

APPRENTICESHIP IN LEATHER TANNING
A CASE STUDY OF THE ASAWASI AND TANZUIN TANNING
INDUSTRIES IN THE ASHANTI AND UPPER EAST REGIONS

BY

LARBI ALEXANDER ATTA SENIOR (B. A. Hons.)

A Thesis Submitted to the School of Graduate Studies,
Kwame Nkrumah University of Science and Technology,
Kumasi in Partial Fulfilment of the Requirements for the Degree of

MASTER OF ARTS IN ART EDUCATION

Faculty of Fine Art, College of Art and Social Sciences

© Department of General Art Studies

August, 2009.

DECLARATION

I hereby declare that this submission is my own work towards the Master of Arts (Art Education) and that, to the best of my knowledge, it contains no material which has been accepted for the award of any other degree of the University, except where due acknowledgements have been made in the text.

LARBI ALEXANDER ATTA (SENIOR)

Student's Name and ID No.(PG 1130507)

Signature

Date

Certified By:

DR. S. K. AMENUKE

Supervisor's Name

Signature

Date

Certified By:

DR. JOE ADU-AGYEM

Head of Department's Name

Signature

Date

ACKNOWLEDGEMENTS

Glory be to God Almighty for the protection and guidance He bestowed on me throughout the execution this project to a successful end.

To my supervisor Dr. S. K. Amenuke, of the Department of General Art Studies (Art Education Section), I express my profound gratitude to him for his professional guidance, contributions, patience, time and encouragement granted me. My heartfelt appreciations also go to all the lecturers and staff of the Department of Art Education, Again it is for Mr. Kwaansa Ansah of Chemistry Department KNUST.

My appreciation goes to my wife, Mrs. Cynthia Larbi my father Mr. A. O. Larbi for their financial support during the writing of this thesis.

I wish to express my thanks to Mr. Yussif Amuda the master tanner at the Maziema tannery, Tanzuin, all and sundry who in diverse ways helped in making this project a success.

A. A. L.

ABSTRACT

There are traditional trades that are gradually dying out because of modernisation and tanning is one of those trades. Tanning is fading out due to the fact that it does not appeal to the youth because of the way it is done in Ghana. Considering the problems highlighted, the only solution is the proper training of the youth in the trades that are becoming obsolete through modernity. But this cannot be done if these trades are not looked at and new ways found to refashion them into more attractive ventures. It is in this light that the study seeks to find the processes that are followed in the training of apprentices in leather tanning, and identify strengths and weaknesses of the apprenticeship programme in the tanning industries in Ashanti and Upper East Regions of Ghana. This will help find the way forward for the apprenticeship programme in Ghana

TABLE OF CONTENTS

CONTENT	PAGE
ACKNOWLEDGMENTS	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	v
LIST OF PLATES	vi
CHAPTER ONE: INTRODUCTION	
1.1 Background to the study.	1
1.2 Statement of the problem.	4
1.3 Objectives	5
1.4 Research questions	5
1.5 Delimitation.	6
1.6 Limitation.	8
1.7 Definition of terms.	8
1.8 Importance of the study	8
1.9 Organisation of the rest of the text.	8
CHAPTER TWO: REVIEW OF RELATED LITERATURE	9
CHAPTER THREE: METHODOLOGY	
3.1. Research Design.	32
3.2. Library Research.	33
3.3. Population for the study.	33
3.4. Sampling.	34
3.5. The sample	34
3.6.0. Data collection Instruments.	35
3.6.1. Interviews.	35

3.6.2. Questionnaire.	36
3.6.3. Observation.	37
3.7. Validation of Instruments.	37
3.8. Data collection procedure.	38
3.9. Primary and secondary data.	38
3.10. Data analysis plan	38

CHAPTER FOUR: PRESENTATION AND DISCUSSION OF RESULTS

4.1. The Data Assembled	39
4.2. Analyzing the Data	51
4.3. Interpreting Data	57
4.4. Conclusions	58

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary of the study	69
5.2. Summary of findings	70
5.3. Summary of conclusions	71
5.4. Summary of recommendations	72

REFERENCES	74
-------------------	----

APPENDICES	76
-------------------	----

LIST OF FIGURES

Fig. 1	The map of Kumasi Metropolis	5
Fig. 2	The map Upper East Region	6

LIST OF PLATES		Page
Plate 1	The pounding of bagaruwa or zinziriga at Asawase	41
Plate 2	Pounding of the leather to soften it at Asawase	42
Plate 3	Pelts soaked in a pit containing wood ash and carbide at Asawase	43
Plate 4	The knife used for dehairing and defleshing at Asawase	44
Plate 5	Dehairing of pelt at Asawase	44
Plate 6	Defleshing of pelt at Tanzuin	45
Plate 7	Bagaruwa or zinziriga, the main tannin for local leather	45
Plate 8	Bagaruwa tree at Tanzuin	46
Plate 9	Leather soaked in the tannin, bagaruwa or zinziriga at Tanzuin	46
Plate 10	Dried khaki leather at Tanzuin	47
Plate 11	Guinea corn leaves at Asawase	48
Plate 12	Leather being dyed with 'karamafi' or guinea corn leaves	48
Plate 13	Lime solution to fix the dye	49
Plate 14	Leather being dried at Tanzuin	49
Plate 15	Apprentice stretching red leather at Tanzuin	50
Plate 16	Scrap metal with lemon for dyeing leather black at Tanzuin	50
Plate 17	White leather in alum at Asawase	51
Plate 18	Pits dug in the ground for soaking pelt at Asawase	53
Plate 19	Water used at Asawase tannery	54
Plate 20	One of the pits that hold pelts at Tanzuin	54

Plate 21	The working environment of the apprentice at Asawase	55
Plate 22	Hair and decomposed flesh deposit at Tanzuin	55
Plate 23	Structure of Mammalian skin	65

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Leather tanning as an activity has been practised in Ghana for more than a century. The skills and techniques have remained the same and the tanners describe it as their tradition and are not willing to change or improve on their skills. The methods, tools, materials and the environment of work have all remained the same for that number of years. This has resulted in low quality of the product, stagnate production and pungent odour of the product due to improper handling of the leather.

Apprenticeship has been the practice by which people, who have the knowledge and skills of the various arts, hand down what they have mastered from generation to generation; to ensure continuity.

The traditional model of apprenticeship involves someone who is at the peak of his training in a chosen field (the master) bringing one or more people with little or no knowledge (the apprentices) up to the level of the master. The apprentice does not start by making masterpieces. Rather, he begins by (figuratively) sweeping the floor, and doing other mundane jobs for the master, while observing the master as he plies his trade. Over time, though, he begins to apply the skills he has observed in addition to the knowledge he has learned by doing small, ordinary projects under the master's supervision. He progresses until he too, becomes a master, able to open his own shop and bring in his own apprentices.

The trend today behoves that science and technology should be brought to bear on apprenticeship so that it will meet the current challenges of computerized age. To do this, there should be an in-depth study to transform the apprenticeship programme.

Again, considering the current flooding of the Ghanaian market with foreign goods and products, it will be better if researchers take a second look at the apprenticeship programmes, their training and sit up to do comprehensive studies into the various programmes that have existed, so that they can give their recommendations on those programmes.

There are clear indications that there is the need to revive and modernize the various traditional employments that are becoming extinct, without losing sight of our cultural heritage. To do this, there should be the introduction of dynamism into the production of art and the raw materials used for the production of art works such as leatherwork.

Ghana as a country is going through unemployment crises, as a result of the collapse of many traditional industries. If the apprenticeship programmes will be looked at with the seriousness that it deserves, it can become a very formidable means of employment generation in the country, where the nation's identity will not be lost.

Apprenticeship is even vital and more challenging for the fact that it attracts the majority of the adolescent population who could not complete school because of some problems. It is through the apprenticeship that these young ones can be educated and be gainfully employed. All those who went through Junior High School but could not make it to the Senior High School and those who, for one reason or the other, could not complete Junior High School should be given apprenticeship training. It is imperative that in the absence of academic certificates and other paper qualifications, these youth should be equipped with strong vocational or technical skills to secure them a means of livelihood. It is believed that due to lack of skill among the youth, many of them engage in selling in the streets of our cities, some go into robbery and other social vices.

Lastly, quality is also a very important factor in the production process of goods in the country. It should therefore be a point to note that, apprentices will be trained to produce quality products

and attach quality to what ever is produced in the country as part of promoting our national and cultural heritage, so that the products from our country will meet both the local and the international market. This is what the Asian “tigers” such as Malaysia and Indonesia have done to develop.

Looking at all the points enumerated above there is the necessity to improve on our apprenticeship programme as a nation, to the standard which will attract the youth into getting training. One clear example of such training is in the leather tanning industry. It is clear that leather tanning remains an untapped resource of the nation with respect to apprenticeship. A study of apprenticeship in leather tanning will unearth positive ideas hitherto unknown.

The sites for the study are Asawase in the Kumasi Metropolis and Tanzuin in the Bolgatanga Municipality all in Ghana. Although the two sites are far apart in distance they share some resemblances. These resemblances are in the areas of drainage and disposal of waste. Asawase tannery is situated near the rail line which runs from the western to the eastern part of Kumasi; a drain also runs from the north to cross the railway at the south eastern part of the tannery. The tannery has a poor working environment with pits and stagnate water all over the ground couple with ash deposits at certain areas. Waste materials such as hair, pounded guinea corn leaves and decomposed meat are left in heaps round the tannery. Some of these wastes are damped into the drains causing environmental pollution.

Tanzuin tannery is also close to a drain and has heaps of hair at various places just as what can be found at Asawase. The tannery makes use of large pots buried in the ground, this is in place of pits for soaking pelts and these create a better and cleaner environmental as compared to Asawase.

1.2 Statement of the problem

Leather has been used by many ethnic groups in Ghana for many years. There are a lot of Ghanaian products that have been made in leather. These products have been used by kings, chiefs, queens and many other people for various purposes. Some of these products have been exported to other countries. This means that leather products are among important national income earners.

Ghana has embarked on development agenda to boost the economy. There is the need to develop the leather industry which is now an integral part of the export trade. This means that the practices and technology in leatherwork must be improved especially when there is knowledge explosion in the world.

In spite of all the good uses of leather in our country, tanning which is the processing of raw skin and hide into leather seems to have been left in the hands of only the indigenous tanners who use simple and obsolete technologies. Also few people learn tanning and most of the practitioners are old which means when the old people die they die with their trade.

The few tanneries established in Ghana after independence have all collapsed due to the absence of trained personnel to man these industries. The raw pelts that can be processed into leather in the country are rather exported to the neighbouring countries at a cheaper price. This may be due to the fact that, there has not been any proper study into the leather tanning industry. It may also be due to the fact that, there has not been any proper apprenticeship programme drawn to train people to tan the local skins and hides. Development of the tanning industry is another important ground for national development. It is in this light that researching into apprenticeship in leather tanning is essential. There is therefore the need to study the apprenticeship programme in leather

tanning, to serve as initial training ground for the youth who would want to go into leatherwork production.

This research is therefore aimed at studying the apprenticeship programme at Asawase and Tansuin. These two leather centres are typical traditional apprenticeship training centres. Therefore a case study of apprenticeship in these centres will generate results that can be replicated in the other centres in Ghana.

The research is also aimed at making recommendations to policy makers in the educational sector, on the best way an apprenticeship programme in tannery may be set in Ghana to train the youth to take tanning as a vocation.

1.3 Objectives

1. To investigate into apprenticeship in leather tanning of selected centres in Ghana and identify their significance in the present day society.
2. To find out how best the apprenticeship programme in leather tanning could be made the preferred programme for the youth in Ghana.

1.4 Research questions

1. What processes are followed in the training of apprentices in leather tanning?
2. What are the strengths and weaknesses of the apprenticeship programme in tanning industries in Ashanti and Upper East Regions of Ghana?
3. What is the way forward for the apprenticeship programme in Ghana?

1.5 Delimitation

The research is limited to a selected leather tanning centre in the Kumasi Metropolis of Ashanti region and in the Bolgatanga Municipality of Upper East region. It also focuses on tanning and not the whole of the leather industry.

