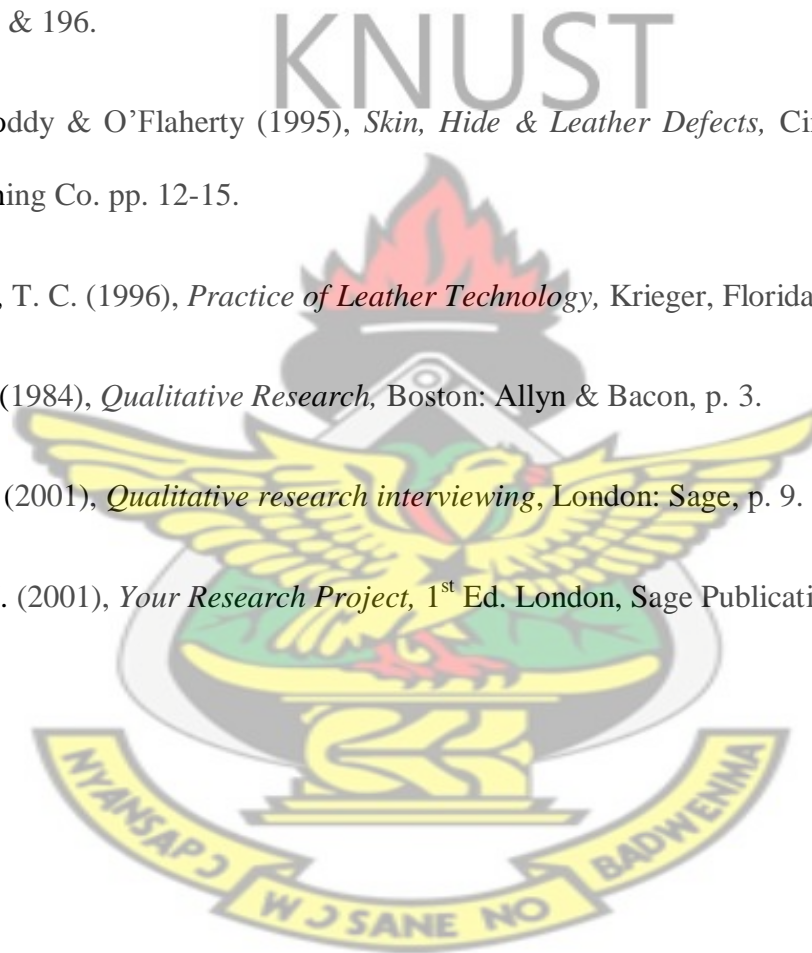
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APPENDIX A

INTERVIEW GUIDE FOR ABATTOIR WORKERS

1. What is the nature of the abattoir work in general?
2. How do you acquire the farm animals into the abattoir?
3. Does the value of the farm animals acquired reflect on their quality?
4. When in the working period specifically are the farm animals slaughtered?
5. What kinds of farm animals are normally slaughtered in the abattoir?
6. What do you consider on the farm animals or what criteria are used to assess them before they are being purchased and slaughtered?
7. Averagely, how many farm animals are slaughtered in the abattoir each day?
8. Are the farm animals slaughtered in the abattoir purposely for the meat or the skins/hides for leather?
9. How are the skins and hides stored/kept at the abattoir before they are purchased by consumers?
10. How is the nature of trade at the abattoir in terms of consumers' patronage on the skins and hides to the market and various tanneries?
11. What do tanners consider or the criteria used in assessing the skins and hides before purchasing them from the abattoir?

APPENDIX B

INTERVIEW GUIDE FOR INDIGENOUS TANNERS

1. What is the nature of the tannery work in general?
2. How and where do you acquire the skins and hides into the tannery?
3. Does the value of the skins and hides purchased reflect on their quality?
4. When in the working period specifically are the skins and hides tanned?
5. What kind of farm animals' skins and hides are normally tanned in the local tannery?
6. What criteria do you consider to assess skins and hides before they are purchased for tanning?
7. What are the processes involved in the preparation of skins and hides before they are tanned?
8. What kind of materials, objects and instruments are used in the tanning process at the local tannery?
9. How are the tanned leathers stored at the local tannery before they are purchased?
10. Are the skins and hides sometimes meant for something else or they are always tanned in the local tannery purposely for leather?
11. How do the tanners in the local tannery trade the tanned leathers?
12. How is the nature of trade at the local tannery in terms of consumers' patronage on the purchasing and what kind of people, individual or group does purchase the local leathers?

