ASANTE BRASS CASTING

Lost-wax casting of gold-weights, ritual vessels and sculptures, with handmade equipment

Christine Fox

CAMBRIDGE AFRICAN MONOGRAPHS 11

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With an introduction by T.F. Garrard

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The African Studies Centre was founded in July 1965 to facilitate interdisciplinary research and teaching on modern African studies in Cambridge. The Centre publishes the Cambridge African Monographs series and the Cambridge African Occasional Papers. The aim of these series is to make available occasional research reports, seminar papers, conference proceedings and bibliographies relating to African studies.

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The African Studies Centre is pleased to be able to publish her account of Asante brass casting as its first contribution to promoting awareness of visual arts in Africa.

J.B. Sender
Director

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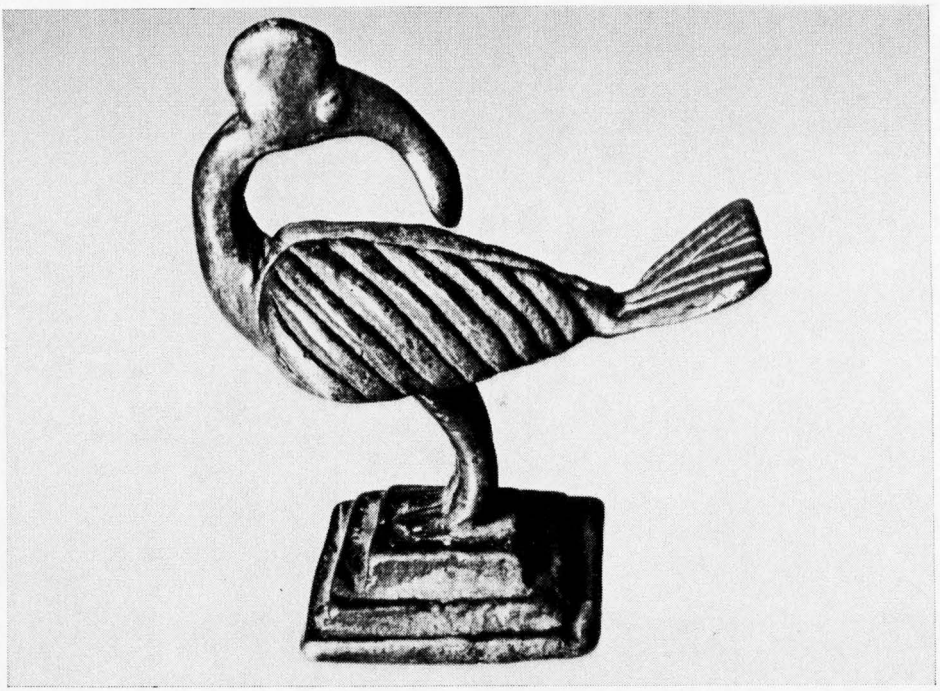

Frontispiece. Sankofa bird, 3.5 cm. Proverb: 'It is not forbidden to look back and take it.'

This book would not have been written without the help of Mrs Peggy Appiah for through her I was able to meet a craftsman of the quality of Amadu Kramo and to study and handle the gold-weights from her very fine collection. I am further indebted to many specialists who helped me whilst I was in Ghana and since returning home, especially T.F. Garrard for his introductory chapter and support and Dr Polly Hill for her practical encouragement. But most of all I must thank Amadu Kramo for the quality of his teaching, and for his patience and humour whilst I learnt, without whose help this book could not have been considered.

Measurements are given in order of length, width and height.

Technical words are listed in the glossary.

Twi, the principal Akan dialect of Ghana, is given in italics after a selected number of words. They are also included in the glossary.

CONTENTS

LIST OF PLATES

Plates 9, 10, 11, 13, 14, by James Austin. - All other plates and illustrations by the author.

LIST OF FIGURES

INTRODUCTION

The historical background to Akan gold-weights

Timothy F. Garrard

Metal weights for the weighing of gold-dust and nuggets have been used in many parts of the world, but nowhere did they assume a more remarkable range of forms than among the Akan peoples of Ghana and Ivory Coast. The brass weights of the Akan are justly famous, for they were cast with consummate skill and many portray, in miniature, aspects of this West African society as it existed several centuries ago. But there is very much more to these weights than meets the eye; behind them lies a fascinating page of West African history.

The Akan are a large group of related peoples, today numbering six or seven million, who live in central and southern Ghana and the eastern part of Ivory Coast. They include the Asante, Fanti, Akyem, Brong, Sefwi, Anyi, Nzima, Baule and other groups, all of whom made brass gold-weights. Unlike their neighbours to the east and west the Akan adopted a currency of gold-dust which was used up to the end of the nineteenth century. Amounts required for purchases in the market-place were weighed out with infinite care, and for this purpose huge numbers of brass weights were made – it has been estimated that

not less than three million genuine Akan brass weights still survive today. The weights fall into two broad groups, often described as geometric and figurative. The geometric weights consist of relatively simple shapes decorated with a remarkable range of abstract designs. The figurative weights are in the form of human figures, animals, birds and fishes, insects, fruits, seeds and snails, drums, cannon, shields, fans, sandals, horns, stools, domestic implements and a great variety of other artifacts. In many cases these are intentional representations of Akan proverbs (known as *mmebusem*), and for that reason they are sometimes referred to as 'proverb-weights'.

In past centuries large numbers of Akan gained their livelihood by panning for gold and digging pits and mines. By the seventeenth century, when production seems to have reached its height, there were probably forty or fifty thousand Akan engaged in this work each season, and their annual output in good years may have amounted to 50,000 ounces, or about 1 1/4 tons of gold. The wealth of the Akan region, though exaggerated by some writers, was impressive, and it gave rise to a flourishing trade. Merchants were attracted from the commercial centres of the Western Sudan, and through the hands of these men, notably the Mande, Akan gold found its way overland to Timbuktu and Jenne, and ultimately by the trans-Saharan routes to North Africa. From the fifteenth century onwards European nations also competed in the trade, and their agents carried back even greater quantities of Akan gold by the sea routes.

There are, in addition to a number of minor gold-fields, three major sources of gold in West Africa – the gold-fields of Bambuk, Bure and the Akan region. When these auriferous regions were first exploited is still not entirely clear, but enough is known to make possible an intelligent guess. Various writers have speculated, optimistically, that the trans-Saharan gold

trade existed in Roman times, or even earlier, but this seems extremely improbable. There is no mention of such a trade in Roman times, even by writers who were familiar with North Africa. Another significant fact appears to have been quite overlooked by historians. Throughout the six-century Roman occupation of North Africa there was (with the exception of one brief period) no gold coinage struck anywhere between the Maghreb and Egypt. It was not until the Vandal invasion of North Africa in the fifth century AD that a little gold seems to have been minted – Vandal copies of Byzantine types, struck probably in Carthage. This was followed, in the sixth and seventh centuries, by a more copious North African gold coinage produced by the Byzantines themselves. The eighth century saw new Arab-Byzantine types, which were superseded in AD 804 by the first purely Arab gold dinars of North Africa. From the ninth century onwards various Arab and Berber dynasties in North Africa produced a spate of gold coinage, and it is evident that by this time the trans-Saharan gold trade was in full flood.

The numismatic evidence therefore suggests that West African gold first began to be exploited on a significant scale about the fifth or sixth century AD. At this time it would have come not from the Akan region but from the more westerly gold-fields of Bambuk and Bure, in the Senegambia region. It was traded by merchants from the Soninke kingdom of Wagadu, better known to us (through Arab geographers and historians) as Ghana. The old kingdom of Ghana (which should not be confused with the modern republic of the same name) continued to exist up to the twelfth century.

Although the Akan were not involved in this early trade, its existence provided a new cultural stimulus in West Africa which ultimately led to the creation of Akan gold-weights. Among the items traded south across the Sahara to be exchanged for gold were copper and brass. Within a century or

two, as supplies of cupreous alloy became more abundant, there can be little doubt that the skills of brass casting were themselves disseminated along the trade routes from North to West Africa. About the same time, North African weights of Islamic standards for weighing gold-dust were introduced to West Africa by merchants from the Maghreb. By the end of the first millennium AD there would have been brass-casting industries in several parts of West Africa, and the use of scales and weights was becoming known over an increasingly wide area.

The Akan enter the picture at a relatively late stage. Archaeological evidence suggests that it was not until the second half of the fourteenth century that a number of small villages along the northern fringe of the Akan region began to develop into prosperous gold-trading towns. Among the more important of these were Begho and Bono-Manso. By this time the older gold-fields of Bambuk and Bure were probably in decline, and there was a significant shift in the gold trade towards the Akan region. The result was the rapid emergence of new trading entrepots (notably Timbuktu and Jenne) along the Middle Niger. By way of these towns, from the late fourteenth to the nineteenth century, great quantities of Akan gold were traded by camel caravan across the Sahara.

We have no certain evidence when the Akan first acquired the knowledge to cast brass by the lost-wax or *cire perdue* method, but it seems reasonable to place this event around 1400 or possibly a little earlier. At the same time, through the emerging gold trade with Mali, the Akan would have acquired their first knowledge of scales and weights of Islamic standard. Supplies of North African brass began to reach the Akan, some in the form of brass bowls and some perhaps as ingots. To the present day a number of Mameluke brass bowls are preserved in Akan towns where they are reverenced as shrines; some

of these bear Arabic inscriptions and have been dated to the fifteenth century.

In 1471 Portuguese mariners reached the Gold Coast, and they found the Akan eager to trade gold-dust for old candlesticks, bracelets and other items of brassware. Soon great quantities of European brassware were being sent out to the Gold Coast, where much of it was melted down and reused. This European metal (much of which originated in Flanders) would have provided a great impetus to the Akan brass-casting industry, and from the sixteenth century onwards craftsmen opened many new workshops in the coastal towns. Previously, little brass would have reached the coastal Akan; it seems unlikely that more than two or three tons a year, at the most, would ever have been traded into the Akan area by the trans-Saharan routes. But Portuguese and Dutch brass imports were on a vastly greater scale, often between twenty and forty tons a year. The evidence suggests that up to the nineteenth century not less than ten thousand tons of European brass reached the Gold Coast. The consequences for the local casting industry can be imagined. With abundant supplies of metal the Akan craftsmen were free to increase their output and develop their talents in new directions. The sudden effloresence of brass casting among the Akan (as at Benin) is to be attributed in large measure to the availability of large supplies of cheap European brass from the late fifteenth century onwards.

Among the Akan there was never any differentiation between workers in brass and in gold. The same group of craftsmen was responsible for all casting work, whether in brass or in gold. They produced an enormous quantity and variety of objects: spoons, ceremonial vessels, rings, bracelets, anklets, beads, pendants, bells, necklaces, chains and other jewellery, animal figures, items of regalia and much else. Although the greater part of their output was and continues to be in brass, these craftsmen are everywhere called goldsmiths in

Ghana today,

The casting technique most commonly used (whether for brass or gold) was the lost-wax method, which is described with admirable clarity in the following chapters of this book. It should not be overlooked, however, that this was not the only casting method known to the Akan. Occasionally, as a variant of the process, castings were made directly from natural objects. Hard-shelled seeds and fruits, snails, crabs, dried fish, small animals, beetles and insects were often used, the object being encased in clay and charcoal and, when completely dry, burnt out in the fire. In some cases the lost-wax and direct casting processes were combined: an oil-palm fruit, for instance, might be cast from nature, attached to a handle formed by a wax model. These remarkable developments in casting technique sometimes achieved outstanding results. They deserve to be the subject of a separate study. Direct casting was not unique to the Akan, however, for it was practised by the Senufo brass casters of northern Ivory Coast, and also in the Middle Niger region, where castings such as groundnuts and grasshoppers have been recovered from ancient graves. In Europe, identical techniques were practised by the goldsmiths of Padua and Nuremberg (especially the Jamnitzer family) from the sixteenth century onwards.

Akan gold-weights were supposed to conform to certain standards of weight, and more than ordinary skill was required to make them to the correct standard. It was not enough merely to mould the design in wax and cast it in metal, for care had to be taken to ensure that the final product had a reasonably accurate weight. This was a difficult undertaking in view of the small size and complexity of many of the castings, but the goldsmith had various ways of solving the problem. If his weight was very much under the required standard he would usually reduce it to the next unit below. If it was

very much over the required standard he might increase it to the next unit above. Where his weight was only slightly above or below the required standard he would adjust it to conform as closely as possible to the intended unit of weight.

The weight of the casting might be adjusted in various ways. The most common method of increasing the weight was to fill a small cavity with molten lead. Alternatively metal rings or small fragments of wire might be added to some convenient part of the casting, or tiny glass beads wedged into the design. Instances are known where quartz crystals, or even small gold nuggets or gold beads, have been used for this purpose. To reduce the weight, corners could be rubbed or filed down or pieces deliberately broken from the casting. Figurative weights often suffered this kind of mutilation. However beautiful and perfect the casting might be, the goldsmith had no compunction in breaking off limbs, horns, ears, tails and other small parts if the weight was not correct. Of course, such adjustments are never carried out for this purpose on the modern 'gold-weights' made for the tourist market today; the modern castings are never made to specific standards of weight since they are not intended for use in weighing gold.

The exceptional skill of past generations of Akan goldsmiths can be imagined when it is realised that the Akan had not less than sixty different units of weight represented by metal weights. Of these, about 39 units of weight were used for ordinary trade; these ranged from about a twentieth of an ounce up to 2.5 ounces. Above 2.5 ounces there were a further 21 or so larger units of weight, whose use was generally restricted to wealthier traders and officials at the chiefs' palaces. European traders often remarked on the skill with which the Akan were able to use their gold-weights, and careful study has shown that the weights were in most cases reasonably close to a

recognisable standard of weight.

The nature of the Akan weight system is of great historical interest. For sixty years European scholars were baffled by the apparent complexity of the system; they resorted to all kinds of elaborate speculations and theories in an attempt to explain it. These attempts were all doomed to failure, being based on inadequate (and sometimes inaccurate) information. Within the last ten years, however, the true nature of the system has been discovered through the weighing of large samples of weights and the interviewing of more than 150 elderly Akan who had themselves been familiar with the use of gold-weights at the end of the nineteenth century. It is now clear that the Akan did not independently invent either the concept of weighing or their own weight standards. Instead, they merely copied the standards used by all the foreign traders with whom they came into contact, and these adopted standards (four in number) eventually came to be combined into one lengthy traditional table containing no less than sixty different units of weight. In brief, the Akan weight system consisted of the fusion of the following foreign series of weights:

(a) the Islamic *mithqal* series as used in Timbuktu and Jenne, based on fractions and multiples of the *mithqal* of 4.5 grams;

(b) the Islamic *uqiya* series, based on an *uqiya* (ounce) of 27.0 grams;

(c) Portuguese or Cologne weight, as introduced by the Portuguese, based on an ounce of 28.7 grams;

(d) the troy ounce of 30.7-31.1 grams, introduced by the Dutch and later commonly used by the English.