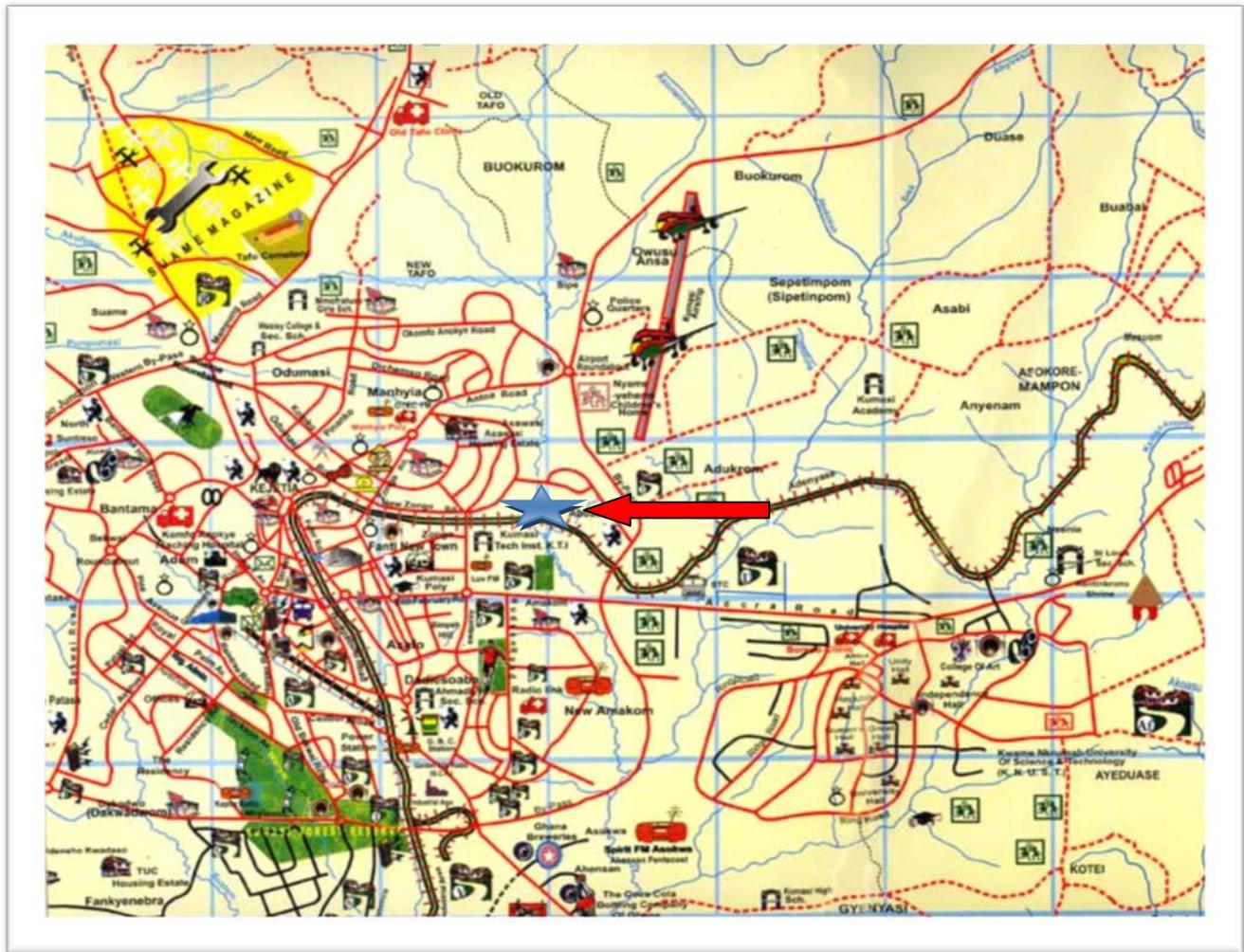


Fig. 1 The Map of Kumasi Metropolis

KEY



The blue star marks the location of Asawase where tanning is done in the Kumasi Metropolis

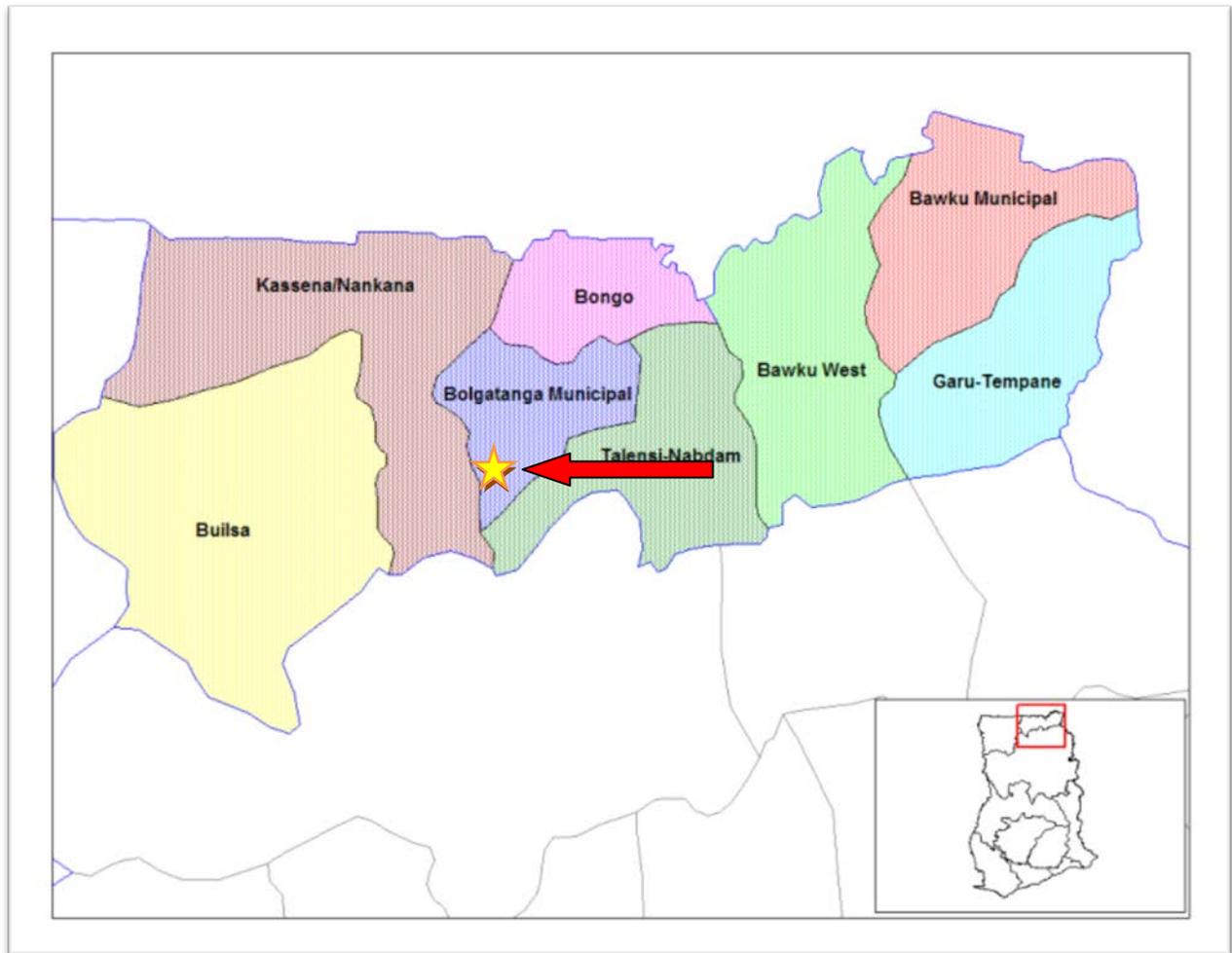


Fig. 2 The Map of Upper East Region of Ghana

KEY



The yellow star marks the location of Tanzuin where tanning is done in the Bolgatanga Municipality



The red rectangular mark on the inserted map of Ghana shows the location of Upper East Region

1.6 Limitation.

There are few books on the topic which are not current. This means that the researcher had to rely on internet reports and interviews granted by people for current information.

Again, leatherworkers who were respondents in this study could not speak English or the Akan language; therefore there was the need to use an interpreter. This hampered the collection of part of the primary data and possibly could affect credibility of the facts.

The researcher does not claim absolute or total knowledge of apprenticeship in leather tanning. For any shortcomings in this study, the researcher is solely responsible.

1.7 Definition of terms

All technical terms have been explained in the text.

1.8 Importance of the study.

The research will help improve the training of apprentices and help modernize the leather tanning industry at least in the centres studied.

The study will serve as a source of information for further research; it would serve as a guide to art educators, lecturers, curators and art students

1.9 Organisation of the rest of the text.

Chapter Two provides a review of related literature and it deals with pertinent literature on the topic. Chapter Three discusses the Methodology, and in this research, descriptive procedure was used. Chapter Four deal with presentation and discussion of the data. It also makes conclusions and recommendations. Chapter Five is the summary of the study, findings, conclusions and recommendations. References have been arranged according to alphabetical order of the surnames of authors followed by journals, magazines and the internet sources.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Apprenticeship has been practised in Ghana for many years, and can be traced way back to the period even before the coming of the Europeans. However little has been seen or heard of any Guidelines or laid down processes with respect to the documentation and the incorporation of this activity into a form of education system in the country. Apprenticeship therefore remains an untapped area in education and it is this aspect of education that the researcher has explored and is reviewing pertinent literature on.

This chapter therefore looks at apprenticeship. It covers forms of apprenticeship that have existed in some countries including Ghana, and a comparison of the various types of apprenticeship that have existed in Ghana and other countries. Apprenticeship in leather tanning is also studied. The system of tanning, which pertains to other countries and the extent to which the leather tanning industry has changed over the years is also considered. Another part also highlights on the processes that are involved in leather tanning.

Wikipedia encyclopaedia (2007) defines apprenticeship as system of training a new generation in, a skill, craft or a trade by an expert in the field by working. Most of the training is done on the job while working for an employer who helps the apprentices learn their trade.

Coy (2000) defines apprentice as, one who learns by participation or observation in a skilled trade. He went on to say that one Japanese term for apprentice is '*minarai*' literally meaning one who learns by observation. He pointed out that traditional pottery skills are transmitted to a variety of learners, while apprenticeship models of training have been drawn into modern Japanese vocational schools.

According to U.S. Department of Labour, (2007) apprenticeship is an important addition to the suite of potential education and training services the workforce system provides to its customers.

Considering these definitions, one can say with confidence that there are a lot of apprenticeship programmes in Ghana, but the question here is how many studies have gone into these programmes to check whether the training being given to these apprentices is meeting the needs of the country's quest for development?

The system of apprenticeship is believed to have first developed in the Middle Ages (The Wikipedia encyclopaedia puts this period in the history of Europe from about AD 350 to about 1450) and came to be supervised by craft guilds and town governments. A master craftsman was entitled to employ young people as an inexpensive form of labour in exchange for providing formal training in the craftsmanship. Most apprentices were males, but female apprentices were found in a number of trades associated with embroidery, silk-weaving etc Wikipedia encyclopaedia (2007).

Apprentices were young, usually about fourteen to twenty-one years of age, unmarried and would live in the master craftsman's household. Most apprentices aspired to becoming master craftsmen themselves on completion of their contract, usually a term of seven years (Encarta 2007).

In comparison, apprenticeship was the way of training the young ones in Ghana before the coming of the Europeans in 1452, who introduced the bookish style of education. But apprenticeship still exists up to today. However, it is not well coordinated and linked up to employment as will be seen in models from other countries. The young apprentice, usually the son of the master goldsmith, would begin his course in a sort of booth roofed with palm leaves with open side in a main street of the town or village (McWilliams, Kwame-Poh, 1975 p5).

...If the apprentice was a son of the master –craftsman, then at the end of his course he worked with his father until old age or death might make him the inheritor of his father's tools and weights. In other cases the apprentice might be an outsider. In this case he must 'pass out' of the training course. It is usually the duty of the father or relations to pay the necessary fee for the passing out ceremony (McWilliams, Kwame-Poh, 1975 p6).

Even chieftaincy was learnt in this way. According to Asante history, Obiri Yeboa the chief sent his nephew Osei Tutu the successor to Denkyira chief's court to be trained in chieftaincy (McWilliams, Kwame-Poh, 1975).

This shows that apprenticeship has been with Ghanaians for ages and still dominates in the training of people who require skills. All these facts show that a lot of countries have some form of apprenticeship which trained the youth to have trade. But the question posed earlier is still valid that, who monitors the apprenticeship programme in Ghana? Is it controlled by the Non-Governmental Organisations, private individuals or governmental agency such as the Ghana Education Service, as is being done in other countries such as France, and the United States of America?

Apprenticeship can be looked at in different countries and each country has its own model and for specific skills that it imparts. The fact that runs through this trade is that it trains the young ones in skills acquisition. Apprenticeship can be informal and formal.

In Australia Apprenticeship encompasses all forms of traineeships. It combines time at work with training and can be full-time, part-time or school-based. Apprenticeship starts at age 14; if one has a willing employer. Under this scheme, 400,000 people in 500 occupations are involved. If at the age of 14 the child has started training then by the age 21 he or she might have completed the training and will be ready to enter the job market. By this, there would not be situation of

unemployment because all the 400,000 people will be employed in not only one sector of employment but in 500 areas of occupations. (Wikipedia 2008)

In France, apprenticeships started in the ninth century and were legally made part of professional training. In 1986 the age limit for beginning an apprenticeship was raised from 20 to 25 years. The French government pledged to further develop apprenticeship as a way of improving employment. In 2005, eighty percent of young French people who completed their apprenticeship entered employment. The government has planned to raise the number of apprentices from 365,000 in 2005 to 500,000 in 2009 and to achieve this aim, it is granting tax relief for companies when they take on apprentices. (Wikipedia 2008)

In Pakistan, special apprenticeship programmes are run to fulfil the needs of IT (Information Technology) industry in the coming years. So, for this purpose Pakistan Software Export Board (PSEB) formerly has launched a very attractive programme for young IT graduates.

"Under the IT Industry Apprenticeship Programme, PSEB offers financial subsidy for the companies to recruit graduates possessing the basic skills and knowledge in Information Technology and other related disciplines to provide IT services. These recruits are generally graduates with some experience. These "apprentices" or trainees are hired by companies as full-time employees and put through a 12-month programme, consisting of in-company training, on-the-job training and mentoring." said by PSEB. (Wikipedia 2008)

Apprentices in Ghana as part of their training should be trained in the IT skills to enhance their work and again companies that need the services of these apprentices such as tanners should hire and retrain them where necessary.