13. Averagely, how many pieces of leathers are sold out to consumers from the local tannery each day?

14. How do buyers assess the quality of locally tanned leathers before buying them?

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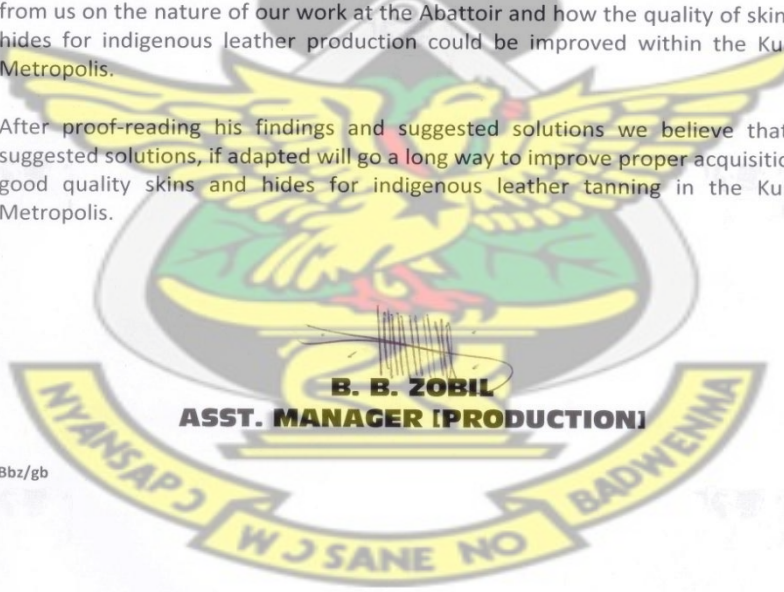
APPENDIX C

INTERVIEW GUIDE FOR LEATHER TRADERS

1. What is the nature of the leather trading business in general?
2. Where do you purchase your leathers from?
3. Does the value of the leathers purchased reflect on their quality?
4. When in the working period specifically are the leathers purchased from the local tannery?
5. What types of leathers are normally purchased from the local tannery?
6. What criteria are considered to assess the leathers before they are purchased from the local tannery?
7. How do you differentiate between good and bad leathers before selling them out to consumers?
8. How do the leather traders store the leathers before they are sold out to consumers?
9. Averagely, how many leathers are purchased from the local tannery and are sold out each day?
10. How do the leather traders transport the purchased leathers from the local tannery to the respective places of supply?
11. How do consumers patronize the locally tanned leathers?
12. How do buyers of leathers from the leather traders assess the quality before purchasing them?

APPENDIX D

ATTESTATION LETTER FROM KUMASI ABATTOIR CO. LTD

KUMASI ABATTOIR COMPANY LIMITED	
	
BANKERS SG-SSB Bank Ltd. Adum-Ksi. Agric. Devpt. Bank Ltd. Asokwa-Ksi.	ADDRESS P. O. Box 9203, Ahinsan-Ksi. Tel. #: +233-51-32111-4 Fax #: 051-32114
kumasiabattoir@yahoo.com	
KACL/ADM.56/80/10	16 th August, 2010
ATTESTATION OF AN OFFICIAL VISIT TO KUMASI ABATTOIR CO. LTD. MR. ANDREW ADU-ASABRE	
<p>This is to attest that Mr. Andrew Adu-Asabre who is offering MA. Art Education at KNUST came to us and with an interview guide from which he demanded answers from us on the nature of our work at the Abattoir and how the quality of skin and hides for indigenous leather production could be improved within the Kumasi Metropolis.</p> <p>After proof-reading his findings and suggested solutions we believe that his suggested solutions, if adapted will go a long way to improve proper acquisition of good quality skins and hides for indigenous leather tanning in the Kumasi Metropolis.</p>	
 B. B. ZOBIL ASST. MANAGER [PRODUCTION]	
Bbz/gb	
	
DIRECTORS: BAFOUR AGYEI KESSE IV (CHAIRMAN), PETER HAYIBOR (SECRETARY), MATTHEW K. NDAA (MANAGING), NANA OSEI AGYEMAN-KUSI, NANA OPOKU AGYEMANG, HON. NANA YAW WIREDU, ABDULAI ZAKARI, ALHAJI BATIRE MUNTARE, IBRAHIM WAHAB, SULEMANA SAMPSON, SULEMANA DAUDA	

APPENDIX E

ACCEPTANCE LETTER FROM THE TANNERS AT ABOABO TANNERY

Kumasi Tannery (MAJEMA)

Plot 11 BLK. 111

Asawase, Royal

Kumasi, Ashanti Region

Dear Sir,

KNUST
ACCEPTANCE LETTER

This is to certify that Mr. Andrew Adu-Asabere who is offering MA. ART EDUCATION at KNUST has come to us and with an interview guide in which he demanded answers from us on the nature of our tannery work and how the quality of skin and hides for indigenous leather production can be improved within the Kumasi Metropolis.

After proof reading his findings and suggested solutions we believe that his suggested solutions which are the received developed criteria if adapted will go a long way to improve the quality of skins and hides for indigenous leather tanning in the Kumasi Metropolis.


Fraternally yours,

Mr. Tanko A. Bawa

for Secretary

Signatories:


Mr. Alhassan Alandjima


Mr. Mohammed Danjima