Antique European nestweights of Portuguese and troy standard are still commonly found in Ghana, for they were imported in large numbers from the

sixteenth century onwards and many found their way into Akan weight bags, to be used side by side with their own weights.

The gold-weights of the Akan, together with other brassware such as the ritual vessels known as *kuduo*, were made probably over a period of five centuries, from about 1400 to 1900. The earliest Akan brass weights took simple geometric forms, being fairly close copies of types from the Islamic world. Often these have delicate engraved decorations on their surface, and all types were occasionally embellished by copper plugs set into the brass. Stylistic elaboration took place, and, perhaps by the sixteenth century, more purely Akan forms began to appear. These show important changes in technique. The delicate engraved decoration largely disappears, and with it the inset copper plugs; instead, bold designs (often of swastikas and bars) are carved out of the wax model of the weight to be cast in brass. A further decorative technique – with designs formed by applied wax threads – now makes its appearance, and this was greatly elaborated in succeeding centuries.

Early in the seventeenth century, if not before, it seems that the Akan goldsmiths embarked on an even more radical departure from previous traditions. By this time the casting of jewellery and other ornaments in gold had reached a high stage of development. Ultimately the goldsmiths began to create not only abstract shapes but also a range of figurative and other representational forms. These developments in gold-casting almost certainly provided the stimulus for a parallel departure in the casting of brass weights. Much remains to be done in elucidating the changes and dating of gold-weight styles, but for the present we may take it that the Akan began to produce gold-weights of figurative form probably from the beginning of the seventeenth century.

The consequences were far-reaching. To the Akan mind, figurative forms were readily associated with traditional proverbs, of which their society had (and still has) an inexhaustible supply. Some of the earliest figurative weights may not have had proverbial associations, but soon the impulse became overwhelming, and the vast majority of later figurative weights were plainly intended to represent, or to be associated with, Akan proverbs and folklore.

The dynamic nature of Akan art has perhaps been underrated. New influences both from Europe and from neighbouring African peoples were constantly being absorbed; new forms and designs were evolved and added to the Akan artistic repertoire. Between the seventeenth and the nineteenth centuries an astonishing corpus of figurative gold-weight types came into existence. Subtle differences of form and decorative technique began to develop among Baule, Asante and Fanti casters, and much work remains to be done in distinguishing and describing regional styles.

The earliest figurative weights, dating probably from the seventeenth century, tend to be bold and simple, and they often represent aspects of military strength or royal power. They appear to have the definite purpose of indicating the power and strength of the Akan state. By the eighteenth century there was a proliferation of types. Goldsmiths showed their skill in the creation of new forms, some of which are ornate and complex pieces of casting. The increasingly detailed execution of many of the castings may reflect the elaboration of the Akan social structure which accompanied the rise of the Asante empire after 1700.

The eighteenth century saw far-reaching social and political changes among the Akan, and there was a great deal of cultural assimilation after the various Asante conquests. Following the defeat of Denkyira in 1701 the Asante carried off many of its best craftsmen and forced them to work in Kumasi where,

according to one tradition, they taught the Asante how to make brass weights as well as items of state regalia. After the Asante victories over Tekyiman in 1723 and Akyem in 1742 many goldsmiths from these areas were also taken to work in Kumasi. Many of the finest brass weights were undoubtedly produced at this time, and as Asante became increasingly the centre of the Akan world, there is no doubt that it also became the centre of cultural innovation. The Asante kings required that their status be reflected in art forms of the highest quality, and skilled goldsmiths were sought out from every corner of the empire. With the arrival of captive craftsmen from the conquered states there was a mingling of diverse cultural influence from north and south.

Up to about 1870 the work of Asante goldsmiths achieved a great variety and exuberance. Many influences combined to create a new art which broke away from the more restrained traditional forms of the past. During this period many more Asante became goldsmiths, and the new artistic stimulus which had such a pervasive influence among the Akan was at its strongest in Asante. However, the 1870s saw the beginning of disastrous political troubles in Asante. Kumasi was entered and sacked by Sir Garnet Wolseley and his troops in 1874, and the old Asante empire began to disintegrate. Many of the tributary states threw off their allegiance, trade was ruined and the arts and crafts began to decline. In these years of doubt and confusion artistic standards could scarcely be maintained, and it is unlikely that many fine gold-weights were made after 1874.

The use of gold-dust and nuggets as currency on the Gold Coast was forbidden by law in 1889, while the use of Akan weights became illegal in 1896. By this time European commercial gold-mining was rapidly replacing the traditional Akan methods of production. English coinage and weights were imported, a system of annual inspection of weights was introduced and to

some extent enforced, and these various developments spelt the doom of the age of Akan gold-weights. By 1900 the use of gold-dust and Akan weights had all but ceased.

In the 1920s R.S. Rattray observed that in Asante 'gold-weights are not now the indispensable possession of every adult male; these weights are now only made, when made at all, to sell as curios to the European collector'. By this time many of the goldsmiths' skills had been neglected and the art of brass casting had declined. When Rattray commissioned some Asante metal workers to make copies of gold-weights for the British Empire Exhibition, he found that brass casting was no longer taught: 'The metal workers who were collected around me to make their series of castings ... were sadly out of practice. Faulty castings were numerous and the failures were costly; the results too were not comparable with the castings of former times.'

Although close to extinction at that time, Asante brass casting somehow survived and in recent years has experienced something of a revival. The commercial possibilities were soon realised, and a number of Akan goldsmiths began to make inferior copies of the gold-weight types most in demand from European collectors. These copies were principally human figure types, which could be readily distinguished by their poor modelling and the indifferent quality of the castings. In recent years there has been a marked improvement in the quality of some of these copies, and today there are a few master craftsmen at work whose castings can justly be compared with the products of former centuries. It now seems likely that under the stimulus of the tourist trade and the international art market, brass casting will survive in Asante for some years to come, despite difficulties caused by the diminishing supply of good quality brass.

Asante metal-casting techniques were first summarised by Bowdich as long ago as 1817, and there have since been fuller descriptions by Rattray in the 1920s and Brigitte Menzel in 1968. The present study by Christine Fox is, however, unique in several respects. Never before has a European served a traditional apprenticeship to a Kumasi brass caster, or been able to observe the secrets of his craft over a period of several months. Only a few years ago such an apprenticeship would have been regarded as unthinkable, and indeed, no Asante woman has ever been permitted such a privilege. That such an opportunity was permitted to Christine Fox indicates the remarkable trust which she was able to inspire among the brass casters of Kumasi, and the high regard in which she is held among them. This volume is the result. It contains the most detailed description yet published of Asante brass-casting technology, and one whose value is increased by the fact that its author is a practising sculptor familiar with the mysteries of her craft.

CHAPTER I

My apprenticeship with an Asante brass caster in Kumasi

This is the account of my three months' apprenticeship to a gold-weight caster near Kumasi in Asante, Ghana, during the months January to March 1976. The old Akan gold-weights (*abrambo*) of West Africa had attracted my interest over many years, particularly the figurative weights, to which this book relates. These show people and creatures, many have a proverbial content and give varied and amusing portrayals of aspects of African life.

The brass Sankofa bird (*dwoa*), shown in the Frontispiece, is only 3.5 cm high, and one of its associated proverbs is 'It is not forbidden to look back and take it', for looking back over its body it suggests one should not be reluctant to return to recover a situation which has gone badly; it is sometimes called '*nim sa*' or 'had I known that'. Such proverbs represent a distillation of traditional knowledge and are often included in Ghanaian conversation, with many a chuckle of understanding when they are altered slightly to suit the context. This Sankofa bird was probably made in the nineteenth century, and has been worn smooth in use. The fine rolls of wax were spun and twisted into legs, neck, beak and wings making a fine abstract shape. Many ancient examples of Akan gold-weights can still be seen and purchased around Kumasi, and the casting of these gold-weights with fine spun threads, some

less than 0.5 mm thick, are amongst the finest in West Africa.

As a sculptor in Cambridge I had for many years worked in *cire perdue* techniques and developed my own methods of bronze casting. Dissatisfied with the noise and dirt of industrialised processes in English foundries and alarmed by their rising costs I planned a visit to Kumasi, the capital of Asante, in mid-Ghana, to study their simpler traditional methods of lost-wax casting in brass and hoped to be apprenticed to a craftsman who would guarantee the thorough understanding and completion of each aspect of the work. Mrs Peggy Appiah was fortunately well acquainted with a fine goldsmith (*sika dwumfo*) of artistic ability and complete integrity. Although such work is forbidden to Asante women, as a stranger and an older woman I hoped to be accepted.

On my arrival in Kumasi I called at Mr Amadu Kramo's house, hoping that he would indeed accept me as an apprentice, but I found that he was working on his cocoa farm in the Enchi area of the Western Region, which he visited at certain seasons. He arrived a week later and, together with an interpreter, we met at Peggy Appiah's house and arranged that I should work for the following three months from 8 a.m. to 6 p.m. for three days weekly. This permitted me to meet my expenses by working for two days weekly teaching sculpture at the Art Faculty in the Kumasi University of Science and Technology. I was to learn to make not only gold-weights of both figures and birds, but also gold-dust containers, and boxes with legs and hinged lids (known as *kuduo*) and a hollow sculptured lion. I omitted to ask for direct casting of natural objects and therefore this was not included in my apprenticeship. The fee was to be 60 cedis, the official exchange rate in 1976 was 2.31 cedis to the £. Also an exchange of gifts would follow should the apprenticeship prove satisfactory. The fee included the cost of libations to the ancestors to call on their spirits and no doubt to appease any wrath arising

from my sex. Libations were also poured over the set of bamboo tools prepared for my use. In accordance with tradition, part of the fee would go to his previous master.

The following morning at 8 a.m. I arrived at the compound, in the Ahinsan area of Kumasi, where Amadu Kramo both lived and worked. It was filled with interested men, women and children, as eight families lived in this compound, each renting a single room with an area of veranda within the compound, and everyone wanted to meet the European woman who was to be apprenticed in their compound. The families shared a cooking, washing and toilet area at one end of the compound to which water was carried from outside. One large butt of water stood beneath the veranda by each front door, for these butts were filled in the cool of the mornings and evenings from basins filled at a public tap some distance away. One man who worked elsewhere during the day, unpadlocked his butt on returning home in the evening, so precious were the contents.

The families conducted their main social life in the large open yard within the compound, where the inhabitants greeted me on my arrival, elegantly attired for the occasion in brilliant coloured cloths carrying many extravagant designs of great beauty and vivid colour. I was introduced to Kramo's second wife with her three children, one of them a week old baby dressed in white. Then my formal apprenticeship began.

Throughout the day we worked with wax at a small wooden table, each with a small work board, seated on small Akan chairs made from hardwood with goat skin seats and backs. As the day progressed we moved with our equipment round the shady edges of the compound to avoid the intense sun, stopping only to partake of plantain fried on charcoal at 11 a.m. and spicy yam dishes for lunch, varied by my own contributions.

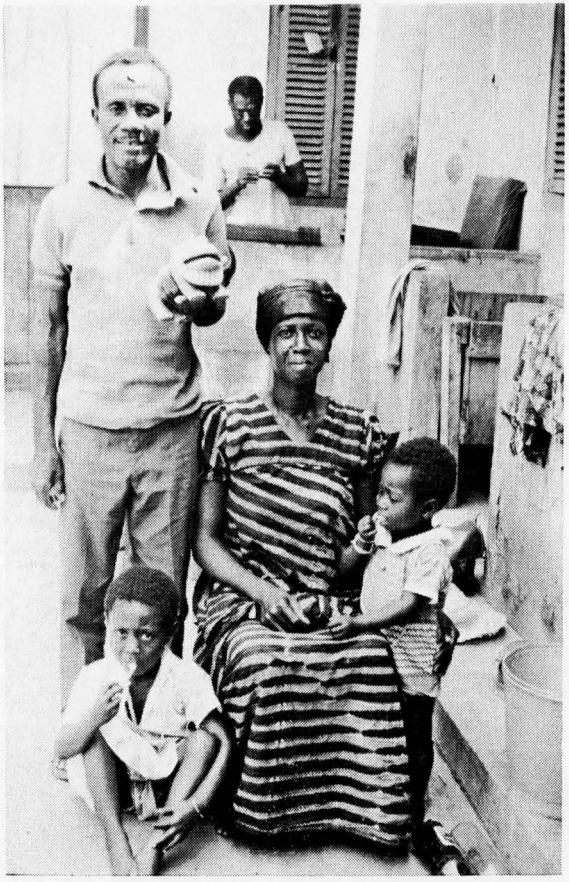

Plate 1. Amadu Kramo with his wife and children.

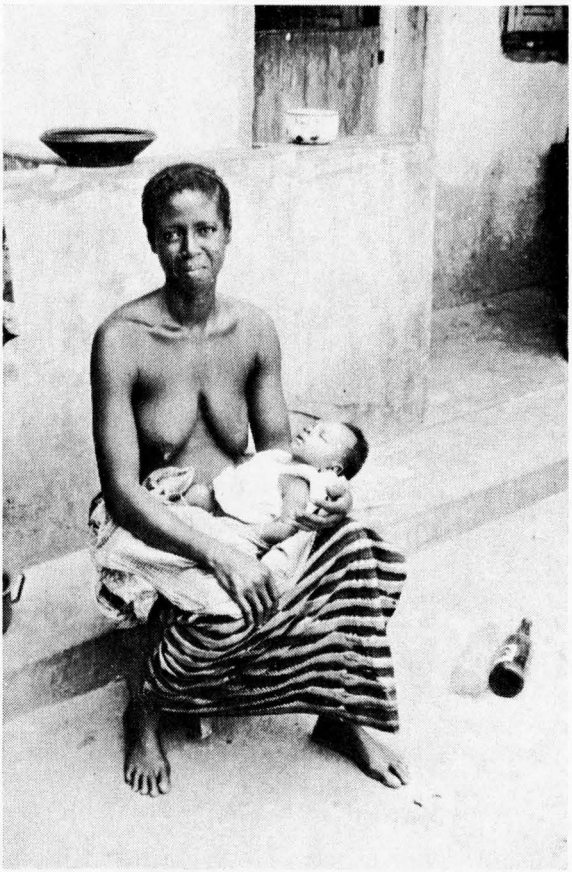

Plate 2. Amadu Kramo's wife with her new baby, who has white beads to measure her growth and white marks on her forehead to seek health and beauty.