In Ghana the story is different. Apprenticeship is left in the hands of Non Governmental Organisations (NGOs), the private individuals and upon completion, the apprentices had to find capital to set up their own businesses. This is what the researcher wants to re-echo that, the private sector and the government should get involved to the point of granting tax relief to companies or even individuals who are interested in taking on these apprentices just to see the apprenticeship system grow.

The informal apprenticeship training in Ghana is responsible for some eighty to ninety percent of all basic skills training in the country. Approximately five to ten percent of training is delivered by NGOs, for-profit and non-profit providers. (Palmer 2007)

The National Vocational Training Institute (NVTI), set up in 1970 is responsible for the nationwide coordination of the NVTI'S Department of Apprenticeship, have been targeted at training "formal" apprentices.

A National Coordinating Committee on Technical and Vocational Education and Training (NACVET) has been set up to coordinate skills training across nine different ministries. Yet, so far it has failed to design a national policy for skills development. It suffers from capacity problems and ongoing tensions between the two parent ministries, which are the Ministry of Education and the Ministry of Manpower, Youth & Employment. (Palmer 2007)

Apprenticeships are part of Germany's dual education system, and forms an integral part of many people's working life. Finding employment without having completed an apprenticeship is almost impossible. This will ensure that all the people will have working experience to work with.

(Wikipedia 2008)

According to the World Bank Report 1991/92 Ghana Living Standards Survey (GLSS), 28.2% informal sector workers are in the Greater Accra

Region, 14.6% in Ashanti Region 11% in each of Western Central, and Eastern Regions; 7.5% each in Volta, Brong Ahafo and Northern Regions; and negligible numbers in the Upper regions

Little comprehensive and reliable data are available on the informal sector. However, the GLSS has shown that in 1991/92 about 32% of urban employment was in the informal sector while according to the Job and Skill Program for African (JASPA) in 1989, 38.3% of the urban labour force, or 911,000 people were employed in the urban informal sector, excluding those involved in the informal sector on a part time basis. The same report estimated that urban informal sector employment was growing about 5.6% per annum, while employment growth in the formal sector was less than 1%.

Urban informal sector in Ghana was contributing about 22 % of GDP. Trade and commerce make the largest contribution of total informal sector earnings (52 %), industry (28 %), services (12 %) and transport (8 %). Despite the crucial role that the urban informal sector plays in employment, employment creation, and GDP, virtually no training schemes exist that are tailor-made to upgrade the skills of those working in the informal sector. For example, only 6% the skilled and semi-skilled informal sector workers had ever attended a Vocational or Technical Training Institute.

Ghana loses sight on the drop outs of the basic, the second cycle and even tertiary institutions.

Plans could have been put in place for the apprenticeship programme to be absorbed into the educational system in order to train all drop outs from the main stream of education to gain employable skills.

In India, the Apprentices Act was enacted in 1961. It regulates the programme of training of apprentices in the industry so as to conform to the syllabi. It also gave the period of training as laid down by the Central Apprenticeship Council and to utilise fully the facilities available in industry for imparting practical training with a view to meeting the requirements of skilled manpower for industry. (Wikipedia 2008) Ghana in 1998 came out with the Children's Act outlines the legislative framework for informal apprenticeship. It defines a minimum age of 15 years, sets out the master crafts peoples' responsibilities, and specifies the content of apprenticeship agreements.

One of the most important elements of the institutional framework for informal apprenticeship is informal sector associations (ISAs). They are actively involved in the supervision of skills training.

However, ISAs are not necessarily strong, effective and representative. They act as intermediaries between member enterprises and the government, but their purpose is usually political (such as the collection of taxes) rather than the provision of active support to its members. A World Bank evaluation concluded that most of the associations they examined only existed in name and were not mobilizing local artisans. (Palmer 2007)

Apprenticeships have a long tradition in the United Kingdom, dating back to around the 12th century. In 1563, the Statute of Artificers and Apprentices was passed to regulate and protect the apprenticeship system. They forbid anyone from practising a trade or craft without first serving a 7-year period as an apprentice to a master (Wikipedia 2008).

It was in the 21st century that Walsall (a United Kingdom world's centre of the saddler trade since the 19th century) changed their entry requirement. Most of their leather trades such as saddle making or bridle cutting were normally by a legally binding seven year apprenticeship, starting at the age of 14. Completion of the apprenticeship at the age of 21 was often marked by "coming of age" rituals. As well as giving the apprentice a thorough training in the `mystery` of the particular profession, the apprenticeship system was also a means of protecting livelihoods by ensuring that there were not too many qualified craftsmen competing for work. The number of apprentices allocated to each craftsman was strictly limited both by the unions and by tradition. (Walsall Leather Museum 2006)

In the United States, education officials and non-profit organizations, who seek to emulate the apprenticeship system in other nations created school to work education reforms. They seek to

link academic education to careers (Wikipedia2008). This is not the case in Ghana; academic education is not linked to careers and it is unusual to see someone who trained as a teacher but will be working in the bank.

Apprenticeship continued to be important in United States for learning a trade until the Industrial Revolution in the 18th century, after which it was largely replaced by the factory system. Revived in the 20th century, it is used in the industries that require highly skilled workers. The terms of modern apprenticeships are specified in a contract and are regulated by trade unions and laws. The National Apprenticeship Act passed in 1937 led to the establishment of the Bureau of Apprenticeship and Training in the United States Department of Labour, which works with employers, labour groups, and schools to promote apprenticeship programs (Encarta 2007).

Master trainers enter into some form of contract and regulation with parents, but these are not recognised by the trade union in Ghana. Individual trainers charge their own rates and items of different assortment are collected depending on the status of the trainees' parents. This is supported by the World Bank report which states that:

The apprentice makes a one-time payment to a master craftsman for an agreed length of training. Depending on the skill required, and the reputation of the master craftsman, a fee of US\$50 to US\$200, bottles of alcohol, and sometimes a goat is charged for training. Apprentices also have to provide their own tools, e.g. Sewing machines for dressmaking. The apprentice, who is usually unpaid, is taught a few simple tasks at a time, and repeats these over and over again in the master's workshop. Often the apprentice will even sleep on the floor of the workshop. (World Bank Report 1995)

One major initiative in Ghana to support skills development in a context of poverty reduction is the SKILLS TRAINING AND ENTERPRENEURSHIP PROGRAMME (STEP), implemented between 2003 and 2005. STEP was a government-supported programme to reduce poverty by

providing employable skills and other assistance like, microfinance to the unemployed. The aim of this was to enable beneficiaries to join the formal economy.

The main components of STEP were skills training delivered through vocational training providers, skills enhancement for master crafts persons and skills training in apprenticeship, placements, and microfinance.

In order to improve teaching capabilities of master crafts people, they received pedagogical skills with the Ghana Regional Appropriate Technology Industrial Service. Up to ten trainees were then attached to a master crafts person to undertake a workshop-based apprenticeship for up to 12 months. Additional training took place, or in other informal enterprises.

The approved STEP budget aimed at funding 1,000 master crafts people to undergo skills enhancement and to take on 5,000 new apprentices. They were paid GH¢ 56 (approx. US\$55) per apprentice to cover the tuition costs. In the end, only 1,140 STEP apprentices were placed with 120 master crafts persons, who only had received limited pedagogical training.

In taking the budgeted estimates and the actual estimates, these are the picture one can paint on the programme; only 12% masters and the corresponding 22.8% apprentice were trained. These figures were far below the average.

Many of the master crafts persons who accepted apprentices could not provide a decent training environment and were ill-resourced in tools and equipment. The master crafts person also complained about receiving insufficient funding. Also, the training was considered too short and there were huge delays in STEP graduates accessing microfinance.

Some of the lessons learned from the STEP programme are:

- There is a need for a more effective assessment whether the training environment is suitable for the trainee;
- Master crafts persons need to receive sufficient funds to cover the training costs;
- The training duration has to be adequate;
- Post-training support has to be more efficient. (Palmer 2007)

The discussion above concerns the various attempts that have been made by the various countries to find an appropriate system of apprenticeship that could help solve the problem of graduate unemployment and the bookish nature of the educational system in Ghana.

Looking at the various programmes put forward by these countries, they provide ample notation in the text that, one can expediently prescribe one best option for the leather industry in Ghana where by the operator will learn through these programmes to improve the system. As time goes by, the apprenticeship programme may evolve to become the best system that will provide the country with skilled manpower to feed all industries and institutions.

Types of Apprenticeship

In America, a variety of apprenticeship programmes are offered. Apprenticeship is organized into three employment sectors: construction, industrial (manufacturing) and service. Each trade has its own programme requirements and selection procedures.

Construction Trades

The construction trades include the people, who build, repair, and remodel homes, commercial and industrial buildings, bridges, highways, airports and other structures. The application process for construction trades varies depending on the trade and the area of the state. In America construction trade apprenticeships are sponsored by local trade committees comprised of skilled workers and employers who are advisory to the Bureau of Apprenticeship Standards. Committee members recommend approval of qualified applicants to the Bureau. Each committee develops its own policies and practices, with approval from the Bureau of Apprenticeship Standards, for operating its apprenticeship programme and for selecting apprentices. (Chippewa Valley Technical College)(2008).

The construction industry in Ghana is made up of apprentices but under individuals. Parents send their children to master for training. No examination, test or experience is required. The apprentices learn for a period of time and pass out as a master who can be on his own.

Applications are taken by each local committee, which determines the selection items required for the selection process. These may include an aptitude test, an interview with the committee, high school transcripts, proof of graduation or equivalent, birth certificate, and valid driver's license or a drug test. Once all application materials are on file and the applicant is deemed to be qualified, the committee will notify the applicant as to the next step in the procedure.

The construction trades use two methods for the actual placement of apprentices in jobs:

- In the **rank order list method**, the committee creates a list of candidates in order of their scores on written and oral examinations. An employer seeking an apprentice will make a request to the appropriate apprenticeship committee. The committee will contact the next

person on the list and ask them to report for acceptance into the apprenticeship program and to sign the contract.

- In the **letter of introduction method**, applicants who meet the basic requirements are given a letter from the sponsoring committee stating they are eligible to be hired as apprentices. They must then find an employer to sponsor their apprenticeship. Frequently the committee will provide a list of participating employers. (Chippewa Valley Technical College) (2008).

In Ghana everybody qualifies to be an apprentice provided that person is mentally sound, strong to work and can purchase his own tools.

Industrial Trades

Apprenticeship occupations in the industrial sector are usually offered in plants, factories, and machine shops. There are many types of industries that utilize apprenticeship training including paper mills, commercial dairies, food production facilities, tool & die shops and automobile manufacturers. (Chippewa Valley Technical College) (2008).

Ghana's industrial sector ranges from chemical plants to food industry and people are given on the job training till they become expert. They are rather paid but are treated as casual till the time that they will finish their training. This has some resemblance to that of the Europeans probably because it was introduced by them.

Service Trades

Employment in the service sector generally involves attending to the needs or requests of people. Service trade apprenticeships include occupations such as Electric Line Worker, utility work, like Barber, Cosmetologist, Cook/Chef and Fire-fighters.

In the United States of America applying for apprenticeship in the industrial and service sectors involves applying directly to the company that operates an apprenticeship programme. Although the Bureau of Apprenticeship Standards has set minimum entry requirements for each individual trade, eligibility requirements will vary from employer to employer and trade to trade. Most employers require a high school diploma or equivalent, and mathematics and reading skills.

Some employers test individuals to determine aptitude and trade knowledge. Some of the larger companies and those companies that have collective bargaining agreements often limit apprenticeship opportunities to people who are currently in their employment. This may mean that an individual interested in becoming an apprentice will have to take another position with the company while waiting for the opportunity to serve in an apprenticeship. Some companies may list apprenticeship opportunities with the local Job Centre, Technical College, or in the classified ads of the local newspaper. (Chippewa Valley Technical College) (2008). In the service sector in Ghana, the groups that fall under this industry include hairdressers, seamstresses, drivers etc. These providers accept people and train them under obligation that they pay an amount to the master and buy tools where necessary.

These types of apprenticeship practiced outside can be modelled in the country to create the needed skilled labour. The various apprentices can be organised into groups under their specific type of trade and be given skills and financial support by corporate organisations and the governments.

Tanning

Tanning is the process of converting or treating chemically, a raw animal hide or skin into leather. A tanning agent displaces water from the interstices (space in body tissue) between the protein fibres and cements these fibres together. Hides and skins have the ability to absorb tannic acid and

other chemical substances that prevent them from decaying, make them resistant to wetting and keep them supple (flexible and elastic) and durable. (The new Encyclopaedia Britannica p.546 (2003) Bienkiewicz (1983).

Leather is divided into hides and skins. The term hide refers to leather from larger animals such as cattle and buffalo. Leather derived from smaller animals such as sheep, goats and pigs as well as reptiles and fish is usually referred to as skin. Leather is a material made from the skin of any vertebrate (including reptile or fish) which has undergone a process which renders it non-putrescible (resistant to rotting) under warm moist conditions". (Roy Thomson) (2006)

The surface of hides and skins contains the hair and oil glands and is known as the grain side. The flesh side of the hide or skin is much thicker and softer. The three types of hides and skins most often used in leather manufacture are from cattle, sheep, and pigs.

According to the World book Encyclopaedia (2001), tanning of animal skin dates back to prehistoric time. The ancient Egyptians made such durable leather that specimens over 3,000 years old have been discovered in almost perfect condition. It went on to give evidence of oil tanning which has been found in leather from Egyptian tombs. The early Greeks and Romans also made contributions to the science of leather making. Some of their methods are still in use today.

Many ancient peoples tanned their leather by placing layers of bark, leaves, and fruit over the hides and adding water. This process took months, and in the case of thick skins, even years. The World book Encyclopaedia (2001). Evidence is also there to show that as early as 800 B.C, people discovered the mineral salt, alum and began using it as a tanning agent. The Assyrians, Babylonians, Greeks, and Sumerians used this mineral method of tanning because it was much faster than previous techniques. (The World book Encyclopaedia LP 169) (2003)

In Ghana leather tanning goes on and is over hundred years, but as to the specific date that it started is not documented. It is mostly believed that, it started in the northern region of the country many years ago and has employed many people. Unfortunately, there has not been any significant change in the way of tanning.

Wikipedia (2007) recorded that, before tanning takes place the following processes should be done. These processes include curing, fleshing, unhairing, and bating:

Curing: hides are cured by applying salt to the flesh side of the skin. The skin can also be soaked in brine (salty water). This is done to keep them from rotting and the water removes dirt and blood.

Fleshing: in this process knife is run over the flesh side of the skin to remove all fat and meat from the skin.

Unhairing: the flesh side is put in vats containing a lime and water solution that has a small amount of sodium sulphide. The solution weakens the hair roots, and in a few days the hair is loose. The hides are then run through a machine that scrapes the hair away. After unhairing, the hides are refleshed to remove bits of fat loosened by the unhairing process. Then they are washed in clean water.

Bating: the hides are placed in a mild acid bath to neutralize the unhairing solutions left in them. This process is necessary because the solutions used for tanning are acidic. If the alkaline solutions used for unhairing are not neutralized in this way, they can prevent the tanning solution from penetrating the skin. Enzymes are also added to the bath to digest soluble proteins in the hide that could interfere with the tanning process. (The World Book Encyclopaedia) (2003)

Drenching

Skins which have been subjected to liming, to remove the hair, are sometimes afterwards `drenched` in a warm bath of fermented bran or pea- flour, which is slightly acidic. This helps to remove any remaining lime and opens up the fibres of the skin in readiness for tanning.

Drenching, puering and bating are all forms of `mastering`.

Some process used for keeping leather

Currying

Currying is the process of treating previously tanned leather with oils and greases to render it supple, hard wearing and water resistant. Currying is also often associated with various finishing processes such as shaving the leather to the required thickness, and polishing, staining and dyeing it (Walsall Leather Museum 2006).

Tanning methods

Dradoona (2003) gives tanning methods as vegetable, chrome/mineral, oil and combination tanning. He continued to explain that vegetable tanning makes use of tanning which occurs naturally in tree barks. The primary backs used in modern times are chestnut, oak, tanoak, hemlock, quebracho, mangrove, wattle and myrobalyn hide are either stretched on frames or hung over pole or immersed for several weeks in vats of increasing concentration of tanning, and they are then removed and dried. (Wikimedia 2007, Dradoona 2003)

Vegetable Tanning

Leathers and sole leathers are produced by the vegetable tanning process and the oldest of any process in use in the leather tanning industry. The hides are first trimmed and soaked to remove salt and other solids and to restore moisture lost during curing. Following the soaking, the hides are fleshed to remove the excess tissue, to impart uniform thickness, and to remove muscles or fat adhering to the hide. Hides are then dehaired to ensure that the grain is clean and the hair follicles are free of hair roots. Liming is the most common method of hair removal, but thermal, oxidative, and chemical methods also exist. The normal procedure for liming is to use a series of pits or drums containing lime liquors (calcium hydroxide) and sharpening agents. Following liming, the

hides are dehaired by scraping or by machine. Deliming is then performed to make the skins receptive to the vegetable tanning. Bating, an enzymatic action for the removal of unwanted hide components after liming is performed to impart softness, stretch, and flexibility to the leather. Bating and deliming are usually performed together by placing the hides in an aqueous solution of an ammonium salt and proteolytic. Bienkiewicz, (1983), Marshall, (1996) Thorstensen, (1993), In Ghana vegetable tanning is the method widely used and the other methods are less known.

Chrome tanning

Chrome tanning also known as mineral tanning uses salt compound of chromium. The skins are prepared by pickling them in a solution of salt and acid. The skins are then immersed in a basic chromium-sulphate solution within a large revolving drum that humbles the skins. This type of liquor penetrates the skins so rapidly that tanager is accomplished in less than a day. (Microsoft Encarta 2007)

Again chrome tanning is the method of tanning leather using chrome salts. It has the advantage of being a much quicker process than vegetable tanning, generally taking hours rather than months, and the resulting leather is usually softer, stretchier, and highly water resistant, making it suitable for shoe uppers, clothing, and gloves (Walsall Leather Museum 2006).

Chrome-tanned leather tends to be softer and more pliable than vegetable-tanned leather, has higher thermal stability, is very stable in water, and takes less time to produce than vegetable-tanned leather. Almost all leather made from lighter-weight cattle hides and from the skin of sheep, lambs, goats, and pigs is chrome tanned. The first steps of the process (soaking, fleshing, liming/dehairing, deliming, bating, and pickling) and the drying/finishing steps are essentially the same as in vegetable tanning. However, in chrome tanning, the additional processes of re-tanning,

dyeing, and fat liquoring are usually performed to produce usable leathers and a preliminary degreasing step may be necessary when using animal skins, such as sheep skin.

The grain leathers from the shaving machine are then separated for re-tanning, dyeing, and fat liquoring. Leather that is not subject to scuffs and scratches can be dyed on the surface only. For other types of leather (i.e., shoe leather) the dye must penetrate further into the leather. Typical dyestuffs are aniline-based compounds that combine with the skin to form an insoluble compound.

Fat liquoring is the process of introducing oil into the skin before the leather is dried to replace the natural oils lost in beam house and tan yard processes. Fat liquoring is usually performed in a drum using an oil emulsion at temperatures of about 60E to 66EC (140E to 150EF) for 30 to 40 minutes. After fat liquoring, the leather is wrung, set out, dried, and finished. The finishing process refers to all the steps that are carried out after drying. Bienkiewicz, (1983), Marshall, (1996) Thorstensen, (1993),

Oil tanning is used for chamois leather that is made from sheep skin. The flesh split (side) shaved split to remove the fat cells. The shaved split is put into a machine that hammers cod-liver oil into the skin. After the oil has penetrated it the skin is removed from the machine and dried. It is then buffed to soften it and to give it a nap (Soft, woolly surface) (The world Book Encyclopaedia p 167) (2003).

Combination tanning involves the use of both the chrome tanning and vegetable tanning methods. Combination tanning is used for leather with special qualities such as extremely soft garment, glove or shoe upper leather.

Combination tanning can also be the leather which has been tanned using two or more tanning agents in succession and is known as combination tanned. For example it may be first chrome tanned, and then vegetable tanned. Each tanning agent imparts particular characteristics to the leather (Walsall Leather Museum 2006).

Tanning has been practised in some African countries for ages. These countries include Egypt, the Hausa tanners of northern Nigeria and the production of Sokoto tanned goatskins.

Tanners and leather workers existed in every main community, the principal areas being Kano and Sokoto. The study shows that, the quality of raw goatskin in Nigeria has always been best in Sokoto, slowly decreasing in standard as one moves eastward. The skins are dark red-haired in Sokoto, lighter red in Kano, white and black and white in Maidugari. Sokoto has always produced the best ironware as well as the finest leather, used in Europe since mediaeval times. (The period in the history of Europe from about AD 350 to about 1450)

It is probably very difficult to prove links between ancient Egypt and today's Kano and Sokoto tanners, due to the lack of written records. However, this may be possible to some extent if cave paintings at Birnin Kudu (near Kano) can be linked to other ancient markings found in a central Saharan mountain range. (Lamb 2005)

The study conducted shows that the tanning industries in African are inter-related and the chemicals used are almost the same.

According to Lamb (2005) he has attempted to produce a commercial version of the Sokoto grain, (the side of leather from which hair has been removed) but despite the application of modern technology he was unsuccessful. 'The natives' basic processes, which involve no machinery or manmade chemicals, are now described by Lamb and these are the processes:

Soaking and Liming (for heavy goatskins)

The carefully flayed skin is washed in well-water to remove blood and dung and is then immersed, in a very large earthenware pot, in a solution called toka - a strong alkali solution produced from the ash of certain types of wood.

This is equivalent to the European liming process and the skin is quite quickly hydrolysed and becomes very plump. Simultaneously, the hair and other keratinous and non-leather-making proteins are broken down by this solution which contains, from previous lots, a small amount of old liquor which the tanner adds to sharpen the new solution. No set amount of old liquor is used and the length of immersion can vary. The skilful tanners, depending on the time of year (i.e. hot or cold season), will give the skins just the right amount of time so that the hair can be loosened and removed without causing any loss of fibre strength or damage to the grain. The time varies between a day and a half and five days. At the appropriate moment the skins are removed, washed off and, using the outside of an old wooden corn grinding mortar, the skin is unhaired while held with the knee. A two-handled curved knife with a very blunt edge is used to press out the loosened hair and roots.

De-Liming

The unhaired skin is again carefully washed and then using the same method, but with a sharp knife, the flesh side is scraped clean of meat and fat left after butchering. Once more the skin is washed and then introduced to a solution made from a plant, which grows in swampy areas, called 'koloko'. This produces a very mild acidic solution and also contains small quantities of a proteolytic enzyme, papain. As soon as the alkaline skin comes into contact with this mildly acidic solution it begins to lose its rubber-like plumpness. When the skin is completely neutralized and flaccid it is immersed in a solution containing an infusion of pigeon dung to

produce the effect known as bateing (bateing is the process whereby non-leather-making proteins such as elastin are removed by the action of proteolytic enzymes. If left in the leather they will make it very hard and less flexible). The tanners have to watch the process very carefully, particularly in warm weather, because the bacteria in this foul solution can very quickly get out of hand and totally ruin the skin. At the appropriate moment the tanners wash off the skin which they test by squeezing; if the skin is properly bated residual water can be squeezed through the grain from the flesh side. Bate is then sterilized by immersing it in an old tan liquor. The clean, pure white skin is now ready for tanning.

Tannins

The local name of the tanning material is bagaruwa; botanical name acacia Arabica or acacia nilotica. Other names are garad (India), gabda and sunt (Sudan). The material used is the pod of the tree, which grows prolifically locally.

The tree, typical African acacia, with seasonal small yellow blossom, matures in two years and can yield pods for up to ten or twelve years. These are gathered when dry (October to January) and look similar to dried lupin pods, although much bigger, about six inches long. The dried pods are beaten in a corn pestle and mortar (usually by women) and the hard black seeds are separated by winnowing. The remaining powder is then used to make a tanning solution. This solution is very mild and gentle and the leather is more light-fast than that produced from say, mimosa, quebracho, chestnut, etc. The pod is also used by native herbalists as a cure for dysentery.

Tanning Process

Using earthenware pots set into the ground, like those used in wash-tub days, the skins are worked in the liquor and from time to time gradual additions of bagaruwa powder are made. The skins are worked for ten minutes each hour and left to lie in the solution overnight. It will be

observed that after lying overnight in the strengthened tanning solution the grain of the leather has drawn into the well known pattern. The skins are continually worked and further additions of powder are made throughout the next day, after which they are again left overnight. On the third day a new solution of tan liquor is made and the skins are constantly worked again, when a much lighter and cleaner appearance can be observed. The skins, if cut one or two inches in across the shank or the thickest part (i.e. the neck) would then reveal that the tan had fully penetrated. If not, the process would be continued until this had been achieved. This test does not involve wastage of the skin.

Towards evening, when the main heat of the day has subsided, the leather is removed from the pots, carefully washed off in clean water and all excess water is squeezed out. The skins are then oiled by hand on the grain side, using groundnut oil. After the oiling, the skins are piled grain to grain on rush mats in the shade of a tree and after lying in this manner for two to three hours to allow partial absorption of the oil, the leather is then hung to dry on lines, clothes-line fashion. The leather is dried slowly for better penetration of the oil. Next day, the skins are re-tanned in a fresh bagaruwa solution, carefully washed, and after straining off excess water, hung to dry. In re-tanning, all the tan and oil stains are cleaned up and the leather then assumes its creamy light-coloured tan shade. During oiling the skins are often adulterated with weight-giving additives by the more unscrupulous tanners. The skins are turned constantly during drying to ensure that this proceeds at an even rate and also to eliminate rope-marks, and so on.

Softening Process

When almost dry and of even colour the skins are handed and barefooted staked in at least six directions. The skin is held across a wooden stake and pulled across the heel to soften the leather - it is a mild stretching and flexing which releases the fibres which have stuck together during

drying. Staking and beating then spread the oil evenly throughout the skin and on to the fibres so that the leather becomes soft. The skins are then folded into six folds and beaten over a special stone. The folding is changed from time to time so that all areas of the skins are carefully worked.

After that the edges of the leather are trimmed and they are ready for the market. Most of the skins are sold off in this state, but the very finest are selected for dyeing. Also, the very poor quality leather, which are unsuitable for export, are dyed into reds, greens, yellows and blues for sale to the desert nomads (i.e. Buzu or Absinawa ethnic group) who use leather for covering Koranic charms. Non-exportable skins are also sold in the natural state to Fulani herdsmen for clothing.

Most dyeing is still done in the traditional manner, using red dye produced from dawa corn stalks, and blue-black from the baba (indigo) plant which grows in this area, but some tanners use aniline dyes which are cheap and simpler to use.