Within a fortnight we realised that the lack of a common language was no barrier to our communication. I watched each technique he used when working in wax once, and copied it, and then I watched again, with greater intensity gained from experience. Finally, I rolled and formed the wax in harmony with my master until I had perfected his technique. This apprenticeship demanded that my wax figures should appear identical to his, for if my work was different it was either destroyed or corrected by him. When identity was achieved he put my work in a small can with his own, in the cool shade, in which a variety of limbs and other parts of human figures, animals and birds accumulated. As I disciplined myself to the severity of his teaching, so unlike any European art training, I slowly learnt to respect him and the precision of his workmanship. I admired the naturalness of his methods and the consideration and love given to the final form of each figure, however small. Each sculpture had a fine artistry resulting from his unhurried approach and the miniatures were works of high quality.

Soon the compound relaxed and became a hive of industry, humour and games, I had become an accepted variation of the norm. The women, now my friends, wore waist cloths which could be lifted and knotted beneath their arms if they left the compound or if strangers appeared. The children played naked in the heat, small girls wearing waist beads. Older girls and women still wear these beads hidden beneath their cloth, and these were in earlier days the support used for underwear. The beads are loved by both sexes and are sold in vast quantities in the huge Kumasi Central Market. Some of these glass beads are still made in small brick ovens fired with hardwood in villages around Kumasi.

My master's baby daughter usually lay naked on her white cloth with white beads added weekly to the strings around her wrists, ankles and waist.

These added beads measured her growth and health, making the use of weighing scales unnecessary. Later, a white line was drawn between her brows in search of health, then white dots were added on either side of her forehead for beauty, as shown in Plate 2.

I became a part of their compound, sharing their moods and making my own contributions of interest and food. I sewed rag dolls and made small toys from discarded food tins, with typewriter reels for wheels; these were improvised in the evenings from scrap, in the hope that older children would invent toys using compound refuse. So, for the first time, I saw the children playing with toys instead of merely imitating adults' actions and work. Many a slap was earned when the children overstepped the limits of their play, using too precious a utensil, a breakable article or a forbidden tool from the casting area. Throughout the day girls learnt domestic skills by an imitative process similar to my apprenticeship, but the toys extended their imagination and added to their delight and pride.

Girls and women lovingly plaited one another's hair in an endless variety of designs; oil and a black antiseptic lotion were worked well in to make the hair clean and shine with an even blacker lustre. Different foodstuffs were crushed to be made tender, particularly the preferred yam which was pounded for long periods in the carved wooden mortar by young women with long wooden pestles, rhythmicly pounding and quietly singing. Women cooked meals squatting before their charcoal fires, and clothes were constantly washed. The smaller children were scrubbed as vigorously in basins of cold water, the soap from their rubbed hair streaming down their heads and dark gleaming bodies, regardless of their hurting eyes – but the howls of the smallest children soon subsided as they learnt to close their eyes in time. The rapidly instructed older children were ever anxious to assume their parental duties, scrubbing and

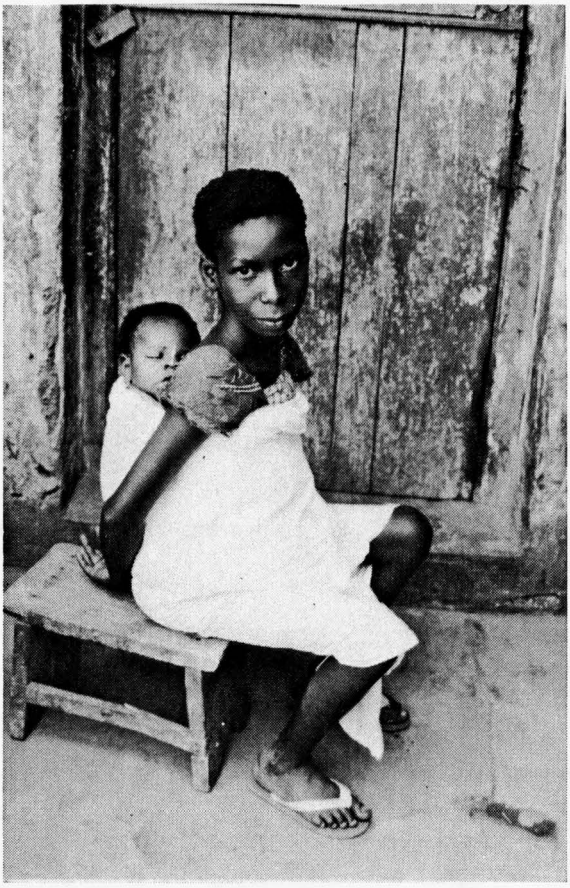

Plate 3. Young girl with baby.

carrying the youngest child. The men were usually out at work, and when they returned home often replaced their more Europeanised dress with loose wrapped cloth (*ntama*) for their leisure time. More elegant *ntama*, some 4 or 5 yards long, was worn on special occasions, such as weddings and funerals, when the men's dignity of movement was noticeably increased. Locally made sandals, bought at the market, might match the cloth, each occasion having its own limitations of decoration and colour. The beautiful deep red and orange worn together with black at funerals and memorial services made such occasions a wealth of colour and warmth, where dirges and drumming, praises and dancing, helped to give the deceased a fitting send-off.

With minimal equipment I worked the three days weekly from 8 a.m. to 5 p.m. until, exhausted by concentration and tropical heat, I left my master to continue work until 6 p.m. over the hot charcoal fire. Throughout this time I recorded detailed accounts of each process and photographed their completion, so making the basis for this book. There was no interruption until, towards the end of March, torrential rain announced my master's approaching return to his first wife and family at his cocoa farm. We retreated to the cramped veranda with our equipment, and then collected water from the roof overflows, topped up the butts outside each door, scrubbed down the compound floor and filled the basins for the evening wash. Women and children dislike carrying water from the tap, so when the rains came the men, for once, became willing helpers, and the children danced, sang and shivered in the rain.

Towards the end of my apprenticeship I made the appropriate gift, showing appreciation and satisfaction over my training: in my case a good watch, as well as several European casters' tools, which were received with pleasure. I received surprise castings of animals and much affection from the children and my friends, so that I felt I was indeed leaving good friends, though we could

still exchange few words. I knew I had been privileged to find myself working in such a calm and civilised compound, away from the noise and dust of European factories, and felt well satisfied with my apprenticeship.

CHAPTER II

Traditional uses of gold-weighing apparatus and described ritual objects

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The apprenticeship in gold-weight casting that I followed was based on old traditions, and the ancient methods of using these weights were shared by many African countries. By the nineteenth century the Akan *sika dwumfo* had developed an artistic style in Kumasi, where the Court of the *Asantehene* (King of Asante) had attracted traders (*obatani*) in gold (*sika*) from many countries.

The Kumasi Market (*egua*) which exists today, was then equally flourishing, and it was the practice in all market transactions for which gold-dust (*sika futuru*) was currency, for both buyer and seller to weigh the gold on their own pair of scales, using their own gold-weights. The chief (*ohene*) in the area was expected to have gold-weights that weighed the gold in his favour. No doubt the practice spread to others in a less privileged position, who endeavoured to use light weights for paying out and heavier weights for receiving payment of a debt. Bargaining would therefore have resulted with many humorous arguments, as it does in Ghana today.

Each merchant (*oguadini*) carried a soft leather pouch, in which he kept a group of gold-weights, which might vary in number from several dozen to

over a hundred. The weighing apparatus included pairs of scales (*nsenia*), sometimes called *frama nsenia* (wind-scales) since even a breath of wind would disturb the balance. These scales have two circular pans suspended from threads of fibre from a horizontal brass beam, see Plate 4. The scales are suspended centrally from the beam on a long thread which was looped over the left thumb as a precaution against fraud.

Small spoons (*saawa*) were used for lifting the gold-dust onto the scale pan, and other spoons were perforated for use as sieves (*huhuamoa*) for sifting the gold-dust. When payment was made, the gold-dust would be placed on a shovel (*famfa*) or blow pan, to be blown gently to remove any grains of dust or sand before the gold was placed on the scales. A brush or feather was used to collect the finer particles of gold-dust which would be kept in a small twist of cloth (*nweraa*), itself stored within an *adaka* or little chest. The cast box shown in Plate 19 had eight flanges to enable firm tying of the gold-dust box. The scale pans and shovels were made of imported sheet brass often carrying engraved circular designs but the spoons can be found both in ornate cast brass or more simple sheet brass.

A quill or the shell of a snail would be included in the trader's apparatus if he was a panner of gold-dust, for these were used as temporary storage of gold-dust whilst seeking gold in the field. A touchstone (*twaboo*) was also used by most traders for testing the quality of gold nuggets (*sika po*).

All this equipment was packed with great care within a cloth and further protected within a piece of antelope skin or other softened leather, then the whole was tied as a firm package with a leather thong or plant fibre. The complete package, known as a *futuo*, rarely left the possession of a wealthy trader. Indeed, he believed that a part of his soul (*kra*) was contained within the package, and during the annual *Odwira* festival the owner's *futuo* was

included in the purification ceremony.

The women of Ghana have always been vigorous traders, and it is surprising therefore that women in the past are thought to have rarely owned their own *futuo*, containing weights. But opinions vary between assertions that no woman owned a *futuo*, to the possibility of a woman inheriting one from her deceased husband. However, evidence also points towards the use of small weights by women during trading. At this time coinage was unknown to the Akan, so that any transaction, even the buying of fruit in the market, would be through the laborious weighing of gold-dust with scales and gold-weights. The gold would be measured over the skin of an animal for fear any was spilled, for any gold falling to the ground of the Kumasi market became the possession of the *Asantehene*. This was gathered up only on occasions of need or crisis in the State.

In the nineteenth century the British were gradually extending their influence in the Gold Coast, and in 1874 Wolseley sacked Kumasi, demolishing its buildings and demoralising its citizens. The British later exiled the Asantehene Prempeh, and forbade the use of gold-dust as a currency and made the use of gold-weights as a weight system illegal. English coins and weights were imposed, and the use of gold as currency soon ceased. By 1920 Rattray reports that gold-weights were rarely made and then only to sell as curios to European collectors, and their workmanship was of very poor quality. Rattray himself encouraged a revival of interest in metal casting, fortunately before knowledge of this art had been lost. Today, though there are still some gold-weight casters in Ghana, most have been corrupted by the tourist trade. Master craftsmen are difficult to find whose workmanship can be compared with the skill of their predecessors, since use and significance of the weights have little meaning today.

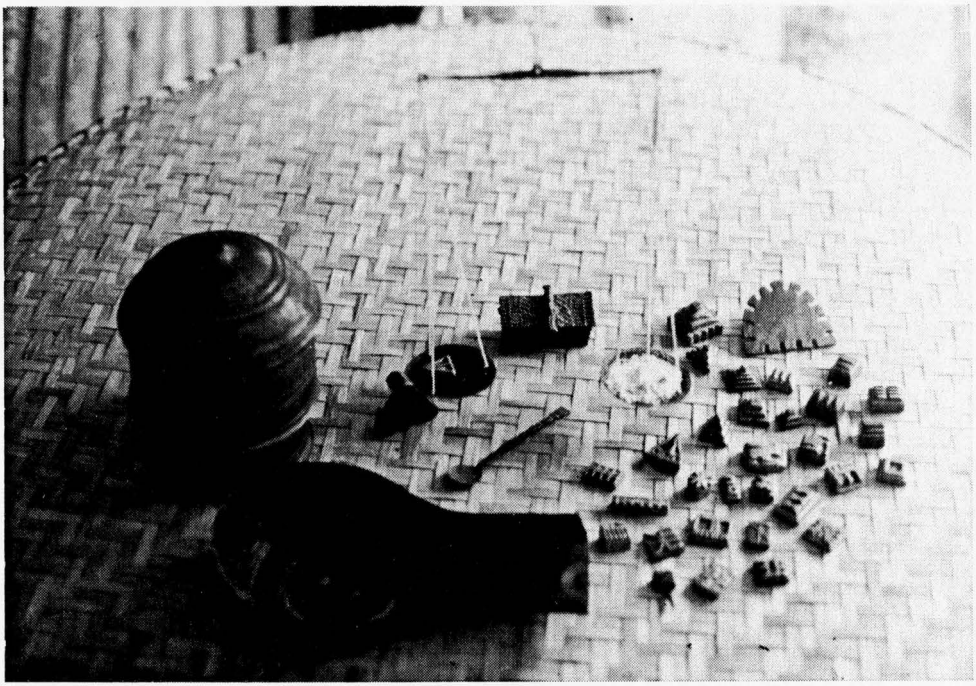

Plate 4. Apparatus for weighing gold-dust. Wind-scales with geometric gold-weights. Spoon and blow pan for sorting and a small box for storing gold-dust.

The ritual vessel described in Chapter V and known as a *kuduo* was used by wealthier Akan to store their personal treasure. This vessel seems to have originated early in the history of the Akan people. Some examples were evidently inspired by geometrically engraved Islamic brass basins and drinking cups with secondary cups as lids. Other *kuduo* forms may also have been influenced by the coastal traders, through knowledge of such objects as Dutch lead tobacco jars and a variety of European silverware. The design of the cast *kuduo* shown on Plate 22 appears to be a recent development of Asante brass casters. After death, a man's *kuduo*, containing his personal treasure, which sometimes included gold-weights, might be placed in his grave for use in the afterlife. The *kuduo* may also be seen stored besides the ancestors' stool during the *Odwira* festival.

This annual *Odwira* or 'soul-washing' festival, still celebrated at the time of the harvesting of the yams, revolves around the purification of the souls of the chiefs and their ancestors. The *sunsum* (an aspect of the soul) of a chief, or a queen mother of a village, is embodied within their personal stool, this stool is placed on its side when not in use to prevent malignant spirits from sitting on it. Like the throne of England, no person within the state would presume to sit on a chief's personal stool. During the ceremony the queen mother and the chief are present, as the libations are poured for the purification of their stools and their ancestors' stools, and all that this signifies in the ruling of a state. The chief will be accompanied by his soul-bearer (*okra*) and to this person he will have given a personal badge (*akrakonmu*), sometimes called a 'soul disc', the making of which is described in Chapter IV. The soul-bearer is often a loving child, and wearing the pectoral disc on a cord around the neck deflects any evil that enemies might plan through witchcraft or other means, and so keeps the chief's *kra* safe from harm. These

badges, still used today, have a long history in Asante traditions and many of their abstract designs show Islamic influences. Like the designs on the early *kuduo*, these may have travelled down the Northern long-distance trade routes from North Africa early in the history of the Akan people.

Amadu Kramo, and other craftsmen who make jewellery and figurative gold-weights in Kumasi, usually work exclusively in brass, as today a licence is required to work in gold. These craftsmen are still known as goldsmiths (*sika dwumfo*), doubtless for reasons of prestige, though *odwumfo* (skilled craftsman) is sometimes now used. However true goldsmiths can still be found and the *sika dwumfo* in Kentenkrono, mentioned in this book, had a licence to work in gold and supplied many chiefs with golden regalia for state ceremonies. He found the casting in gold always the most lucrative work, and had several assistant apprentices around him.

CHAPTER III

Equipment, materials and methods of working in wax

In 1976, owing to severe import restrictions, the Ghanaian gold-weight casters were obliged to use the same materials and equipment as their forefathers, except for manufactured files, razor blades and penknives, and a variety of cans and lids which had been converted to useful purposes. Also Omo washing powder was used to clean the brass sculptures after casting, as it worked more quickly than the traditional soap. Otherwise Kramo had either made his equipment himself or bought it from Kumasi Central Market, a market of locally made diverse wares. This simple equipment, as described below is shown in Fig. 1.

A WORKBOARD (*adwini pono*), made from a hardwood block at least 50 x 20 x 5 cm. It was planed flat at the top and edges then sanded absolutely smooth. Hardwood was used to enable the absorption of water without warping or cracking the board. This workboard was the entire working surface used by Amadu Kramo.

A BLOCK OF HARD WOOD (*tame*), 15 x 10 x 5 cm, used for rolling wax and beating it into flat sheets. All surfaces and edges were planed absolutely smooth and round. The wood was again capable of saturation in water without warping.

A SET OF MODELLING TOOLS made by Kramo:

1. A bamboo or hard wood paddle (*adwini ba*), used for rolling fine threads of wax, for beating small flat sheets of wax and squeezing, scraping and polishing wax. The paddle was made from 10 cm diameter bamboo split 2 cm wide, 1.5 cm thick and 26 cm long. The rounded hard skin of the bamboo was left with well rounded and polished edges. Hardwood was used by other casters and these paddles often had decorated handles.

2. Small bamboo tools (*adwini dua*) were made and used for modelling. About 5 of these were cut and each retained the outer hard skin of the bamboo as this hard edge was used for cutting, modelling and incisions. With a variety of sharpened tips, pointed, rounded and square, varied in thickness, these were sometimes cut specially to suit a piece of work on hand.

3. A wooden stick (*adwini*), with carved circular knob at one end and a smaller rounded knob at the other end, used for making cup shapes in wax.

4. Bamboo circular canes or metal tubes of various diameters had one end cut to make a half circle and the other left circular, both ends were trimmed to make a smooth circular and semi-circular tip used for incisions in wax for decorations and modelling textures.

A PORCUPINE QUILL, both tips of which were used for piercing different sized holes and for pressing home small details or smoothing rounded cavities. Wax thread was wound around the wetted quill to make coils, these coils were then slipped off the tapered end or cut down the side of the coil to make a series of wax rings.

A SMALL KNIFE (*sekan*), was often used, it was heated for clean cuts in wax or used to join pieces of wax along fine edges.

A RAZOR BLADE gave the finest cutting edge, and was always used wet.

AN IRON ROD (*dwin' dadie*) of 5 mm diameter was inserted into a round

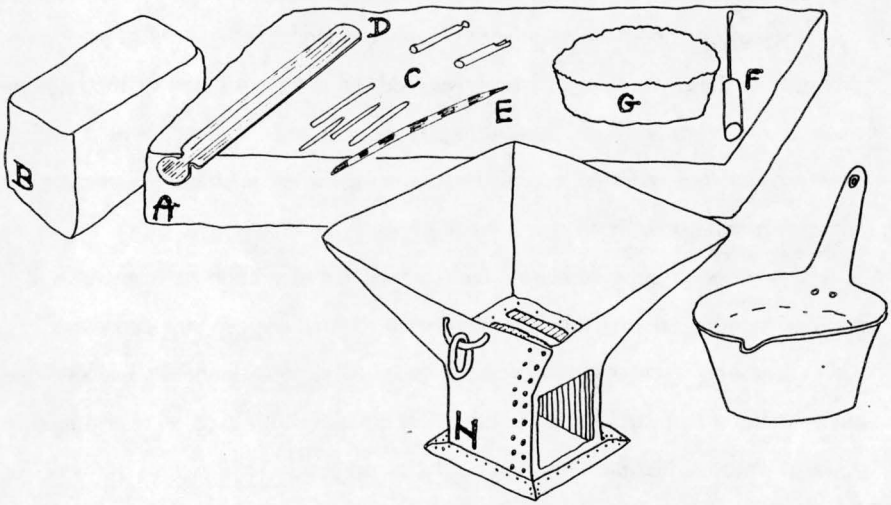

Figure 1. Minimum equipment required for working in wax: (A) workboard and (B) block with (C) set of bamboo modelling tools, (D) bamboo paddle, (E) porcupine quill, (F) iron rod, (G) beeswax, (H) charcoal burner.

piece of wood to make a handle. The tip of this iron rod was beaten flat and well smoothed, it was then heated in the charcoal fire and used for joining wax parts, applying molten wax to joints and repairs, or for smoothing wax surfaces by melting.

A SMALL TIN LID was filled with wax from which the iron tool lifted clean molten wax.

A CAKE OF NATURAL BEESWAX (*akaa tatere*) was bought at the local market in a solid block. This had been collected from wild bees' nests in the forest, the liquid honey having been poured out from the honeycomb, which was then pulverised in a mortar. This mass was then boiled with water, and the wax skimmed off, cooled, re-heated and filtered through a cloth into a container of cold water. The cooled flat cake of wax was then easily removed from the container. Kramo was occasionally fortunate in finding a bees' nest in the forest, as the price of wax was high and wax was often scarce.

A CHARCOAL STOVE, made from old cans cut and rivetted or brazed together with an open base for draught, was fired with charcoal and was used to heat the iron rod and to heat water in a pan, to dry and harden cores and to burn wax from the moulds.

A PAN (*kyensen*) was required to heat water in order to make the beeswax malleable and to heat and wet modelling tools and workboard, the water being kept at a temperature that was comfortably warm for the hands. Hotter water was required for dipping the paddles in order to roll fine threads, but the water was never boiled as this would have melted the wax.

CHARCOAL (*bidie*) was purchased locally and was preferably made from hard wood as this gives a more concentrated heat, particularly necessary for the furnace. The caster at Kentenkrono, near Kumasi, made his own charcoal in order to control his temperature more accurately, as he sometimes cast in

gold.

The following equipment was required for the making of cores and moulds and for building the furnace for melting and pouring the brass:

A GRINDSTONE AND PESTLE formed by hollowing a shallow dip in a large flat piece of granite and by rounding a piece of granite for a pestle. If natural stones were found and used these wore to very beautiful sculptural shapes. Charcoal, sandy clay and *ludo* were well ground with these granite stones to make cores and moulds.

THE CLAY (*esan*) contained layers of sand and was dug from circular pits just outside the compound. The clay had a binding quality and the sand gave a strengthening aggregate.

LUDO is the European word for the cases of old moulds, broken up after use. This practice, invariably found in European foundries, was also employed in Ghana. It saves much labour as the old moulds have already been well ground, but there is a limit to the number of times *ludo* may be re-used.

PALM NUT FIBRES (*ahoma*) were extracted from the husk of the palm nut, well shredded and then pounded with the clay. Many other natural fibres could have been used such as coconut, but palm nuts were available close to the compound. The fibres produce good lateral binding within the clay and when burnt out allow increased porosity for escape of gases during the melting and pouring of the metal.

A FURNACE (*ebura*), 80 x 80 x 80 cm, had been made by Kramo of clay and sand, well pounded with palm nut fibres. It had a crescent-shaped wall, 20 cm thick, which was open at the front, and contained three holes round the base for a draught system. Small furnaces suitable for the firing of one mould could be moulded within an oil drum with cut air vents and front opening, see Plate 5.

FIREBRICKS (*busua*) were used for closing the front of the furnace. These were purchased from the market but were sometimes made from the same clay and fibre.

TWO PAIRS OF BELLOWS (*afa*) of a European pattern made from hard wood and leather by local craftsmen were used for blowing the fired charcoal in the furnace to an intense heat.

A PAIR OF TONGS (*dawa*) with a small mouth was used for moving charcoal and lifting smaller moulds and castings. A second pair of LONG TONGS with large mouth was used for extracting moulds from the furnace and turning moulds during casting.

A POKER was used to break up any clinker or to remove obstructions to the draught system.

BRASS (*ayowa*), with an approximate melting point of 898°C (1635°F), was used for casting the gold-weights and was made up of approximately 75-88% copper, 12-25% alloy of zinc, and included varying proportions of lead. The melting points of these metals are: copper 1083°C (1981°F), zinc 419°C (787°F), lead 327°C (621°F).

There were two important aspects of Amadu Kramo's Asante methods for modelling in wax. The first was the building of figures and animals through the composition of individual parts. Each part was made by rolling wax into threads and rolls of various thickness, by pinching it into balls or oblongs or by patting and scraping it into flat sheets. All these parts were later assembled with a hot iron and hot wax.

The second aspect, sometimes overlapping with the first, involved the making of a core to support the wax model, then beating out sheets of thin wax to be pressed around the warmed core and the final application of designs by incision or applied coils of thread to the surface of the wax sheet.

Plate 5. Furnace, moulded within an oil drum, suitable for holding one mould only, built at Kentenkrono.

Three procedures for modelling in wax were followed:

1. The wax was kept in a plastic state by constantly immersing it in warm water comfortable to the hands and kneading it well.

2. The tools, hands and workboard were kept constantly wet to avoid the wax sticking and becoming rough. In this way the cast metal figures were beautifully smooth when completed, and required no further polishing in the final metal stage.

3. The pieces of wax to be joined were heated and dried and then, using a hot iron or knife, were touch-joined and drops of hot wax were added if necessary to strengthen the joints.

To start building wax figures it was essential to master the rolling of wax. Kramo would bite off a small lump of previously strained beeswax and knead this in warm water until it became evenly plastic. The wax was squeezed repeatedly and if it showed any creases it was re-immersed in warm water and kneaded smooth until a compact mass was made in the shape of a cone.

To make the rolls of wax, the wax cone was dipped in warm water, the temperature of which was then increased to just too hot for the hands. The paddle, or sometimes the small block, was dipped into the hot water, and a little water was lifted on to the workboard, causing a warm pool where the tip of the wax cone turned freely, shown in Plate 6. Regular rolling of the wax cone three turns forward and three turns back rapidly produced the elongated rolls used for bodies, with thinner rolls for neck, legs and arms.

In order to make wax threads, the workboard was later placed on a slope with the small block beneath the workboard on the left side, by this means the wax cone was rolled on to a sloping workboard with applications of hot water trickling down the wax thread and keeping it soft and malleable. Regular rolling from the tip upwards towards the cone resulted in long and fine

threads. Faulty rolls showed spiral creases and were brittle and hollow inside. To avoid this the cone was again immersed in the hot water, now holding the fine thread clear of the water and immersing the thicker cone and faulty wax only. Care was taken to ensure that the water was not so hot that the wax would melt before becoming pliable for further rolling.

For very fine threads of 0.5 mm to 1 mm lumps of beeswax were left in the sun until the lump could be easily kneaded and squeezed into thin plates which were again left in the sun. These soft wax plates were then rolled in the hand into cone shapes and once more placed in the sun. About half an hour later, rolling commenced at the tip of the cone and worked up towards the cone steadily. The threads were lifted downwards off the work table edge as lengths developed, until the end reached the floor, when it was cut and laid to one side.

Broken threads were trimmed, overlapped and tapped together and rolled into one thread with the hot wet paddle. All rolling was done from the thin towards the thick end of the wax cone for otherwise weak parts would have developed and the metal would have failed to flow through the thin areas of the casting causing breakages in the casts.

Kramo regularly rolled threads the length of his board plus the distance to the floor, some 100 cm long and as fine as 0.5 mm which he used for the wings of birds, backs of tortoises or the finer decoration on gold dust containers or jewellery. Fine rolls of thread many metres long were rolled by the caster, Opanyin Kwaku Yamoah, at Kentenkrono, which he used for his castings both in brass and gold for chiefs' regalia. His technique was to reverse the position of the cone on the sloping workboard, holding the rolled thread in his left hand, he rolled the cone to and fro downwards in warm water, towards the base of the workboard, then he wound the newly formed

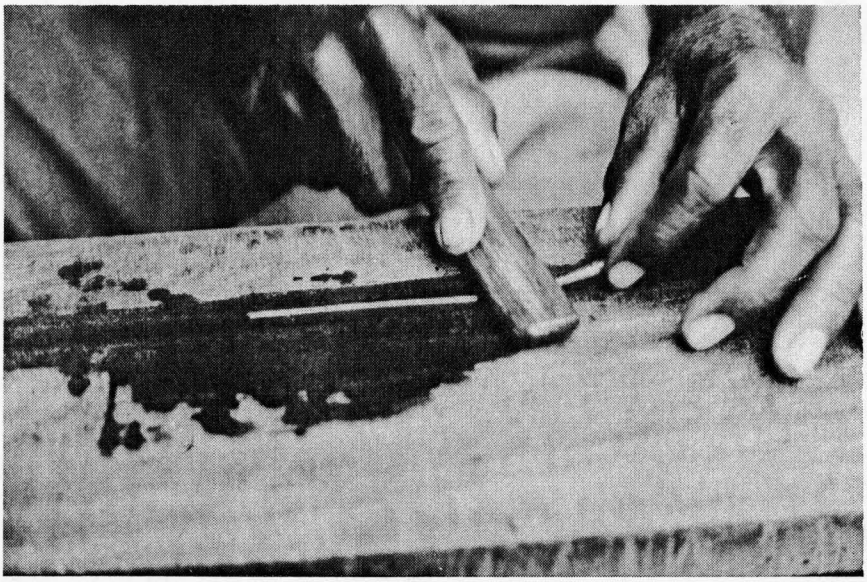

Plate 6. Amadu Kramo rolls wax threads with a bamboo paddle dipped in hot water.