The subsequent study looks at the tanning processes that are used in Ghana, which of the methods is studied by apprentices in Ghana. The research examines how well the apprentices are involved in the tanning industry. The work schedule of the apprentice and what is being done to keep the industry alive.

CHAPTER THREE

METHODOLOGY

This chapter enumerates the methods used in soliciting the needed information for the study, as well as the procedures and processes that were used to collect and collate information from the respondents. The various steps used in collecting and assembling data have been stated and discussed.

3.1 Research Design

Given (2008) says that research design refers to the way in which a research idea is transformed into a research project or plan that can then be carried out in practice by a researcher or research team. She went on to say that research design is more than just the selection of methods or techniques to be used in collecting data for a particular study. Rather, the term refers to and encompasses decisions about how the research itself is conceptualized, the subsequent conduct of a specific research project, and ultimately the type of contribution the research is intended to make to the development of knowledge in a particular area.

The qualitative research methodology was used. According to Leedy, Ormrod (2005) qualitative research encompasses several approaches to research, yet all have two things in common. The first is that they focus on the phenomena that occur in natural setting and the second involves studying those phenomena in all their complexity. For the purpose of this research, case study which looks at a particular programme, individuals or event, and studies it in-depth for a defined period of time was used. This is a more appropriate research design for the study.

Case study is more appropriate for this study because it allows for a detailed study of the apprenticeship programme in leather tanning industry, and making useful investigation into how the programme has changed over time in the country and make the necessary recommendation as

to ways to improve this trade. The case study will also provide clues for the subsequent research that will aim at solving different problems in the area of apprenticeship or in the leather tanning industry.

3.2 Library Research.

Library research played a very vital role in this study. The libraries included

- The KNUST libraries
- Ashanti library, Centre for National Cultural, Kumasi
- Wesley College library, Kumasi.
- Ofinso College of Education library, Ofinso.
- The University of Education Winneba campus library and Kumasi campus library.

Other sources include data collected from internet and documentary sources from books, unpublished thesis, journals and periodicals.

3.3 Population for the study

Population as a concept in research refers to every individual who fits the criteria (broad or narrow) that the researcher has laid out for research participants. Qualitative researchers tend to study smaller numbers of people in great depth, it is perhaps more common for them to study small samples. It is not feasible to complete an in-depth, qualitative, interview study of the full population of apprentices in the leather tanning. In this case all local tanneries in Ghana are the population for the study but, it is true that all local tanneries have almost the same techniques of working; this necessitated the chosen of the Asawase and Tanzuin tanneries. Given (2008)

Sharp, Peters and Howard (2002) also have it that, population can be said to be all elements in a well defined collection on set of values. Again they went on to say that the population to which the researcher intends to generalize his/her finding is referred to as the target population

The target population for the study includes apprentices in the leather tanning, leather tanners, lecturers in leatherwork and other categories of leather workers in Ghana. The accessible population used for the study comprise apprentice in the leather tanning, trainers (senior apprentice), masters at the Asawase and Tanzuin tanneries and lecturers of leatherworks.

3.4 Sampling

Usually the target population is too large for the researcher to work with. The geographical area covered may be too wide spread. Sharp et al (2002). A sample therefore became a subset of values from a target population. There are many types of sampling techniques. They include convenience sampling, snowball sampling, and purposive sampling which come under non probability sampling. The researcher preferred to use purposive sampling because the people chosen are typical of a group and represent a diverse perspective on the issue under the research.

In that case not every body on the street will have to be interviewed for ideas on the way leather is tanned. Leedy (2005) has it that in purposive sampling people or other unit are chosen for a particular purpose.

3.5 The sample

A sample is the set of actual data sources that are drawn from a larger population of potential data sources. Approaches to selecting samples are typically divided between probability sampling and non probability sampling, where the former uses a group's size in the population as the sole influence on how many of its members will be included in the sample, while the later concentrates on selecting sample members according to their ability to meet specific criteria.

The sample was purposefully done to ascertain the required information. The study was conducted among leather tanners from two different regions of Ghana namely Ashanti and Upper East regions. To meet the specific criteria for apprenticeship in the leather tanning industry, purposeful sample was used to narrow down to two tannery centres, Asawase and Tanzuin. At Asawase and Tanzuin nine and eight people were interviewed respectively. Two lecturers each from the Department of Integrated Rural Art and Industry (I. R. A. I.), K N U S T and the Department of leather, University of Education responded to questionnaire

3.6.0 Data collection Instruments

The instruments used include Interviews, questionnaire and observation.

3.6.1 Interviews

Interviews are oral questionnaire in which the interviewee gives the needed information verbally in the presence of the interviewer. Leedy (2005) is of the opinion that, in qualitative study interviews are rarely structured, and are more open-ended. He went on to say that, unstructured interviews are more flexible and likely to yield information that the researcher hadn't planned to ask for. Interviews bring out much more confidential information than any other data – gathering device, which the interviewers may be unwilling to write or record. On the part of the interviewer, he can explain further to the interviewee the purpose and kind of information he wants. When the subject is stimulated into greater insight by the interviewer, the interviewee is also able to delve much into the subject matter using his experience to explore important areas for further discussions. This instrument was used to collect the first-hand information from the master, trainers and the apprentices. Through interview much information was gathered and even questions not found on the interview guide were also captured by this instrument.

3.6.2 Questionnaire

A questionnaire is a carefully designed instrument for collecting data in accordance with the specifications of the research questions and hypotheses. It is written responses from the subject of the research through a series of questions or statements put together with specific aims in mind.

In this study the questionnaire method was used to ascertain facts, opinions, beliefs, attitudes, practices and reasons why future generations should take up leather tanning as a vocation or as a profession.

Questionnaire as a research tool was essential for the respondents who have acquired knowledge in the profession and can administer it with little or no problem. This helped the researcher in soliciting information from lecturers, who lecture extensively in schools and colleges on leather and the way the apprentices are trained.

Furthermore, it was used because some of the respondents could read, write and understand the simple questions posed to them. Another reason for the use of the questionnaire as an instrument for collecting data was its efficacy in collecting statistically quantifiable information. It is also an efficient method in the sense that some respondents can be reached within a relatively short period of time.

The items in the questionnaire were a combination of open and close- ended items. The close-ended questions consisted of statements, which were followed by words that the respondents had to choose from. For example, words such as Yes and No or list of items that are common to respondents which, in the view of the researcher, would be necessary for obtaining information were used. The open-ended questions on the other hand were basically meant to seek information from the respondents' own experience and opinions.

3.6.3 Observation

The observation method of data collection uses systematic procedures to look into processes such as curing, fleshing, unhairing, bating and record them. Observation as a method of research tool is also necessary because information provided by respondents in a questionnaire and interviews could be inaccurate, biased or untrue. In contrast, observational techniques of data collection make it possible for the researcher to obtain first- hand information about the objects, events, and the personalities themselves. These phenomena which must be looked at as it forms part of the researcher's personal experience with the interviewee may be used alone or to supplement information collected with other method,' says Nkpa (1997). The processes and conditions of the apprentices during the training were all observed and recorded

3.7 Validation of Instruments

Validation refers to the means of asking few people to share their opinions on the questionnaire to check on their authenticity before administering them to the target and chosen respondents. For this reason, two professional leather workers were consulted to conduct the face validation. The face validity was attempted to find out whether the items do measure to what they were supposed to measure. In doing this, the questionnaire was thoroughly looked at and the necessary corrections were made. In addition to the above, to improve on the validity of the instrument, the researcher carried out a pilot study to try the items out to be sure that, they are not difficult and are well understood by the respondents.

3.8 Data Collection Procedure

An introduction letter from the Department of Art Education was shown to the people who were selected and this authenticated their trust in the researcher to gather the needed information. Most of the interviewees were very happy to receive the researcher while others were suspicious of the researcher and ignored him. The information required was obtained from the respondent through series of meetings. The masters, trainers and apprentices were interviewed on the various processes of their work schedules at the tannery. Some of the processes and the working environment were observed. Lecturers and leather workers answered to questionnaire to ascertain the new trends, the strengths and weaknesses of the tanning industry.

Some of the interviewees were quite open and so they accepted the researcher to be at their work place at any appointed time to observe and question them on the various processes.

3.9 Primary and Secondary Data

The information given to the researcher by the personalities such as the apprentices, masters and trainers constitutes the primary data, which included pictures of training site and tanning materials shown by the respondents, as well as those from friends and relatives of the personalities Ghanaian tanners have been described in this report.

Apart from the questionnaire, the apprentices were engaged in mutual conversations which afforded the researcher the opportunity to know more and beyond the tabulated questions.

Secondary data comprise information collected from books, thesis, journals, magazines and periodicals.

3.10 Data analysis plan

Data collected have been assembled, described, analysed and discussed in the next chapter.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.1. The Data Assembled

Research Question 1

What processes are followed in the training of apprentice in leather tanning?

Entry Requirements of an Apprentice

- No uniform is required from the apprentice.
- The master provides all the tools for the day-to-day running of the tannery.
- In some instances money is charged as a starter for the buying of raw materials. This is determined by the master and the amount charged ranges from GH ¢20 to GH ¢45.

Rights of the Apprentice

- The apprentice has the right to meals depending on the daily sales. The day that sale is bad the apprentice had to depend on the money that will be provided by their parents.
- The apprentice has a right to health care if he falls sick in the line of duty.
- He is helped in times of bereavement or any sudden occurrence.

Forbidden Practices of the Apprentice

- The apprentices are forbidden to drink alcohol, smoke, steal or chase girls.
- They should not sell leather or keep money,
- They should not be absent from work without permission and
- They should respect seniority, master and any one who comes into contact with the tannery.

Disciplinary Measures to Control Apprentices

- An Apprentice who has committed an offence is first reported to the parents or the guardian
- Apprentices are also suspended for a period of time depending on the severity of the offence
- Apprentices are dismissed if they prove to be incorrigible.

The activities of apprentices, masters and trainers (senior apprentices) were observed while work was in progress and interviews were also granted by them.

During the interview it came to light that apprentices' age ranges from fifteen years to twenty-four, as one master retorted "we do not take anybody below fifteen". The educational background of the apprentices was not considered when it comes to recruitment. Of the number of apprentices interviewed, only two have not gone to school at all; four have ended their education at the primary level; four at basic level; one is in the Senior High School and the last one had completed the Senior High School.

Of all the tanneries visited only one apprentice has spent less than one year, the rest have stayed for a period ranging from two to fourteen years. What accounted for the long stay at the tannery is that some of the apprentices are relations of the masters and do not pass out of the apprenticeship but help the masters in training the new apprentices. For them they are the senior apprentices and they take the new ones through all the tanning processes.

According to Yissif Amuda a master in charge of the Maziema tannery Tanzuin, the tannery is over one hundred years old and the industry has trained many people. He admitted that the tannery has changed locations but the method of tanning has remained the same. A trainer at Asawase confirmed that, the tanning processes cannot be changed, the reason he assigned is that

tanning is a tradition, which has been transferred to them so it will be difficult for one to change it.

There are two kinds of apprentices. There are apprentices who grew on the job because they are relatives of the masters or relate to somebody in the tannery. This group is conversant with all the processes and only need to put up just a few practices to become professional tanners. The second kind is the apprentices who are brought to the work place by their parents or their relatives. They are the group worth considering for this study and their training takes a year.

When the apprentice is brought to the tannery the work schedule for the first month is to run errands at the tannery. These include sweeping, fetching water for the cleaning of the pelt, cleaning pelts, pounding bagaruwa (the main tannins used by local tanners) and, drying of leather.



Plate 1

The pounding of bagaruwa or zinziriga at Asawase



Plate 2

Pounding of the leather to soften it at Asawase

The next process the apprentice learns is the soaking of the pelt and the pounding of the leather to make it soft. These are done for sometime and the apprentice proceeds to learn dehairing and defleshing the pelt

The process of dehairing starts with soaking of the pelt in a pit containing wood ash and carbide (calcium carbide, CaC_3). These chemicals help in the losing of hair and getting the flesh rotten.



Plate 3

Pelts soaked in a pit containing wood ash and carbide at Asawase

The soaking process is called liming, a preparatory process, used to prepare skins and hides for tanning. The skins and hides would be suspended in pits containing lime solution in order to loosen the hair and outer surface of the skin (the epidermal layer), and open up the fibre structure to make it receptive to the tanning agent. If carried out correctly the hides and skins could then be `unhaired` and `fleshed` with relative ease, before the process of tanning proper could commence.

The apprentice removes the hair by placing the pelt on a cylindrical pipe and running a blunt knife with two handles on each end over the pelt. This is used to remove all the hair from the pelt. This process is called dehairing. The next process is the removal of flesh from the flesh side of the pelt. This follows the same process as the dehairing but this time the opposite side of the knife is used. The opposite side of the blade is a bit sharper than the one used for the dehairing. The apprentice is taught to be careful so as not to cut the pelt. Once the pelt is dehaired and defleshed, it is ready to be processed into leather.



Plate 4

The knife used for dehairing and defleshing at Asawase



Plate 5

Dehairing of pelt at Asawase



Plate 6

Defleshing of pelt at Tanzuin

The apprentice is taught how the pelt is converted into leather. At this stage the trainer asks the apprentice to soak the pelt which has been dehaired and defleshed, into a solution of water and tannin. The tannin used here is called bagaruwa or zinziriga. It is pounded into powder and soaked in water.