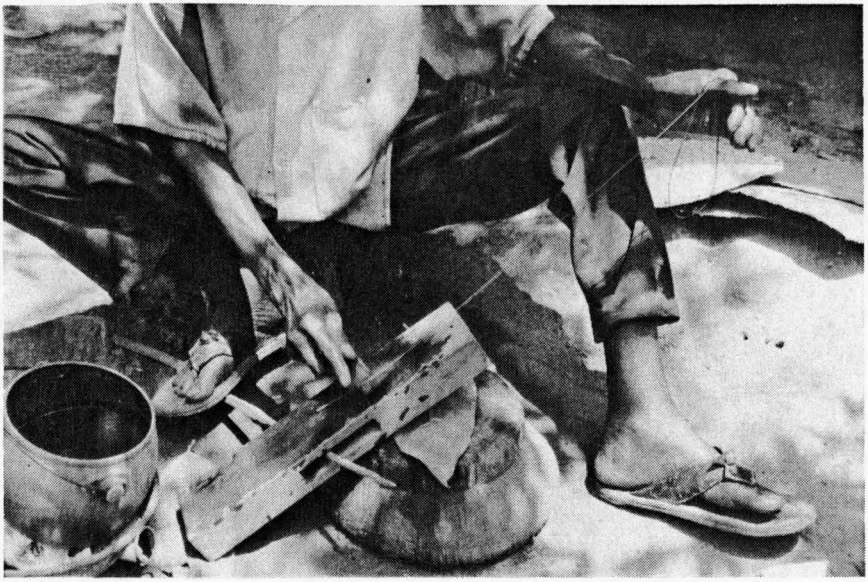

Plate 7. Caster from Kentenkrono rolls wax threads many metres long.

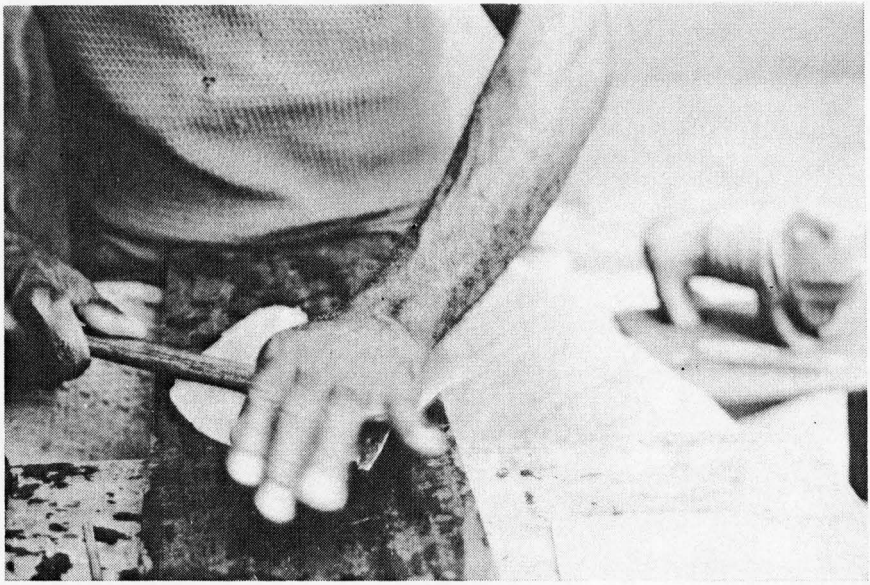

Plate 8. A sheet of wax is beaten and scraped thin with a bamboo paddle.

wax thread around his arm and lifted the cone with the wet paddle back to the top area of the workboard, again paddling more hot water onto the board and cone. These long threads he made to the length required, often using them for pectoral discs. The two Plates 6 and 7 show the differences between the two methods.

The Asante gold-weight caster, having mastered these methods of rolling wax into as fine a thread as required must also learn how to beat and scrape the wax into flat sheets, sometimes as thin as 1 mm. The wax was again well kneaded in warm water, then slapped with the small wooden block whilst lying in a pool of water on the workboard. The warm and wet bemboo paddle was used to beat the wax until the required thinness was achieved, then to scrape the surface flat and smooth. Should air bubbles occur, they were pricked, squeezed and slapped flat and the wax sheet was cut to shape with a wet razor blade. The wax sheet was warmed on both sides to ensure flexibility should it be required to wrap round a miniature figure for clothing for it would then reveal the shape of the body beneath, and firm fixing of the two parts of the wax would be ensured. Patterns would have been applied to the flat wax sheet, by pressing the wax onto textured objects such as rough wood or a file, which would have been dampened to prevent the wax sticking. Thicker sheets of wax were incised with a bamboo tool to show an assortment of geometric designs of great variety.

Parts such as heads, necks, arms, bodies, baskets, cloth and tools, were made up usually in tens as separate wax parts and allowed to harden in the shade, see Fig. 2. When the assembly of figures began, either holes were made in the body into which the rolls for limbs were pressed, or spikes were pulled out and rolls were pushed on to hardened spikes, which made realistic joints and firm joins. All these joins were touched with the heated iron point to weld

them together and when necessary a drop of wax was lifted from the tin lid and added to the join. This gave increased strength, particularly where a figure was weight supporting.

CHAPTER IV

The making of gold-weights and jewellery

This is a detailed account of the making of individual gold-weights and jewellery. Similar methods were used by all the Asante gold-weight casters I saw, with only slight personal variations, though each caster might have had his own particular proverbs or shapes which he enjoyed making.

FIGURES:

Man carrying basket with another looking inside, see Fig. 3, 6 cm high. Proverb (*abebusem*): 'I am carrying an empty basket, why do you look inside?', meaning that if someone is in trouble you should not try to rub it in by curiosity. To make the gold-weight, small lumps of wax were squeezed until malleable and rolled between blocks to correct thickness for bodies, necks and arms then cut to the required lengths, which were marked out by notches on the side of the work board.

The roll was flattened for the body and cut up the centre of the lower half for the legs, then the legs were squeezed into shape and feet were pinched out onto the wet board, and incised for toes. Legs were bowed, then bent at knees and at buttocks, and the feet were turned until the figure's stance was correct. Two balls were squeezed between dry thumb and finger and pressed into holes made to receive the buttocks. Two points were pulled out to form shoulders

and to receive arms, which were pressed the next day onto the hardened points, thus creating shoulder blades. A cut was made with a wet razor blade into the chest to receive the neck which had been cut diagonally across the neck roll, as this gave the correct positioning for neck and head.

The head was squeezed between fingers into an elongated shape, flattish and smooth. A nose was pinched forward then pressed upwards with a wet tool which was rolled across the mouth forming the nose and nostrils above. With the rounded end of a bamboo tool the top of each cheek was pressed inwards to create the eye cavity and eyebrow. The forehead was pressed down for eyebrows and the wet tool was rocked to make the face smooth. Two balls for eyes were pressed into pierced cavities and scored for pupils. Eyebrows were incised and ears were pinched and applied, then pierced and shaped with the porcupine quill. The mouth was cut and the tool was rolled across the chin to shape the lips and to make the wax smooth. Various parts of the body are shown in Fig.2. The head and neck were joined the following day with a hot iron and a drop of wax. A fine thread of wax, previously rolled, was slightly warmed and wrapped around the loins for a knotted cloth. A second man was then assembled in a similar manner.

The basket was made with three threads laid across one another and squeezed for a join, a fine thread, heated lightly, was woven round this shape for the base of the basket and the sides were turned up and the weaving completed up the sides of the basket. The top of the basket was trimmed with a wet razor blade and secured with the hot iron. This basket was placed on the first man's head and his arms were bent into a carrying position. The fingers were incised and the thumbs separated with a wet tool and related on each side of the basket and joined. Wax was then beaten flat for a stand and trimmed and the feet of both men were pressed onto the stand, being fixed

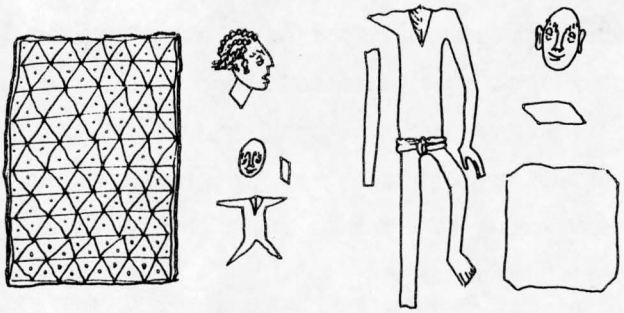

Figure 2. Wax parts for a man, woman and child awaiting assembly. Details on heads already applied.

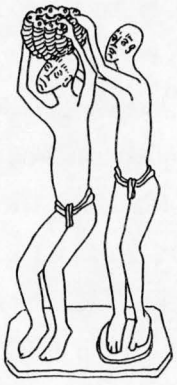

Figure 3. A man carrying a basket with another looking inside, 6 cm, drawn to scale. Proverb: 'I am carrying an empty basket why do you look inside?'.

Mother and child, 6 cm, drawn to scale. Proverb: 'It is the hard working woman who carries her child and load at the same time'.

with the hot iron and a drop of hot wax, then postures were rectified. The second man was stretched to peer into the basket and had his hands similarly formed and attached to the back of the basket.

The completed wax model (*foa*) was turned carefully in Kramo's comparatively large and wetted fingers, it was inspected lovingly for any flaw, any rough surface being smoothed out with the rocking movement of his wetted bamboo tool. Finally when satisfied with its successful completion it was passed to me, and I, too, examined each part minutely, listening to Kramo's chuckles as he quoted many variations of the proverb carried by each weight and their amusing applications to daily life.

Mother and child, see Fig. 3, 6 cm high. Proverb: 'It is the hard working woman who carries her child and load at the same time.' Although the mother was formed from the same wax parts previously made for all the figures, the feminine posture was carefully considered by Kramo as he assembled the limbs and body. Fine threads of 0.5 mm were made, then two were twisted for the hair. Lengths were cut then inserted into holes made around the hair line of her forehead and joined at the back of the head in a fashionable style (*mpese*). Breasts were applied and the baby on her back was formed with points pulled out for arms and legs, no further limbs being applied, for otherwise the child would have been too bulky when covered with the thin sheet of wax wrapped around mother and child for a cloth. The sheet, having been incised with decoration, was lightly warmed then wrapped around the mother and child to reveal the draped form within. The mother's matchet and hoe, only 2 cm long, were made, each requiring three parts, joined and then attached to the wooden bowl. The bowl had been formed by pressing over Kramo's tool made with a rounded end, and was attached as a load to the mother's head with hot wax.

The hunter, see Plate 9, 7 cm high. Proverb: 'The hunter does not distinguish a sick animal.' The same method of making a man was again followed, but in order to make the hunter's equipment Kramo made a series of minuscule abstract shapes of great beauty, though some of the forms of 0.5 mm to 3 mm could scarcely be seen and were placed for safety on a sheet of paper, shown in Fig.4. He rolled these miniatures with the smallest modelling tool dipped in hot water as a miniature paddle, the standard paddle being of comparatively giant proportions.

The gun (*etuo*) was built of fifteen parts and was 3 cm long. The barrel and handle each consisted of a roll, one pierced, the other flattened. The gun sighting was built with two ovals and a circle, which were placed along each side of the barrel and at the tip. The trigger, built from five parts, also had a carefully shaped flint and a safety catch made from four parts.

The matchet, 2 cm, was made from a roll with one half flattened for a blade and the handle left round, two balls were pressed into incised holes as screws. The bag, 1 cm, was made from a ball which was squeezed then flattened and wrapped round a small bamboo tool with the front cut in a curve, it had a twisted wax rope as a handle. The gazelle, 2 cm long, was made in twelve parts, these were assembled and bound with a single thread of wax and fixed firmly on the hunter's head. The hunter's loin cloth, gun and hunting bag were attached, and the hunter was then correctly positioned on the stand.

The reader should examine the measurements of these miniscule tools, shown in Fig.4, to understand the precision of this work. Only then will the true artistic ability of the Asante sculptor be appreciated. I shared the pride and pleasure shown by Kramo upon the completion of each of the ten hunters, and value my miniature as greatly as any work in my collection of sculptures.

Plate 9. The hunter, 7 cm. Proverb: 'The hunter does not distinguish the sick animal.'

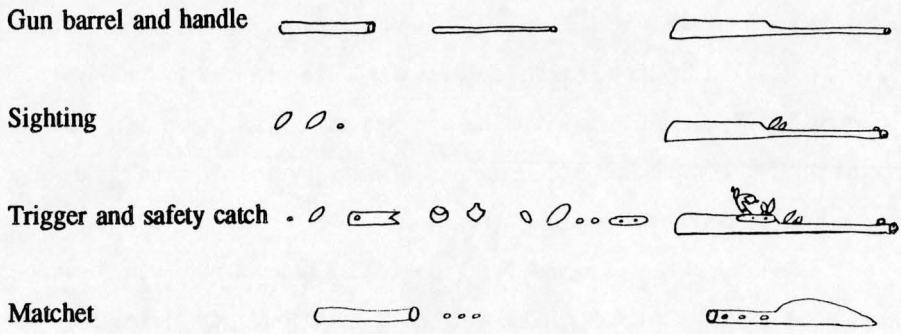

Figure 4. Showing the fifteen wax parts used to make up the hunter's gun and the four parts to make up the matchet. Drawn to scale.

ANIMALS AND BIRDS

Towards the end of my second month's apprenticeship I was beginning to perfect my master's technique so that more of my wax figures were placed in the communal tin of wax parts, and we were both involved in the assembling of parts. My desire to work on birds increased, but fell upon deaf ears until Kramo had completed the ten examples of each figure and animal gold-weight he had planned to make during this season.

Therefore, when wax was being prepared I brought out from my pocket several of Peggy Appiah's older weights depicting birds, and asked if I could copy some of them. In this way I avoided the apprentice's ordeal of repetition.

The hornbill and the snake is an example of a gold-weight that I made, copying an old brass weight that was worn smooth with age. It is shown in Plate 10, 4 cm high. Proverb: 'The snake on the ground has caught the bird in the sky!' means that God provides for everyone. A story is associated with this proverb which relates how the snake lent money to the bird, who refused to repay, but in time of drought, whilst the bird was drinking at the only pool, it was caught by the snake: an encouragement for patience.