Plate 7

Bagaruwa or zinziriga, the main tannin for local leather

The local name of the tanning material is bagaruwa; (Bagaruwa in Hausa) botanical name *acacia Arabica* or *acacia nilotica*. Other names are garad (India), gabda and sunt (Sudan). The material used is the pod of the tree, which grows prolifically locally. The tree, typical African acacia, with seasonal small yellow blossom, matures in two years and can yield pods for up to ten or twelve years. These are gathered when dry (October to January) and look similar to dried lupin pods, although much bigger, about 15.24cm long. The dried pods are beaten in a corn pestle and mortar (usually by women) and the hard black seeds are separated by winnowing. The remaining powder is then used to make a tanning solution. (Malcolm J. Lamb 2008)

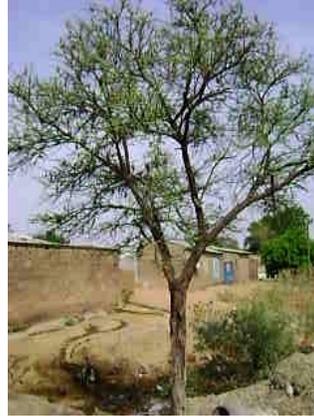


Plate 8

Bagaruwa tree found at Tanzuin



Plate 9

Leather soaked in the tannin, bagaruwa or zinziriga at Tanzuin

The pelt is allowed to stay in the solution for a day. The apprentice removes the pelt from the solution, squeezes it and dries it.



Plate 10

Dried khaki leather at Tanzuin

This process gives the khaki colour and the only process that will be added to make the leather complete is to oil it. Where other colours are preferred, then the apprentice will have to process the leather further. The red coloured leather is obtained by immersing the khaki leather in a dye solution obtained from pounded guinea corn leaves.



Plate 11

Guinea corn leaves at Asawase

Guinea corn leaves are referred to in the local language as ‘karamafi’



Plate 12

Leather being dyed with ‘karamafi’ or guinea corn leaves

The tanners call these leaves ‘karamafi’. The leather is again immersed in lime solution to fix the dye. The leather is then dried, oiled and stretched to complete the process.



Plate 13

Lime solution to fix the dye



Plate 14

Leather being dried at Tazuin



Plate 15

Apprentice stretching red leather at Tanzuin

Other colours can be produced. The black leather is produced by immersing the dried khaki leather into a solution made from scrap metal with lemon to help in the rusting of the metal. Brown is obtained when the freshly produced red leather is dipped into the black dye.



Plate 16

Scrap metal with lemon for dyeing leather black at Tanzuin

The white leather is produced by immersing the dehaired and defleshed pelt into an alum solution (Potassium alum, $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$).



Plate 17

White leather in alum at Asawase

All leather produced are dried and stretched by the apprentice.

4.2. Analyzing the Data

Research Question 2

What are the strengths and weaknesses of the apprenticeship programme in tanning industries in Ashanti and Upper East Regions of Ghana?

Strengths of the Apprenticeship Programme in the Leather Tanning Industries at Asawase and Tanzuin.

Upon studying the various groups in the apprentice programme the researcher found out the following strengths:

- The indigenous tanneries make use of local and natural resources. Tanning also forms part of the tanners' tradition. It is important to note that it is an inexpensive way of tanning

leather because all the raw materials are mostly found in the environment; therefore the finished product becomes cheaper

- There is proper control of apprentices in the tannery industry and the fact that the masters cater for their apprentices when they are in need and provide the apprentices with food when the daily sale is good. This means that the apprentices will get conducive atmosphere to concentrate on their work.
- The entry requirements are minimal as compared to other apprenticeship programmes. In some tanneries nothing is paid as entry fee and the master provides all the tools needed for the work
- The apprentices have the opportunity to stay at the tannery and continue to work for the master as senior apprentices if they are not ready to open their own tannery.
- The period of training is short, compared with other trades; the actual time for the training is one year and this can further be reduced because some of the processes can be learnt within a short period of time.
- This study indicates that, the apprentice will require a few resources to start his own tannery. The most important resource that he will require is the site. An improved tannery can be practiced at home with a very small space.

Weaknesses of the Apprenticeship Programme in the Leather Tanning Industries at Asawase and Tanzuin.

The following weaknesses were observed:

The masters take the tanning as part of their tradition and therefore will not like to change or are not willing to accept any change. This has resulted in the industry remaining as it was from the

time immemorial when the tradition was first introduced in hundred years back. This means that the apprentices may also continue in the same light and there would not be any improvement in the industry. This cannot support large scale production.

Secondly, the environments in which the tanners work deter people from going there to do business. In almost all the areas visited, pits have been dug in the ground, and this is where water is stored and pelt being treated are kept. The water is stored for years unchanged. This may lead to fungi attack of both the water and the pelt which will affect the quality of leather obtained at the end of the process. This type of environment cannot support large scale production.



Plate 18

Pits dug in the ground for soaking pelt at Asawase



Plate 19

Water used at Asawase tannery

The pond found in plate 19 is the water used for all the activities that go on in the tannery and Plate 20 also shows the pit where the pelts are soaked in the ash and carbide. These are all in the ground.



Plate 20

One of the pits that hold pelts at Tanzuin



Plate 21

The working environment of the apprentice at Asawase

Most of the tanneries are found at the banks of rivers, so it makes the site prone to floods during rainy seasons. After the water has receded, some water still remains at the work place, making the site waterlogged and the breeding of mosquitoes is eminent. The waste materials generated from the work like hair and decomposed flesh are also dumped into the river which pollutes the river and create environmental problems. The pollution of the water bodies and the land around the tannery if not checked can cause an epidemic.



Plate 22

Hair and decomposed flesh deposit at Tanzuin

The manner waste materials are disposed off at the tannery gives an indication that, producing on a large scale will be difficult to handle. Chemicals such as alum, carbide and ash are used for the processing of leather but the actual measurements of these chemicals for the processes are not known, as different quantities will give different results. Therefore there are inconsistencies in measurements, which affect the quality of the leather tanned.

The processes through which the pelt goes make the leather smell. Therefore reducing the value of the leather, when it is used for the production it develops moulds on the surface and this accounts for the rejection of local products made of leather.

In stretching the leather, the apprentice uses the foot in pressing the leather against a large stone. This may cause injury to the foot and the question is how many pieces of leather can be stretched in a day under large production? The stone can also destroy the grain side of the leather reducing the face value of it.

Teaching in the industry is based on only the master's knowledge because there is no curriculum or any reference books on the industry in our part of the world. There is no possibility of being abreast with modernity or science and technology. The master, who uses his own knowledge in teaching, lacks pedagogical skills for the teaching of tanning. This means that the type of teaching that goes on in the tanning industry will be of low quality.

The tannins known to the tanner at Asawase and Tanzuin are the alum and bagaruwa.

There is the taboo that the skins of the dog and pigs are not tanned. Tanning is over concentrated on goats and sheep to the detriment of other skins such as the alligator, snake, crocodile and others which are done on request only. This practice blocks creativity and variety in tanning.

4.3. Interpreting Data

Apprenticeship in leather tanning programme enjoys the cheapest form of entry requirement to apprentices because in some tanneries nothing is paid as entry fee and the master provides all the tools needed for the work. This indicates that apprentices can learn the trade with less initial cost.

An apprentice is given proper moral training in the tannery and the masters cater for their necessities such as food when the daily sales are good. This, the apprentices are very pleased with. This means that given the necessary conditions and proper resources more apprentices will like to get into the trade and learn in order to improve the tanning industry and concentrate on their work. The fact that tanners use indigenous tannins and natural resources, chemicals used as tannins and for other processes can be researched into and new ones evolved. This shows that improvement can be made to the system of tanning at a lesser cost.

Tanning to the masters is more of a tradition than a profession so it embodies the beliefs and customs of the people. Again tanning has been handed down from generation to generation therefore it becomes very difficult for them to change the method of production. Tanners are not willing to accept any change. This has resulted in the industry remaining as it was handed from the time immemorial. The practice is a threat to modernity and global competition, therefore seriously affect large scale production.

The environment in which the tanners work is the one prone to floods with some parts used as refuse dumps. This makes the place unhygienic to work in. The pelts are also soaked in pits in the ground; the result of this is that, the water used for soaking becomes unchanged for years. This adds to the smell of the pelt. This situation deters many of the young people who will like to go into tanning business.

Chemicals such as alum, carbide and ash are used for the processing of leather but the actual measurements are not known. This means that tanning will be done but the correct usage of chemicals for the various processes will not be known. This will make documentation difficult and apprentice will find it very difficult learning the trade. The unscientific approach to tanning retards the forward march of the industry.

Taboos which are the prohibitions of certain practices still exist in the tanning industry. It is forbidden for the skins' of the dogs and pigs to be tanned and other skins and hides from animals such as cows, alligator, snake; crocodile are tanned on request by the customers. This denotes that there will be over concentration on skins of goats and sheep to the detriment of other skins. The apprentices will find it difficult to tan those skins and hides they have not been trained with. Besides, variety in tanned leather is limited.

4.4. Conclusions

In conclusion, there are few apprentices and the tanning industry remains an untapped sector in the country. Tanning should be well packaged, so that it will employ a lot of the youth and this will improve the local leather industry.

Also, tanning done at Asawase and Tanzuin in Ghana are similar to what was done in the historical Hausa and Sokoto tanners in Nigeria. The import of this is that tanning might have come from those communities, so lessons of new ways of tanning can be learnt from the new generation.

There are a lot of products that have been made in leather. These products have been used by many other people from all walks of life, for various purposes including culture. Some of these products are exported to other countries. This means that leather products are among the export

commodities which generate income for the nation. In spite of all the importance of leather, tanning has not been given the necessary attention that it deserves. There is no training for the apprentice to improve their skills, no financial support and lack of interest by the government and the Ghanaian society as a whole.

In Ghana the skins of goat and sheep are delicacy so people prefer eating this raw material to the production of leather. So, it does not only make this raw material expensive but also insufficient for the production requirement of the country and for the export market. There are virtually no books written on leather tanning which describe the procedure of tanning and the chemicals used. This makes it impossible for the intellectuals to learn, practice tanning and research to find out new ways of possible modernisation of the industry.

Tanners at Asawase and Tanzuin have no knowledge of the structure of the skin they tan and have no knowledge of the chemistry of leather. The composition of the chemical they use for the tanning and the chemical effect on the leather is also not known, this accounts for the poor quality of leather they produce.

Research Question 3

What is the way forward for the apprenticeship programme in Ghana?

The way forward for the apprenticeship programme in the Leather Tanning Industries in Ghana

There should be special training centres established by the government of Ghana, which will train apprentices and this should include leather tanning. The youth will then become acquainted with actual work conditions and with the maintenance or production of tradable goods through appropriate technologies. There should be a body or an agency established by the government of Ghana to be responsible for the various apprenticeships programmes. This body will study the apprentices systems especially the leather industry and recommend to the government how best the apprentices can solve the several unemployment problem facing the country.

Even though skill training, in itself is not sufficient to raise incomes in the informal sector of the apprenticeship, these skill training should be encouraged because it can improve incomes along with other inputs, and also contribute to enhancing the productivity of the sector and that of the country.

The training of apprentices should be made accessible to the rural and urban populations at the same time. The various modes of training should be at a lower cost and should be financed by the government and the private sectors. The government should also get the economy right and the skilled opportunities will follow. Some of these vocational subjects as commerce, computer literacy, accounting, business studies, management, record keeping and entrepreneurship should be introduced as part of the apprentices' regular academic curriculum.

The government of Ghana should be more committed to the apprenticeship programme if the nation wants to develop. Governments in other countries have started and are planning to improve

upon it. In 2005, eighty percent of young French people who completed their apprenticeship entered employment, because the government granted tax relief for companies that take on apprentices. The government of France has also planned to raise the number of apprentices from 365,000 in 2005 to 500,000 in 2009. This is one of the measures the government of Ghana can take to improve apprenticeships in the country to alleviate poverty in Ghana.

Again, it is worth noting that in Australia apprenticeship as a scheme has employed 400,000 people in 500 occupations. By this, there would not be a situation of unemployment because all the 400,000 people will be in not only one sector of employment but in 500 areas of occupations. (Wikipedia 2008)

There should be a provision of pre-employment training by either the government agency or the non-governmental organisations that matter in employable skills in our institution, of those skills that are traditionally not part of the higher academic curriculum of the formal education but have been part of the apprenticeship culture among the society.

In America construction trade apprenticeships are sponsored by local trade committees comprised of skilled workers and employers who are advisory body to the Bureau of Apprenticeship Standards. Committee members recommend approval of qualified applicants to the Bureau. Each committee develops its own policies and practices, with approval from the Bureau of Apprenticeship Standards, for operating its apprenticeship programme and for selecting apprentices. The Bureau of Apprenticeship Standards has set minimum entry requirements for each individual trade, eligibility requirements will vary from employer to employer and trade to trade. This can be replicated in Ghana where by a local trade committees will be set up to advice bodies such as Bureau of Apprenticeship Standards at the national level. The bureau's mandate will also be to set minimum entry requirements for each individual trade, eligibility requirements

for employer and each trade. It should take in all forms of traineeships including full-time, part-time or school-based. The bureau should also link up those people who have graduated from the apprenticeship to the job market.

Again in Pakistan, special apprenticeship programmes are run to fulfil the needs of IT (Information Technology) industry. So, for that purpose Pakistan Software Export Board (PSEB) formerly has launched a very attractive programme for young IT graduates. Under the IT Industry Apprenticeship Programme, PSEB offers financial subsidy for the companies to recruit graduates possessing the basic skills and knowledge in Information Technology and other related disciplines to provide IT services. The apprentices in Ghana will be better off if the trainees are given IT training as part of their programme. The IT companies can as well come together to give on-the-job training and mentoring to school leavers on a subsidised rate.