To make the hornbill in wax, I bit off a lump of beeswax which I softened in warm water and rolled in wet hands into an oval body. I pulled out a neck and formed an oval lump for the head at the far end. This smaller oval I pinched to form a beak and a crest, then incised the beak and scored the crest. I rolled legs and cut three claws and attached smaller rolls for the back claws, then pressed into holes the hardened and pointed ends of the legs and fixed and adjusted the hornbill to a good perching position. Having spun some fine wax thread I made a spiral, cut this in half, arranged the outer half circles as outstretched wings. I beat a thin piece of wax and cut and attached a triangular tail, then added triangles of thread to each side of the tail. I also made a

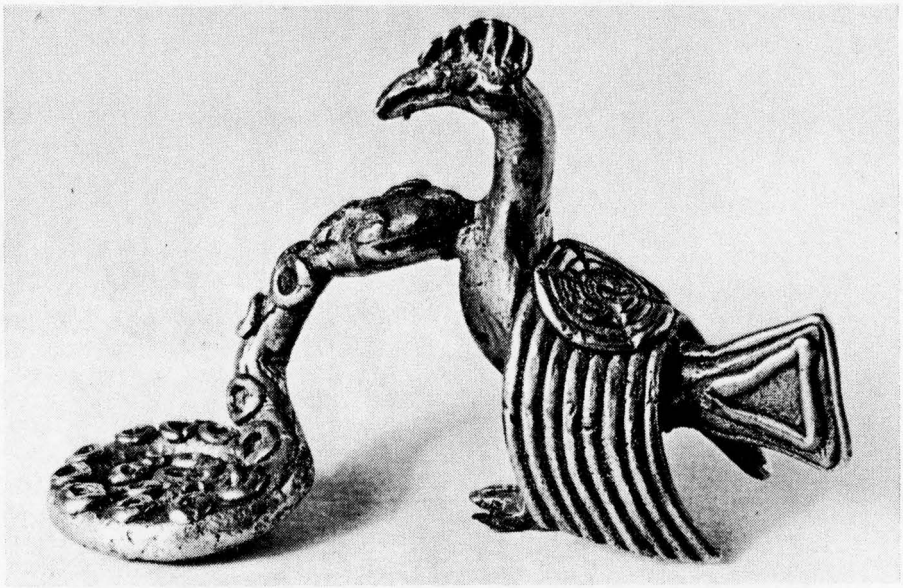

Plate 10. The hornbill and the snake, 4 cm. Proverb: 'The snake on the ground has caught the bird in the sky.' Made by the author.

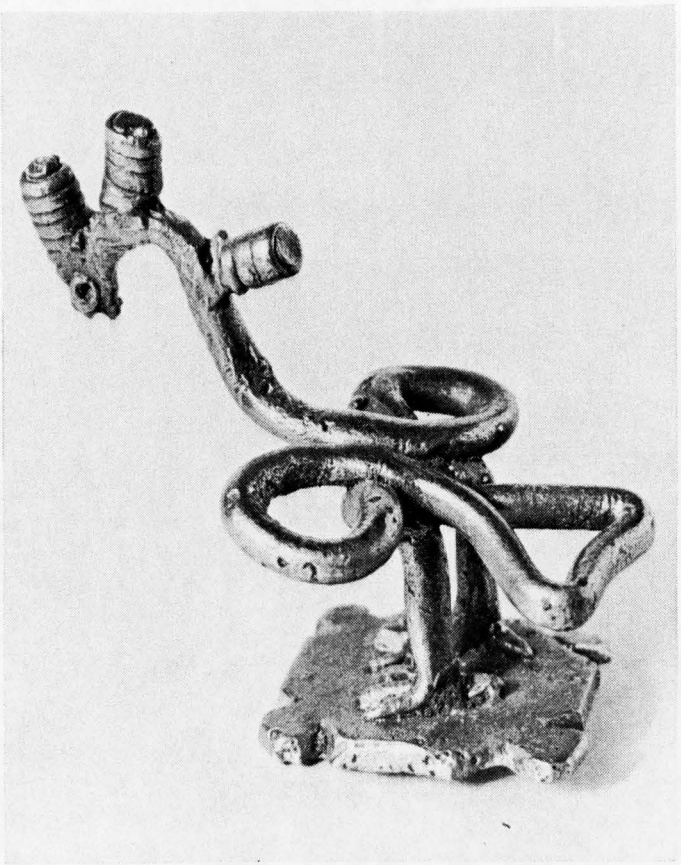

Plate 11. A bird in the form of the knot of wisdom, 3 cm. Made by the author.

smaller spiral of fine wax thread for the bird's back on top of the wings, which was stroked with the hot iron before attaching it with an incised cross to hold it firmly in position. The repeated use of spirals and triangles to make up bird weights may well express a forgotten symbolism described by Rattray. [Rattray, 1927] One ancient hornbill from my gold-weight collection has three miniature spirals placed at the three corners of its triangular base, each wing of the bird is also made from the two halves of a complete spiral with threads of 0.3 mm. The Asante feel that the hornbill is a foolish bird and that it has the godlike quality of an idiot child, and its skull is often found as an offering on West African shrines. I purchased a large and beautiful skull from a magic and medicine stall in the Kumasi Central Market.

Of the snake it is said 'She is feared even if she has no bad intentions'. The snake catching the hornbill was also made from a spiral, this time rolled thicker and with a tapered coil which was beaten slightly flat and pointed at the thick end, to be pressed when hardened into a pierced hole in the head with mouth and eyes already incised. I dipped the snake in warm water, then coiled the tail and lifted the neck and head to the height of the hornbill. Having prepared a fine thread of wax I coiled this around the wet porcupine quill, then cutting down one side of the coil, made a series of rings of varying sizes from the tapered end to the thick end of the quill. These rings I firmly attached to the top side of the snake, giving it a scaled texture. The gold-weight was completed when I had firmly attached the snake's fang to the breast of the bird with the hot iron and a drop of hot wax for strength.

Plate 11 shows a bird in the form of the knot of wisdom (*nyansapo*) which, like the hornbill, contains a wealth of symbolism. One long coil for the head, neck, wings and tail was sufficient for this bird which is only 3 cm high. The legs, being one loop of the same thickness, were easily attached. The crest

was one fine thread wound round another. I cut this coil into three pieces of equal length and attached them to the bird's head. This was the first gold-weight I made independently of Kramo, though under his critical eye. I felt as great a pleasure in the completion of all the bird gold-weights as from finishing bronze sculptures in England in sizes ranging from 30 cm to 2 m.

JEWELLERY

A pectoral disc (*akrakonmu*) is the form of spiralled bead that sometimes symbolises a man's soul. It might be given by an Asante chief to a dearly loved member of his family or to a supporter within his State, in order that they should treasure and care for his soul. The breath-taking beauty of the golden pectoral discs in the Museum of Mankind, British Museum, together with other golden regalia from the Asante treasure, emphasise the ability and artistry of Ghanaian craftsmen. Much jewellery, both large and small in scale, is still being made for Asante ceremonies, both religious and secular, the golden beads and rings being superior to those made of brass because of the greater beauty of the metal, not because of their finish or charm.

To make a flat pectoral disc in wax, see Plate 12, fine threads were rolled out on the sloping wet workboard with the bamboo paddle dipped in hot water, the wax having been thoroughly prepared by melting in the sun. This thread of 1 mm thickness, was lightly warmed and spiralled on a wet tin lid, to the size required for the bead. It had to be very lightly touch-joined at the back whilst it lay in a pool of cold water, for otherwise it would have melted and the form would have been destroyed. Two such spirals were made of the same size and then a rolled core was prepared and laid across the centre hollow of the bead to carry the thread. The core was three parts charcoal to one part clay containing sand, ground together with water between granite stones. When the mixture was plastic a roll was made in the palm of the hand

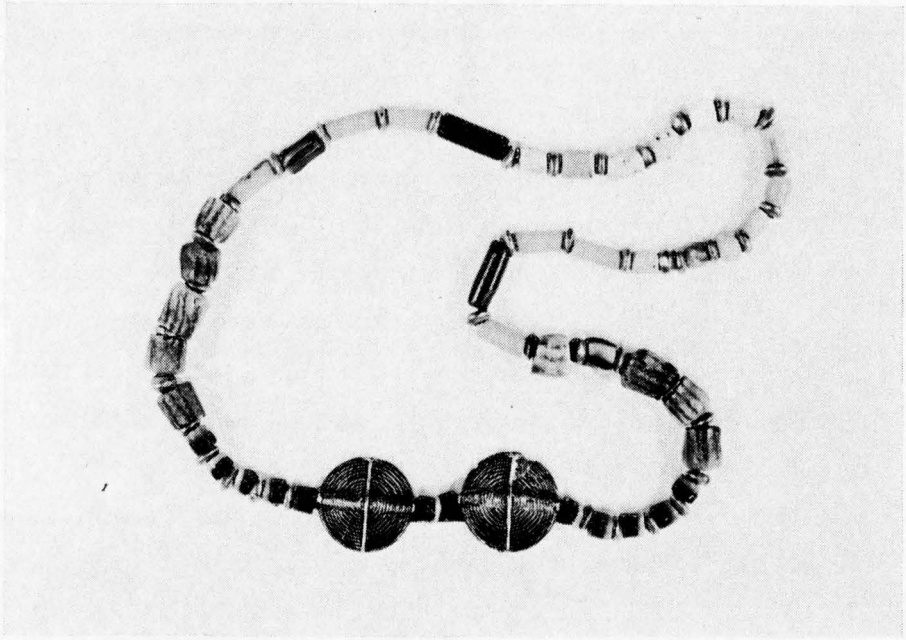

Plate 12. 2 Pectoral discs, 3 cm diameter, made with fine threads of beeswax and cast in brass. They are threaded onto a necklace of assorted beads, some made outside Kumasi.

and cut to size. It was dried by a low fire and lightly baked in the charcoal ash, away from the glowing embers. When baked hard and cooled the first circle of spiralled wax was lightly heated for flexibility then pressed across the baked core, see Chapter V. The second spiral was then squeezed to the first across the centre of the core, using wet fingers, so that the first spiral was in no way disturbed. Rings of wax, the diameter of the bead, were wound around the wetted porcupine quill and two of these were placed on each side of the core, to strengthen the openings in preparation for threading the bead onto its necklace when completed.

Bells were similarly formed from wax spirals, which were cupped round the wooden modelling tool with the circular tip. Two spirals were cupped around a prepared and dried circular core, then the base of the bell was welded together and a flange for hanging the bell was joined on. A round of metal or a small pebble was pressed inside the bell after it had been cast and the core had been removed, the bell form was then squeezed slightly to enclose this clapper.

The mudfish ring (*nsannu*) shown in Plates 13 and 14, 4 cm x 4 cm. Proverb: 'If the mudfish grows fat it does so for its master the crocodile.' A small core was moulded in the shape the thickness of the fish's body, and was baked hard in the charcoal ashes. This core enabled a thin sheet of wax to be used for the body of the ring, so keeping the brass casting light in weight for the wearer. A thin sheet of wax was beaten and scraped flat, and with both sides warmed, it was wrapped around the warm form of the core, then pressed and trimmed to size. A ring and a ball for each eye were pressed onto the head and double threads of wax were zigzagged above the wax tail, forehead and upper lip, and scored firmly into position. Spirals of wax threads were cut in half and attached for fins with the hot iron, three double loops of thicker

wax threads were attached for the tail, and two plaited lengths for the mudfish's barbels. The ring flange was beaten flat and cut to size and engraved, then fixed with hot wax on the back of the fish avoiding the core. In Plate 14 the attached flange and the core of the fish can be seen, as well as the runners, already attached for the carrying of the metal to the extremities of the mould. Many rings of this type are made in brass and commonly but proudly worn by Ghanaian men.

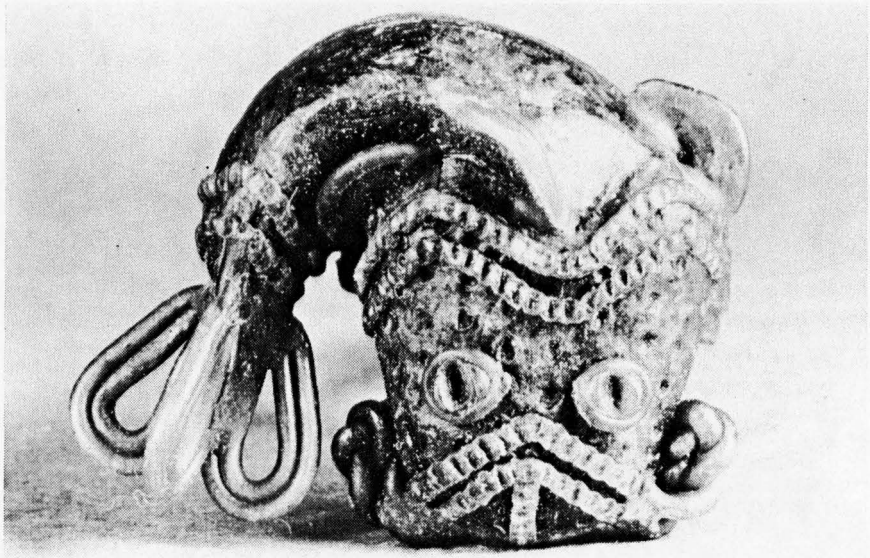

Plate 13. A mudfish ring made in wax, 4 x 4 cm. Proverb: 'If the mudfish grows fat it does so for its master the crocodile.'

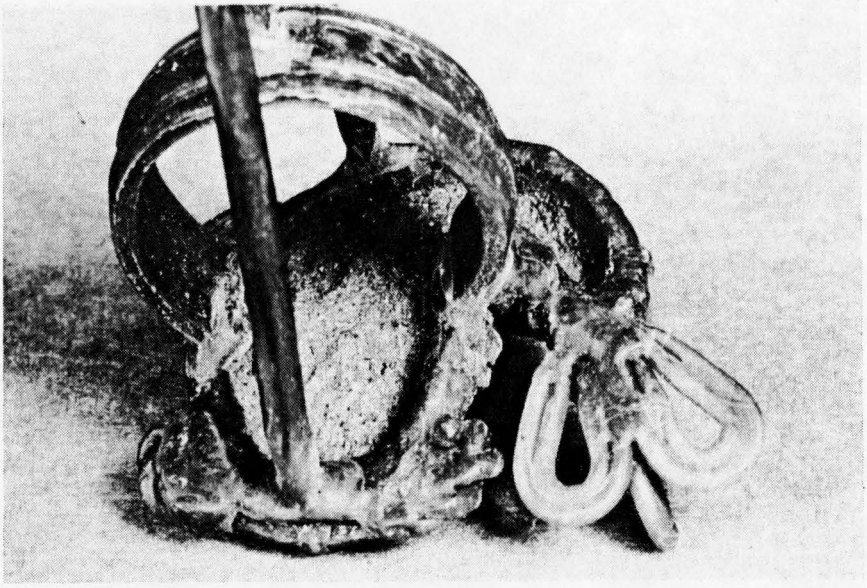

Plate 14. Back of the mudfish ring, showing core and wax runners attached ready for casting.

CHAPTER V

Methods and materials used for the making of cores and building lions, boxes and *kuduo*

When the object to be cast is large or of an irregular shape with bulky body and slender limbs, the wax must enclose a core, as a great thickness of hot metal replacing the lost wax shrinks back towards its centre and causes crazed cavities in the finished casting. A thick body which joins slender limbs may cause shrinkage so that the limbs would be too lightly attached with the consequent risk of breakage in the metal. The use of the core enables an even thickness of wax to be applied throughout, and ensures an even flow of metal in the metal pour, and the equal cooling and shrinkage of the metal. Such cores are employed throughout the world by all casters.