There should be a governmental agency that will periodically train masters to acquire skills and methodology of training young ones in the acquisition of skills. That body should have a permanent mandate to organise training of trainers' workshop which will give the masters the ways to train and attract apprentices.

Apprentices should be trained with professionalism by their masters who have also received training such that their finished products (tanned leather) can attract money. The money may be put in funds which should be used to purchase basic equipment for apprentices upon graduation to settle them. Young people trained through informal apprenticeship should be awarded two certification options:

- ❖ Certificates awarded by Informal Sector Associations (ISAs);
- ❖ The National Vocational Training Institute (NVTI) proficiency certificates on the basis of a non-written competency-based skill test.

Many informal apprentices do not register for the NVTI examination. Without the certificates one should not be allowed to practice. This will streamline the apprenticeship training.

The 1998 Children's Act outlines the legislative framework for informal apprenticeship. It has defined a minimum age of 15 years for which apprenticeship should start, sets out the master crafts peoples' responsibilities, and specifies the content of apprenticeship agreements. The most important element of the institutional framework for informal apprenticeship is the formation of informal sector associations. They are to be actively involved in the supervision of skills training. They should be empowered to sanction offenders who go contrary to the set up rules governing the Associations. The minimum age of 15 years defined by the Children's Act for apprenticeship should stand as it is. But there should be some intervention which will see to the mopping up of the school leavers and drop out who may be above the age 15 and would not have acquired any skills to go into employment.

The tanning industry should be renewed and this can only be done if the up coming apprentices are re-train in the new method of tanning so that, they can set up their own tanneries which will not do things the old ways but will try to modernize the old methods of leather processing. This can only be done if proper research is made by leatherwork students of the department of Integrated Rural Art and Industry in collaboration with the chemistry department all of KNUST.

Tanning as an old industry without any support will not modernize. It will be better if the companies who use leather come together to finance the setting up of tanneries where the youth will be employed and trained to take up the tanning as a professions.

Sites for tanning should not be in the open space where pits and containers will be exposed to the weather. Tanning should be done in a well planned structure, where rooms and hall can be built to accommodate the various section of the tannery. Proper vents should be built for the soaking of

pelt, apply chemical and for dyeing. These vents should have pipes that will let in water or holes to drain water out of them. The water should not be allowed to stand in the vent for a very long time

As part of the way forward the skins of the animals processed into leather and the structure of the skin should be studied by apprentices. This will enable them to know the way chemicals react with skin and transform it into leather. Plate 23 is an illustration of a mammalian skin. The cross-section shows the epidermis and the central fibrous dermis or corium layer. The epidermis in mammals is thick and has many layers of dead cells at the surface. These cells also contain keratin which helps to make the skin water-proof. The thick keratinized epidermis is effective in protecting the underlying tissues from water loss, invasion by microorganisms and mechanical abrasion. The epidermis is very thick and forms horny pads on the soles of the feet and toes of many mammals.

The dermis is composed of long fine fibrils of protein collagen, grouped together in units of between twenty and fifty to form fibres. The fibres are then further associated in bundles, held together by reticular tissue. It is also composed of dense fibrous connective tissue and contains blood vessels, nerve fibres and sensory endings, arrector pili muscles, glands and hair follicles. Sebaceous glands and sweat glands are multi cellular glands of epidermal origin. The presence of hair is a distinct mammalian characteristic and hair is the most obvious derivative of mammalian skin. In most mammals, hair forms a dense protective and insulating fur over the body. (Kent Simmons 2008)

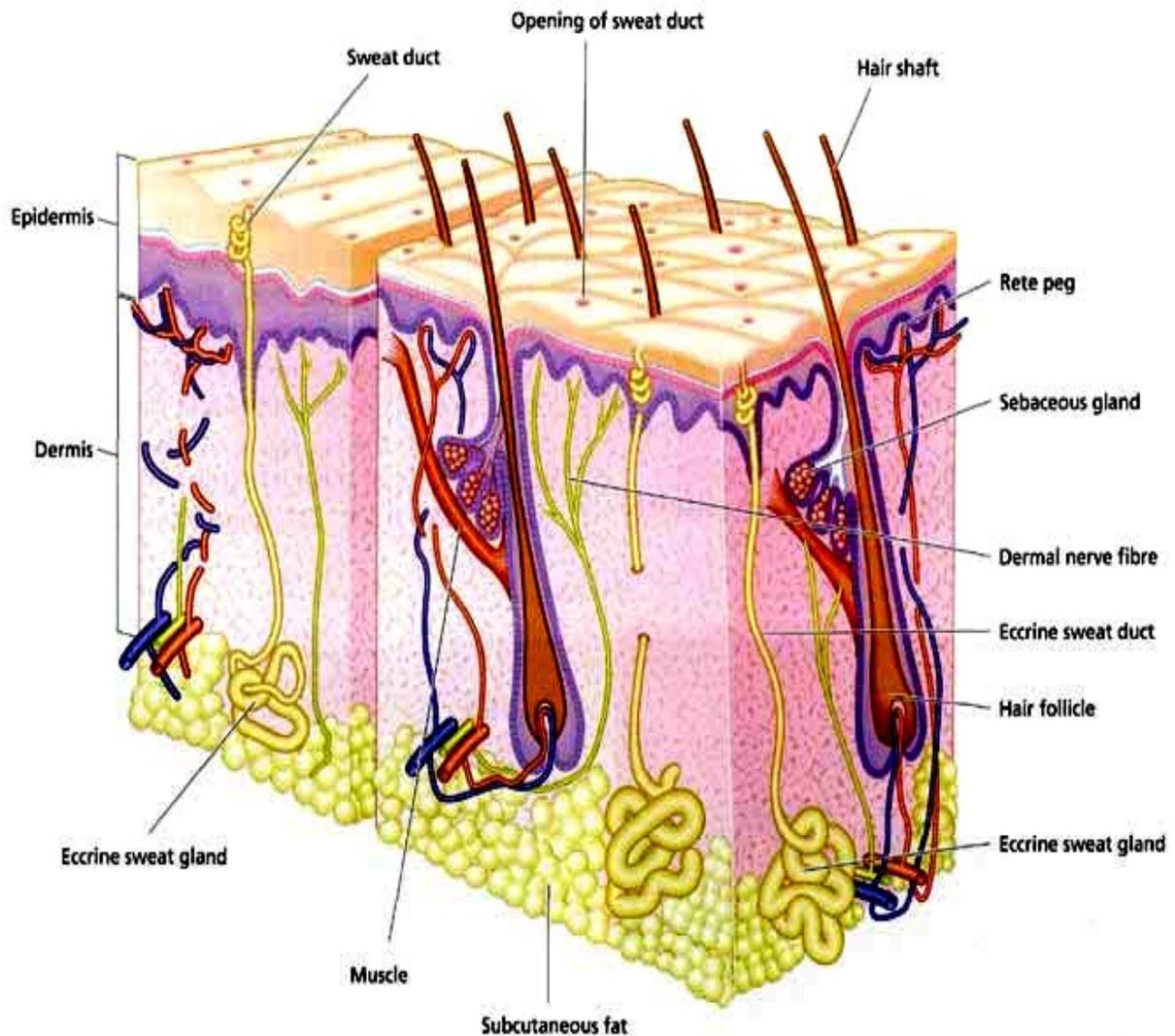


Plate 23

Structure of Mammalian skin (Kent Simmons 2008)

blood vessels - Tubes that carry blood as it circulates. Arteries bring oxygenated blood from the heart and lungs; veins return oxygen-depleted blood back to the heart and lungs.

dermis - (also called the cutis) the layer of the skin just beneath the epidermis.

epidermis - the outer layer of the skin.

hair follicle - a tube-shaped sheath that surrounds the part of the hair that is under the skin. It is

located in the epidermis and the dermis. The hair is nourished by the follicle at its base (this is also where the hair grows).

hair shaft - The part of the hair that is above the skin.

hair erector muscle - a muscle connected to each hair follicle and the skin - it contracts (in response to cold, fear, etc.), resulting in an erect hair and a "goose bump" on the skin.

melanocyte - a cell in the epidermis that produces melanin (a dark-coloured pigment that protects the skin from sunlight).

Pacinian corpuscle - nerve receptors that respond to pressure and vibration; they are oval capsules of sensory nerve fibres located in the subcutaneous fatty tissue

sebaceous gland - a small, sack-shaped gland that releases oily (fatty) liquids onto the hair follicle (the oil lubricated and softens the skin). These glands are located in the dermis, usually next to hair follicles.

sweat gland - (also called sudoriferous gland) a tube-shaped gland that produces perspiration (sweat). The gland is located in the epidermis; it releases sweat onto the skin.

subcutaneous tissue - fatty tissue located under the dermis. (EnchantedLearning.com2001-2009)

Upon the studies conducted, it came up that the skins and hides are composed of about 60 % water, 35 % fibrous and non-fibrous proteins and rest are lipids, carbohydrates and mineral salts. The aim of producing leather from skin is to preserve the fibrous structures from which the principal characteristics of strength and flexibility arise and to modify the proteins in the skin to avoid decay in damp conditions. Tanning also removes excess bound water and water soluble plasma proteins (such as albumins and globulins that surround collagen fibres) from the skin already given leather increase resistance to micro organisms. In simple terms what this means is that, the skin is made up of excess water that forms bound around the fibrous proteins. The water speeds up decay and to prevent that, tannins which are astringent (meaning it tightens pores and

draws liquids out) either bind and precipitate or shrink proteins and is use to dry the skin and preserve it from decay. (Graham Lampard1997)

Again, to get good quality leathers, the health of the animals' skin or hide that solely mark the type of leather produced and they also depend on the animals' age, sex, breed, feeding habit, climate, and care of the animals.

Bagaruwa is the main tannin use in the tanning process and it is analysed below.

Typical analysis of ground pods with seeds removed:

- 34.2% Tans
- 18.8% Non Tans
- 40.7% Insoluble
- 6.3% Water
- pH of analytical solution: 4.7
- Bagaruwa produces a very soft plump leather of very light colour which remains fairly fast to light.

Typical analysis of leather:

- 34.9% Hide Substance
- 14.0% Moisture
- 11.4% Grease
- 4.9% Sulphated Ash
- 34.8% Tanning Matter
- 7.0% Water Soluble at 25°C
- 28.4% Fixed Tan
- 81.4% Degree of Tannage 81.4%
- 4.3% Insoluble Ash
- 7.3% Moisture
- 0.6% Sulphated ash of water soluble

- pH of water soluble: 3.14
- Shrinkage temperature of leather: 72-75°C (Malcolm J. Lamb 2008)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary of the study

The study sought:

1. To investigate into apprenticeship in leather tanning of selected centres in Ghana and identify their significance in the present day society.
2. To find out how best the apprenticeship programme in leather tanning could be made the preferred programme for the youth in Ghana.

Outline of the problem

Apprenticeship was in existence in Ghana before the coming of the Europeans (1452). Sons were trained to take over from fathers; nephews were trained by chiefs to inherit them when they are no more. Traditional Apprenticeship training has been responsible for 80-90% of all basic skills in the country. (World Bank 2004a:131). One major initiative in Ghana to support skill development in a context of poverty reduction is the STEP Programme implemented between 2003 and 2005. STEP was a government-supported programme to reduce poverty by providing employable skills and other assistance in the form of microfinance to the unemployed. The aim of the activities was to enable beneficiaries to join the formal economy.

Considering the time frame that apprenticeship has been practiced in the country, one would have expected that much could have been achieved in this area, with respect to employment and skill development.

This shows that the apprenticeship programme in Ghana is beset with many problems notwithstanding the many efforts and intervention made by the various governments and non-governmental organisation. Some of the problems include

- Weak training environment
- Lack of demand for the product produced
- Lack of microfinance
- Poor managerial skills
- Weak institutional linkages and
- Lack of post-training support

These have impacted negatively on the indigenous trades such as leather tanning. In spite of the positive factor that is possessed by the apprenticeship in leather tanning programme, it remains the same trade as it was handed down to the present generation.

5.2. Summary of findings

The training of apprentices in the leather tanning industries takes a year. Entry requirements of an apprentice into the industries are very simple, straight forward and some times an amount is charged. The discipline code of the apprentice, forbids practices such as drunkenness, smoking, stealing, chasing of girls, showing disrespect to seniors, master and any one who comes into contact with the tannery. This puts the apprentices in a better position to concentrate on the lessons and become more disciplined

The age for apprentice ranges from fifteen years to twenty-four, and the educational background of the apprentices is not a condition for recruitment. This makes it possible for the grown ups with no skill to acquire one. The apprentices have the opportunity to stay at the tannery and continue to work for the master as a senior apprentice if he is not ready to open up his own tannery.

The indigenous tanneries make use of local and natural resources. This makes it an inexpensive way of tanning leather because all the raw materials and chemicals are mostly found in the environment; therefore the finished product becomes cheaper.

The environments in which the tanners work do not promote industrial growth at places visited. Pits have been dug in the ground, and this is where water is stored and pelts are treated there too. This may lead to fungi attack of both the water and the pelt which will influence the quality of leather obtained at the end of the process. Pollution of the water bodies with waste materials and the land around the tannery is also another serious problem that should be looked at.

Chemicals used for the processing of leather are not measured and this may give different results and different qualities. The process through which the pelt goes makes the leather smell, reduce the value and this account for the rejection of local leather products.