Amadu Kramo made up his cores by grinding together two parts of ground charcoal for porosity, one part of local clay, which contained layers of sand, for binding quality, and two parts of *ludo* – crushed parts of old moulds – for bulk; these proportions were measured by volume. Each ingredient was first ground separately, between granite stones, then mixed together and ground with added water to make a heavy pudding-like substance, part of which was rolled and patted into solid blocks of the shape required for the core. A further part of this substance was made into a thin cream 'slurry' for infilling cracks in the drying core. A part was mixed with less water forming a thick cream slurry for building up the core. A third part, with even less water, became a whipped cream slurry for the final modelling of the core. Slurries of these

three consistencies were used to build up the core and moulds alike. When the cores were fully formed and dry they were lightly carved to the exact shape, then they were slowly baked in the grey embers of a low charcoal fire, avoiding any contact with glowing embers, and turned to ensure even baking until absolutely hard and dry. We made a variety of core shapes to support the wax sculptures and the making of two of these, the lion and the large *kuduo* boxes, will now be described in detail.

The lion was the largest sculpture made by Kramo, being 30 x 12 x 16 cm and therefore requiring a large and complex core, as shown in Plate 17. With the careful working of a core for each lion, Kramo managed to cast two lions of amazingly similar thickness of metal throughout of 2 to 3 mm. To make these cores Kramo ground the materials rapidly and formed the heavy pudding-like substance. This substance was rolled and patted to make a compact mass. As this dried in the sun, cracks appeared and were patted until the mass was reformed when it was again left to dry on leaves or paper. The cores only remotely resembled the bodies of the two lions to be made, and were rolled over like fat kidneys so that they would dry evenly in the sun. During this time other work on moulding the smaller gold-weights was continued.

The following day, when the cores were firm, they were carved with a very wet pointed knife to the shape required. The dry powder carved off was spat upon and modelled back onto the lions' cores. The slurries were prepared in three consistencies, then the surface of the body of the core was dampened and built up further by modelling with the thick slurry, layer by layer to get closer to the required shape, carving back again where necessary. Any cracks were infilled with the thin slurry and the surface was polished smooth by finger. Surface moisture that appeared was removed by an absorbent material and

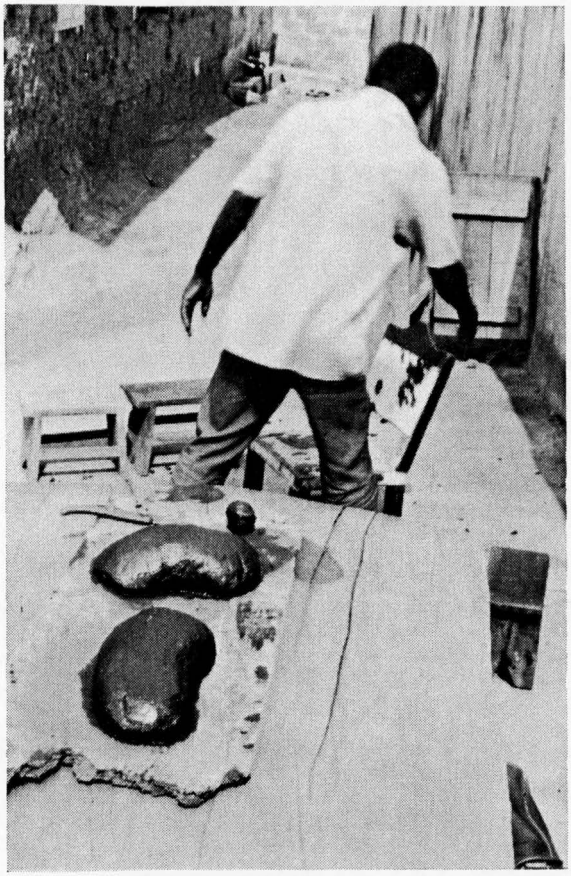

Plate 15. Kidney shaped cores lie in the sun to dry in preparation for making the lion sculpture.

Plate 16. Kramo carves the drying core of a lion.

again the bodies of the lions were turned in the sun to dry.

Round balls for eyes, thick rolls for legs and flat shapes for the lower manes were then made and left to dry in the sun. Square holes of 3 cm were cut into the dry core of the body for the insertion of four legs. These holes were filled with water and when it was absorbed they were wiped with medium slurry and the leg rolls, already slightly dried, were pressed into the cavities, being then joined with thick slurry and pressed firm and smooth. Further modelling was built up to relate the legs to the body of the lion, and the legs were then bent for standing positions. The lions were placed on their backs in the sun with legs supported by banana leaves, to prevent them from sagging.

On the third day, soft balls of whipped cream slurry were applied to the bases of the lion's legs. Pads were modelled onto the paws and an indication of the claws added. Thick slurry was pressed firmly up the legs for added strength and each lion was further adjusted for correct standing position. When the legs had again dried in the sun, further carving of detail was completed and, where necessary, the surface was again dampened and modelled up to shape.

The balls for eyes were inserted into similarly wetted holes and fixed with slurry. The mane was also pressed with slurry into an incised cavity and carved with undulations for hair effects. One lion's mane showed a deep crack that proved too large to press together with slurry, so the crack had to be carved open and filled with thick slurry and wiped smooth.

On the fourth day, when one lion core had been fully formed and was completely sun baked and hard, it was placed in the grey embers on the side of the low burning charcoal fire with legs turned away from the hearth. The lion was slowly turned until it was baked hard throughout and whilst it was

warm to the touch, wax was gently rubbed over the core, so that the melted wax seeped into the core to a depth of about 1.5 cm These applications of wax were carried on intermittently for the rest of the day whilst other work was in progress. Wax was not applied to the eyes, mouth, the underside of each paw or a rectangular area beneath the stomach of the lion, as these areas were later used as core supports, and it was important that no wax should separate the core from the mould at these openings. If the core was not warm enough to absorb the wax, then it was returned to a cool area of the fire for heating sufficiently gently to avoid burning the absorbed wax. Pieces of charcoal were lifted out with tongs and held close to the cooling lion where more wax was needed in order to heat areas which the fire had not reached. This waxed surface later helped to hold the wax skin in position. This wax, when it is later burnt out, causes changes in the colour of the surface of the fired core for 1 – 2 cm depth.

The warm baked core of the lion, which was awaiting the application of sheets of wax, was now easily recognisable, though somewhat uninteresting without its wax skin and details. At this time Kramo made a libation of wax to assist the next stage of the process. A small lump of wax was pressed home at the bottom of the pan of water, accompanied by a short chant, as an offering to the spirits. The water was then heated further, and lumps of wax were chewed and kneaded with constant re-dipping into the hot water until they were completely plastic, then they were beaten flat between the two wooden blocks, and scraped smooth with the paddle as described above. The sheets of wax, about 2 mm thick, were then cut roughly to the shape and size required to cover the core of the lion. Before application of the wax, the lion was slightly warmed, making the waxed core tacky, then, as the legs were most fragile, Kramo started to apply the wax around them as the hard wax later

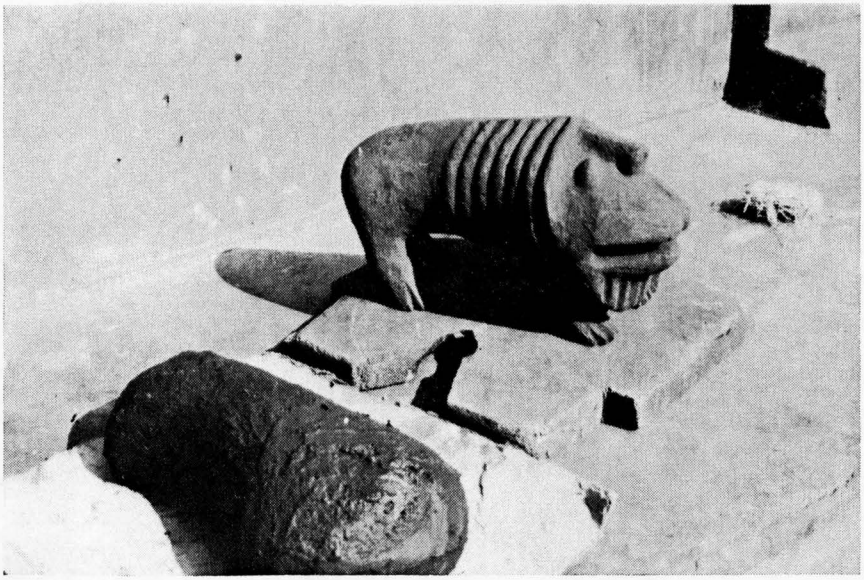

Plate 17. Modelled and carved core of one lion with a second lion core half formed. Palm nut fibre for the outer case of the mould is in the background.

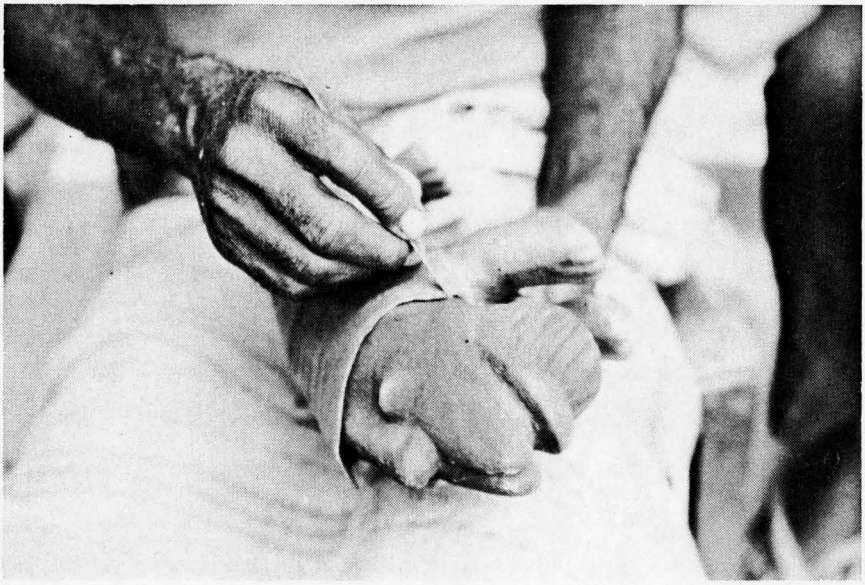

Plate 18. Application of a sheet of wax to the core of the lion.

acted as a protection to the core. Kramo's hands were wetted and the wax sheet, shaped to cover the first leg, was well warmed on both sides and pressed round the carved shape of the leg and up into the hip of the lion, as shown in Plate 18. The wax sheets were cut with a wet hot knife for perfect fits, joins in the wax were pressed and scraped very thoroughly together with wet bamboo tools and then the surface was polished smooth with a hot wet paddle. Care was taken not to re-lift the wax sheet or the tacky surface of the core would have been displaced.

The body of the lion was then completely covered with warmed wax sheeting, and if the wax was too cold to reveal the smaller details of the core, a piece of charcoal was lifted with tongs from the fire and held close to soften it further before completion. After the entire body had been covered, the wax was carved back from the eye and mouth cavities, from beneath the four paws and from the rectangular area beneath the stomach where the core had previously been left free of absorbed wax, an easy task as there was no tacky wax in those areas. The whole wax skin of the lion was extremely hard and of an even 2 mm thickness.

The surface was further polished smooth and pressed into cavities with a damp leather or cloth. Small bamboo tools, wetted in hot water, were pressed onto undulations making the form of the carved core clearly visible. This polishing of the wax replaced the metal polishing so often done with machinery during the final stages of European metal castings, sometimes to the detriment of finer details. The zigzag of fur design was now lightly incised on the body, legs and mane of the lion, using a blunt wet bamboo tool, and eyebrows were scored and whiskers engraved. A long roll of wax was rolled on the sloping board, then flattened and laid along the spine and finally deeply scored into the body of the lion, to attach it firmly to the spine. All decorative

incisions were again polished smooth with the wet leather. Kramo was constantly sucking in cold water from the pan and spraying this out through his mouth onto the lion and his hands to avoid any tackiness in the wax, as this would have caused roughness in the final metal casting. Wax ears, teeth and claws were then formed and applied with the hot iron and drops of hot wax. Another longer and thicker coil of wax was rolled for the tail, which had a bud form pressed onto its pointed tip. The thicker end of the tail was pressed, when hard, into a cavity made in the buttocks of the lion, being then firmly joined with wax. The end of the tail was curved away from the body of the lion, to avoid creating a narrow wall in the mould through which the metal flow might break whilst pouring, and was then curved back to be firmly fixed to one leg to ensure a continuous flow of metal during the casting. Two balls and a roll were attached beneath the tail and back legs for testicles. Finally a fine thread was rolled and spiralled and applied to the forehead of the lion, like a symbolic sun disc, a suitable tribute to the life force of the lion, the king of beasts, see Plate 24. A sculptured lion may be placed on the back of a chief's state chair or on top of his state umbrella, or it may be worn as a gold ring for finger or toe, or stand as an emblem on his sword or sword sheath during state ceremonies.

I turn now to the boxes (*adaka*) used for the storing and carrying of gold-dust during trading, which were made in many sizes. If only 3 to 8 cm long they were built without cores in sheets of wax beaten in the manner described earlier, but with both sides of the wax polished as the box must be as smooth inside as out. The sides of the box, 1 mm thick, were cut to size and a base was cut in a slightly thicker sheet of wax to ensure a good wearing quality. The sides and base of the box were joined with the hot iron, and a small lid was made to slide inside the box, with a temporary handle to ensure a perfect

fit. The inside flange was attached flush with the edge, then a twisted or plaited coil of wax of the exact thickness of the lid, was applied to its edge, thus ensuring that lid and box fitted exactly and that the metal shrinkage was the same throughout. Much rectifying of the shape took place as there was no supporting core for these small boxes.

The decoration of applied threads was mainly abstract, with very fine threads of 0.5 mm zigzagged across the lids, interspersed with lines, rings and many spirals. Sometimes the spirals were cut in halves and sometimes left complete. Decorative motifs also included images of casters' tongs, knots of wisdom and human masks. Many boxes carried eight or twelve small spirals bent across a wet porcupine quill and applied to the four corners of the lid of the box which can be seen in Plate 20. This box container was made by the author to match an original box lid sold to her by a trader. When in use the metal box could then be tied firmly with a cord slotted through the flanges at each side. The gold-dust would have been inside the box wrapped in a small piece of cloth, and all would be enclosed in a piece of soft leather for additional security.

The ritual *kuduo* boxes shown in Plate 22 were used in Ghana for the storage of the owner's personal treasure such as gold, precious beads or other jewellery. The *kuduo* was made with polished wax sheets of a slightly thicker gauge of 3 mm for these larger boxes, often 12 to 16 cm high. An internal core was made by patting and carving the pudding-like substance previously prepared for cores, then baked on the charcoal fire, but the outside of the core was not wiped with wax, as was recommended for the lion, as this would have caused roughness on the inside of the box, which must remain smooth for use, and the simple shape of the wax box did not need this additional support.