There are no curricula or any reference books on the industry. This has made things worse because there is lack of modernity, pedagogical skills for the teaching of tanning, the introduction of science and technology into the industry. Taboos, over concentration on some animals' skins to the detriment of other skins is also blocking creativity and variety in tanning.

5.3. Summary of conclusions

Tanning as an industry has not been given the necessary attention that it deserves and because of that the youth are not interested in the industry and yet the country complains of unemployment so it is time that we become serious with the traditional industries.

Tanning has been done for over hundred years in many countries including Nigeria and the profession has not remained the same in those countries, so it will be better to learn from those countries that have gone ahead of Ghana.

The manufacturing industries that use the finished product of the tanners as their raw material should take keen interest in the training of the apprentice to improve their skills. This will ensure them of regular supply of leather and reduce the high cost of import tax that they pay on the importation of leather. Government can set up an industrial fund out of the taxes collected from manufacturers to train the apprentice to improve their skills

Ghanaians should be well educated on the fact that skins of animals can generate a large leather market, so as they take leather as a delicacy there will be a time that all leather will be imported. Tanners should diversify their source of raw material from goat and sheep so as to get sufficient skins and hides for the production of leather requirement of the country and the export market.

Books should be written on leather tanning, describing the procedure of tanning and the chemicals used; this will go along way to develop new methods and chemicals through research. The industry cannot modernise if research is left out.

5.4. Summary of recommendations

Apprenticeship should start at the age of 15 years. This should be strictly observed. The youth should be trained at special training centres in various skills to make them skilful for the job market and to raise productivity. The government and the private sectors should finance the training of the apprentices and make training accessible to both the rural and urban populations

Vocational subjects should be introduced as part of the apprentices' regular academic curriculum. Again there should be a provision of pre-employment training in employable skills concerning the traditional trade in the institutions

Masters should be periodically trained to acquire skills and methodology of training young apprentices in the acquisition of skills and when apprentices graduate, they should be awarded certifications to show that they have attended a professional training.

Funds should be secured for the proper construction of sites for tanning; this should have proper vents built for the soaking of pelt, application of chemical and dyeing.

REFERENCES:

- ❖ Chippewa Valley Technical College [http:// www.cvtc.edu/pages/646asp](http://www.cvtc.edu/pages/646asp)
- ❖ Development Document For Effluent Limitations Guidelines And Standards For The Leather
- ❖ Dragoona:<http://www.alpharubicon.com/primitive/tanningdragoona.htm> 2003
- ❖ Enchanted Learning com (2001-2009)<http://www.enchantedlearning.com/Home.html>
- ❖ Graham Lampard(1997) Grad student Leather Technology, British School of Leather Technology webadmin@www.madsci.org
- ❖ Bienkiewicz K., Physical Chemistry of Leather making, Krieger Publishing Co., Malabar, FL, 1983.
- ❖ Kent Simmons (2008) <http://kentsimmons.uwinnipeg.ca>
- ❖ Given Lisa M. (2008) The SAGE Encyclopedia of Qualitative Research Methods Volumes 1 & 2 SAGE Publications, Inc.
- ❖ Malcolm J. Lamb (2008)The Hausa Tanners of Northern Nigeria and the production of Sokoto tanned goatskins: <http://www.hausa%20tanners.pdf>
- ❖ McWilliams, Kwame-Poh, (1975) The development of education in Ghana Longman, London. (pp 5-7).
- ❖ Coy Michael William, (2000) Apprenticeship from Theory to Method and Back Again, Sony Press. <http://www.sunypress.edu/index.asp?> (p13)
- ❖ Microsoft Encarta (2007).
- ❖ Robert Palmer, (2008) Apprenticeship in the informal economy in Africa. Geneva, ILO, <http://www.ilo.org/publns> (p 41)

- ❖ Roy Thomson ,Walsall Leather Museum (2006) leathermuseum@walsall.gov.uk
- ❖ Thorstensen, T. C. (1993) Practical Leather Technology, 4th Ed., Krieger Publishing Co., Malabar, FL.
- ❖ Telecon, A. Marshall, Midwest Research Institute, with F. Rutland, Environmental Consultant, Leather Industries of America, August 7, 1996.
- ❖ The New Encyclopaedia Britannica 15th Ed. Volume 11, (2003) Chicago (p 546).
- ❖ The world Book Encyclopedia L Volume 12, 2001World Book, Inc a Scott Fetzer Company, Chicago. (pp 166-169)
- ❖ Wikimedia (2007): <http://en.wikipedia.org/wiki/Tanning>.
- ❖ World Bank,(1995) Republic of Ghana Vocational Skill and informal Sector support Project, Staff Appraisal Report No.13691-GH (Washington, DC)

APPENDICES

Interview schedule:

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
QUESTIONNAIRE FOR THE MASTER OF THE TANNERY

These are questions to appraise the performance of the apprenticeship programme in leather tanning industry.

Please tick or respond to these questions by supplying the relevant answers in the space provided. Since the exercise is purely academic, all information given would be treated as such, and with all the confidentiality it deserves for it to be of benefit to us all

Personal Data

1. How many years have you been doing this work?
.....
2. What is your duty in this tannery?
3. How old are you?

Data on Tannery

1. In your estimation can you tell the year in which this tannery was started? Yes No

If No skip question 2

2. In what year was this tannery established?
.....

Data on apprenticeship

1. How many apprentices are there in this tannery presently?
.....

2. What is the age of the oldest apprentice in this industry?

.....

3. What is the age of the youngest apprentice in the industry?

.....

4. How do you attract apprentice into this industry?

.....

.....

.....

5. When taking people on for training as apprentice do you consider their age? Yes No

If is No skip question 6.

6. What is the age range for people taken on for training?

a) 15-20years

b) 21-25years

c) 26- 30years

d) Others specify.....

7. Do masters enter into any contractual obligation with the apprentice? Yes No

if answer is No skip question 8.

8. What is the contractual obligation like?

.....

.....

.....

.....

9. How are apprentices introduced to the job or training?

.....
.....

10. How many years does it take an apprentice to become a master?

- a. Below 1 years
- b. 1 years
- c. 2 years
- d. Above 2 years

11. Is it compulsory for the new apprentice to be formally educated before taken? Yes No

If No skip question 12

12. What is the minimum academic requirement for the apprentice?

- a. Primary school
- b. Junior high
- c. Senior high school
- d. Drop outs at all levels (If 'd' give reasons)

.....
.....
.....

13. What is the work schedule for the apprentice for the

- a. First

time.....

.....

- b. Second

time.....

...

.....
.....
.....

14. What are the entry requirements (with respect to tools, uniform etc.) for the newly recruited apprentice?

.....
.....
.....

15. What are some of the rights enjoyed by the apprentice? (example, Right to breakfast, Lunch)

.....
.....
.....

16. What are some of the forbidden practices among apprentices (example, no right to talk to strangers?)

.....
.....
.....

17. Do you have any disciplinary measures to control recalcitrant apprentice? Yes No If yes explain

.....
.....
.....

18. As an industry, do you have any taboos? Yes No if no skip question 22

19. What are the Taboos?

.....
.....
.....

20. What are some of the challenges you face as a master?

.....
.....
.....

21. What is the way forward?

.....
.....
.....
.....
.....

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
QUESTIONNAIRE FOR THE TRAINER ON THE TANNERY PROCESS

These are questions to appraise the workings of the leather tanning industry.

Please tick or respond to these questions by supplying the relevant answers in the space provided. Since the exercise is purely academic, all information given would be treated as such, with all the confidentiality it deserves for it to be of benefit to us all

Tannery process

1. What kinds of animal skins do you tan into leather?

.....
.....
.....

2. In your estimation how many animal skins do you tan a day/week.

.....

3. How many days do you work in a week?

a. days

b. 7days if 'b' skip question 4

4. Are there any day(s) that you do not (The whole tannery) work due to taboos?

.....
.....

5. How many hours do you work in a day?

.....
.....

6. Where do you get the raw pelt?

.....
.....
.....

7. After tanning the skins, where do you send them?

.....
.....

8. Can you give some of the processes through which the raw pelt goes through before it become

leather.....
.....
.....
.....

9. What chemicals do you use in tanning the skins?

.....
.....
.....

10. What is the source of your chemicals?

.....
.....
.....

11. How do you measure your chemicals for use?

.....
.....
.....

12. What are the various methods you employ in tanning?

.....
.....
.....

13. Is there any method of tanning that you know but do not use?

.....
.....
.....

14. How many days do you use in tanning a pelt?

.....
.....

15. How much is a pelt sold for, if you buy from the market?

.....
.....

16. How much do you sell leather for?

.....
.....

17. Do you buy leather from outside to resell? Yes No If no skip question 18

18. Give the quantity and why?

.....
.....

19. What is the significance of tanning under the following headings

a. Cultural.....
.....
.....

b. Economic.....
.....
.....

c. Social.....
.....
.....

d. Academic.....
.....
.....

e. Political.....
.....
.....

20. What challenges do you face in the tanning industry?

.....
.....
.....
.....
.....

21. What are your future plans for the operation of this industry?

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
QUESTIONNAIRE FOR THE APPRENTICE OF THE TANNERY

These are questions to appraise the workings of the apprenticeship programme in leather tanning industry.

Please tick or respond to these questions by supplying the relevant answers in the space provided. Since the exercise is purely academic, all information given would be treated as such, with all the confidentiality it deserves for it to be of benefit to us all

Person Data

1. What is your age?
2. What is your highest educational level?
 - a. Primary school
 - b. Junior high
 - c. Senior high school
 - d. Drop outs at all levels (If 'd' give reasons).....
.....
3. How many years will you spend here in learning this vocation?
.....
4. What were you doing before you joined the tannery?
.....

Work Details

1 How long have you been on the training?

2 Why did you decide to choose this vocation/profession?

.....
.....
.....

3 Are you related to any of the masters in this industry? Yes No

4 What are your duties as an apprentice?

.....
.....
.....
.....

5 What changes would you like to see in this vocation?

.....
.....
.....

6 What will you like to do when you graduate?

- a. Stay here and work with your master.
- b. Set up your own tannery.
- c. Join other tanneries.

- d. Stop and find another work.
- e. Undecided.

Give reason for your answer to question 7

.....

.....

.....

7 What do you like about this work?

.....

.....

.....

Questionnaire:

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
QUESTIONNAIRE FOR LECTURERS IN LEATHERWORK

These are questions to appraise the performance of the apprenticeship programme in leather the tanning industry.

The information provided will enable the researcher to appraise the performance of the apprenticeship programme in the leather tanneries in Ghana. Your ideas and views will also help in the analysis and writing the Research Report.

Please tick (✓) or respond to these questions by supplying the relevant answers in the space provided. Since the exercise is purely academic, all information given would be treated as such, and with all the confidentiality it deserves.

I thank you for your kind co-operation.

Personal Data

1. How many years have you lectured in leatherwork?
 - a. Less than 2 years
 - b. 2-4 years
 - c. 4-6 years
 - d. Above 6 years

2. Have you worked with an apprentice in the leather industry before? Yes [] No []

3. What is your knowledge in leather tanning? Excellent[] Very good[] Good[] Satisfactory[]

Data on Tanning

1. In your estimation what is the performance of the leather tanning industry in Ghana?

Excellent[] Very good[] Good[] Satisfactory[]

Explain your

answer.....

.....

.....

.....

2. Is there any new way of tanning, which is not known to the leather tanning industry in Ghana?

Yes [] No []

Give

details.....

.....

.....

.....

.....

.....

.....

3. Are there any new tannin (chemical for tanning) you know but is not known to the leather

tanning industry in Ghana? Yes [] No []

Give

details.....

.....

.....
.....
.....
.....
.....

4. What are the strengths of the leather tanning industry in Ghana?

.....
.....
.....
.....
.....

5. What are the weaknesses of the leather tanning industry in Ghana?

.....
.....
.....
.....
.....

Data on apprenticeship

6. Do apprentices in leather industry get the best of training in Ghana? Yes [] No []

Explain your answer.....

.....
.....
.....

7. What are the strengths in the training of apprentices in the leather tanning industry in Ghana?

.....
.....
.....
.....
.....

8. What are the weaknesses in the training of apprentices in the leather tanning industry in Ghana?

.....
.....
.....
.....
.....

9. In what way can the leather tanning industry be improved to meet the growing demands for leather articles?

.....
.....
.....

10. State additional comment, view or suggestion that can be shared on the topic?

Comments.....

.....

.....

.....

.....

.....

.....

.....

.....

Views.....

.....

.....

.....

.....

.....

.....

.....

.....

Suggestions.....

.....

.....

.....

.....

.....

.....

.....

.....

Observation Guide:

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY OBSERVATION SCHEDULE FOR THE TANNERY INDUSTRY

These are questions to appraise the performance of the apprenticeship programme in the leather tanning industry.

The information provided will enable the researcher to appraise the performance of the apprenticeship programme in the leather tanneries in Ghana.

1. Who is an apprentice at the tannery and what are his obligations?
2. What do the apprentices do with respect to their work schedule?
3. How many apprentices are there in each tannery visited?
4. How are the apprentice trained in the various processes of tanning?
5. Who are the trainers at the tannery and what is their work schedule?
6. Under what condition do apprentice work?
7. What are the states of physical infrastructure at the tannery?
8. What is the environment like at the tannery?
9. What chemicals are used in the tanning processes?
10. How do pelts react to the chemicals used at the tannery?