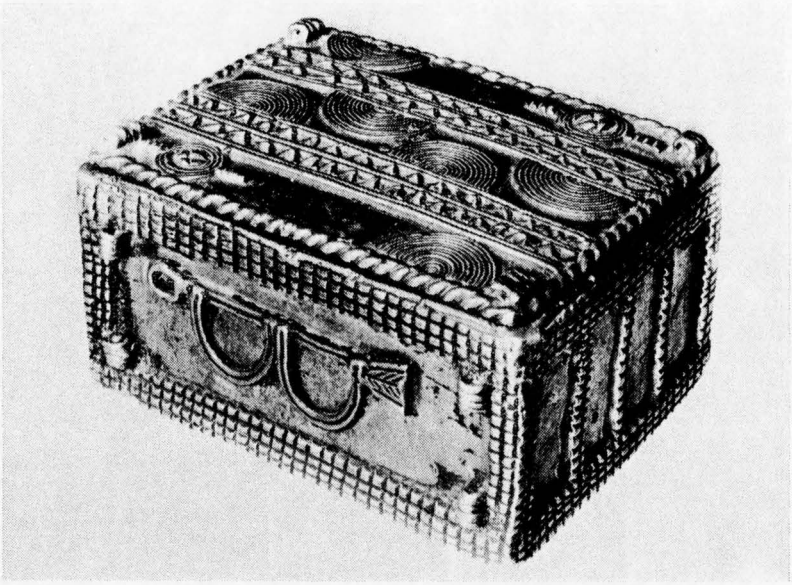

Plate 19. A gold-dust container, 8 x 6 x 4 cm, with spiralled loops at corners for tying box. Base made by author to match Akan lid purchased from trader.

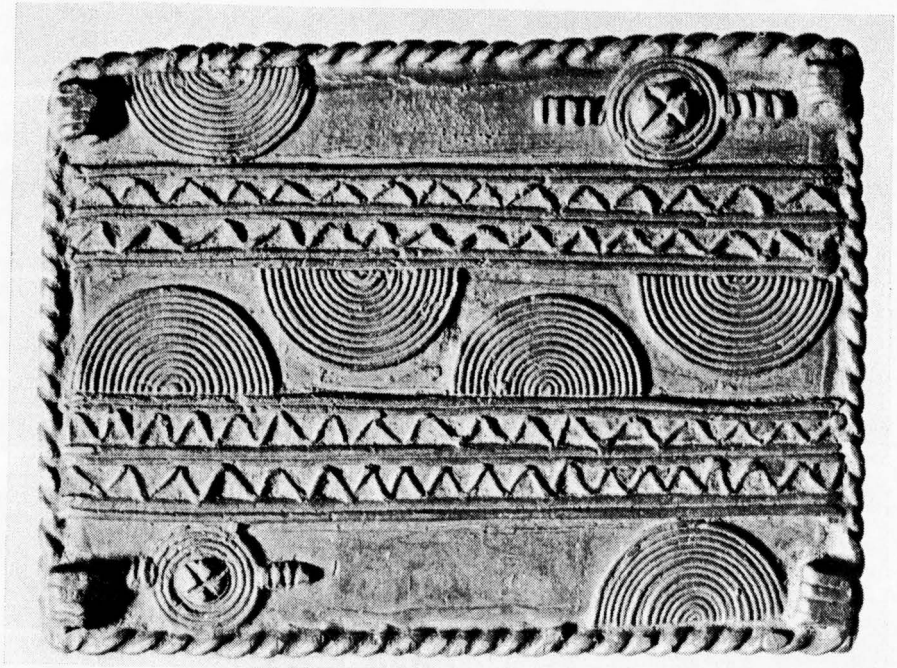

Plate 20. An Akan lid for the container showing spiralled and twisted thread decoration.

The smooth wax sheets were firmly fitted round the sides and base of the core, joined with the hot iron and polished. Much of the coiled decoration served to strengthen the box as it was applied to the outside joins at corners and at edges. Geometric designs of infinite variety were incised into the surfaces, using a blunt wet bamboo tool to avoid piercing the wax and causing faulty castings, see Plate 21.

The lid, with flange, was cut to fit the top exactly and a heavier weight of rolled wax was applied for a strong twisted edging. Thick wax rolls were used for the hinges and lock catches, and the catches often supported small masks. As a handle the lid usually carried a small figurative sculpture with proverbial content such as the hornbill and snake, or the leopard with its prey. All were modelled as separate figures in wax and were fixed with further wax when completed. Temporary wax nails were used to ensure the correct positioning of hinges and lock catches on both the lid and the box, some fine adjustments being made to ensure easy movement. The lid was then parted from the box, both being prepared for moulding and cast as separate sculptures. All *kuduo* were lifted off the ground by at least 2 cm. They were commonly lifted by a series of adjoining circles but some had lion's paws at each corner. During the final stages of modelling in wax many people from other compounds and two of Kramo's previous apprentices arrived to praise and admire the wax sculptures and the vast array of miniature wax gold-weights. It was a pleasure to realise that respect for the master craftsman was still alive in Ghana.

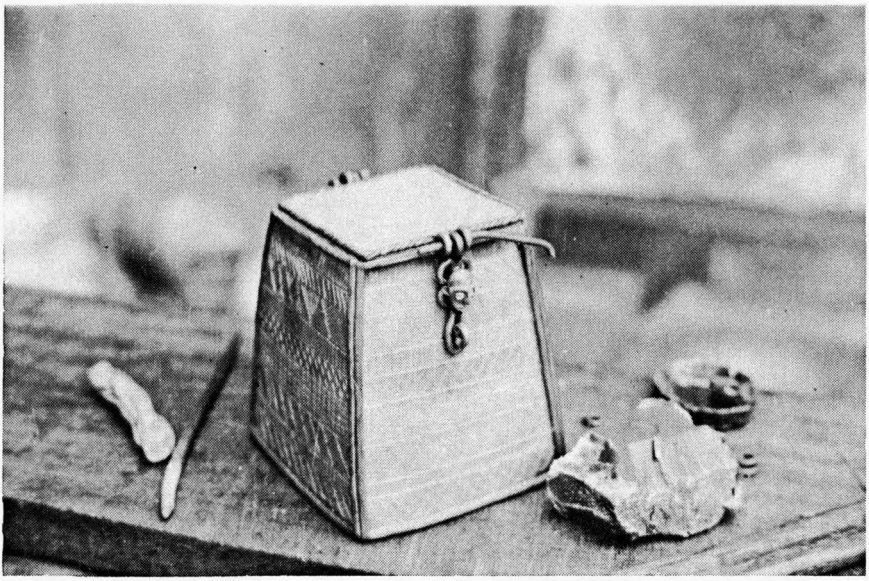

Plate 21. *Kuduo* container being formed in wax, with the lock catch carrying a mask and a temporary wax pin. Beeswax and a porcupine quill are seen on either side.

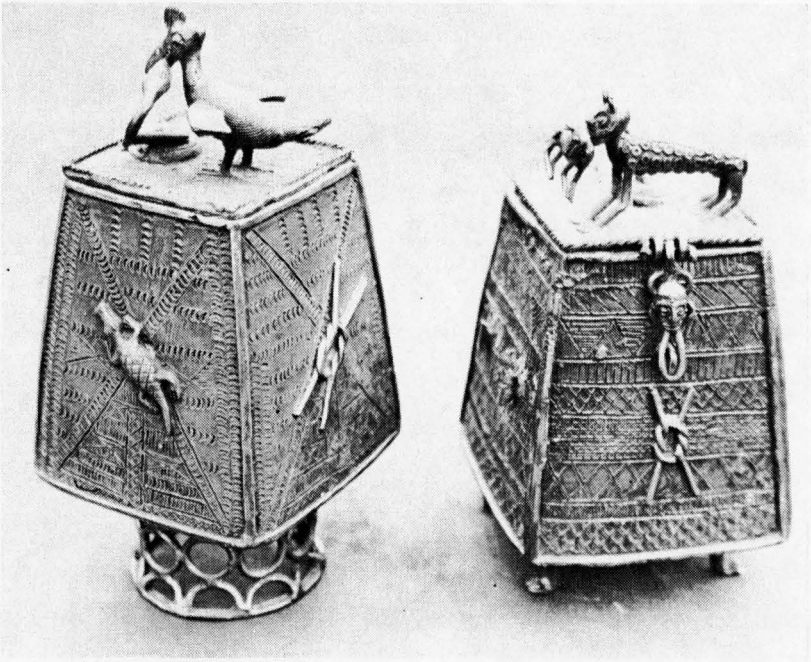

Plate 22. *Kuduo* containers, 9 x 9 x 16 cm, carrying proverbial handles for the lids, also knots of wisdom and other coiled and incised decoration.

CHAPTER VI

Preparing waxes for casting, investment of waxes and burning out wax sculptures

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There are diverse terms and techniques for lost-wax casting, commonly called *cire perdue*, and though the following techniques are those found in Asante, European terminology will be used – see glossary.

The wax models, now ready for casting, require wax 'runners' and 'pouring cups' to be attached. These form the channels through which the metal enters the shapes to be cast. They should be of nearly equal size or slightly thicker than the wax model in order to avoid variations in the shrinking of the molten metal. The runners must on no account be thinner than any section of the model or the cavity will be starved of metal. 'Risers', used in Europe for the escape of gases during the casting, are not needed in West African moulds where charcoal, clay and fibres are used. These permit the escape of hot air and gases through the body of the baked mould during the metal pouring. The mould (*foa dua*) is invested over the entire work to be cast and the wax is then drained or 'lost' by heating the mould until the wax pours from the runners and cup, leaving a void formerly occupied by the wax model. Into this void the molten metal is poured until it fills the cavity completely, the mould is later removed and when necessary, the metal casting is finished with tools.

In order to cast Asante boxes in brass of 4 x 2 x 2 cm and 2 mm thick, each box had four runners (*gyinae*), 2 – 3 mm thick, which were attached

firmly with the hot iron to the four edges of the box. The lid also had four runners attached to its flange. Larger boxes, of approximately 10 x 5 x 4 cm, had six or even eight runners attached along the top edge. These runners were then bent and joined together at their tips into one group which formed the receiving cup for the liquid metal when the wax had been melted out – see Plate 23.

The large *kuduo* boxes, some 10 x 10 x 15 cm, required ten to twelve runners placed around the base and feet of the box to ensure an even flow of metal. These runners had to be easily accessible for later removal when cast in metal. The deep *kuduo* box with its heavy core, also had four metal pins, about 8 cm long, pressed through the wax at the fullest part of the box and 3 – 4 cm into the body of the core, in order to support it in a position related to the outer mould. The open mouth of the box was also of use as the core was firmly joined to the outer mould, but was not sufficient to hold the weight of the core in position. Should the core have dropped, cracking away from the outer mould, then the cavity left by the removal of the wax would have been closed, and the metal would not have flowed correctly. Fig. 5 shows the investment of a *kuduo* with metal which had flowed correctly into the cavity.

The lion, being considerably larger and more complex, needed a more extensive runner system. Four runners were attached to the base of each foot, five more joined the edge of the mane at the middle and sides, four thicker runners led into the underside of the lion close to the bulk of the body and the exposed core beneath, and one runner was attached to the end of the tail to ensure a good run of metal down the narrow tail passage – these are shown in Plate 24.

These twenty-six runners had been firmly fixed with the hot iron, all of them at points where they could easily be cut off in the metal stage without

destroying the modelling on the lion. They were gently warmed so that they could be sorted out to eliminate any twists or sharp angles which might have caused breakage of a corner inside the mould as the metal flowed down runners into the cavity. They were then bent into curves which joined in one batch beneath the lion, care having been taken to leave space between each runner and also between the wax lion and the runners, otherwise the metal flow might break through the dangerously narrow walls within the mould during the metal pour. The runner tips were dipped in hot water, then squeezed into one firm mass and any irregular ends trimmed with a hot knife. This made a big cup to receive the large quantity of molten metal required for the lion.

Four steel pins of 8 cm length were pushed through the body of the wax 3 – 4 cm deep into the core. These helped to support the core as did the hollows of the eyes and mouth and the cavities beneath the legs and the stomach where the unwaxed core of the lion was exposed, ready for binding to the inner casings of the mould.

Before the working in wax was complete there was a growing atmosphere of excitement as the arduous grinding of materials for casting progressed. The quality of the metal casting depends on the use of very fine slurry in the first layers of the mould, for this ensures that all details are revealed, thus distinguishing the serious craftsmen from those supplying the tourist market.

Quantities of the clay from outside the compound, charcoal and *ludo* were ground and kept in separate wooden bowls ready for use. These materials were then mixed together in the following proportions gauged by volume and stored in separate pans:

1. Two parts charcoal to one part clay were mixed to a thin cream slurry for the first layers of the mould.

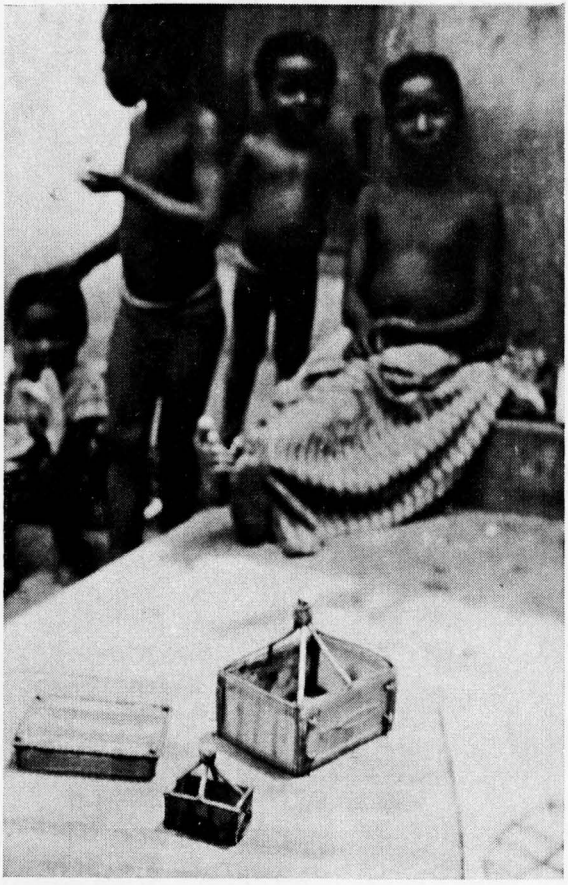

Plate 23. Small gold-dust containers formed in beeswax with runners and pouring cup attached. The children wear their much loved waist beads.

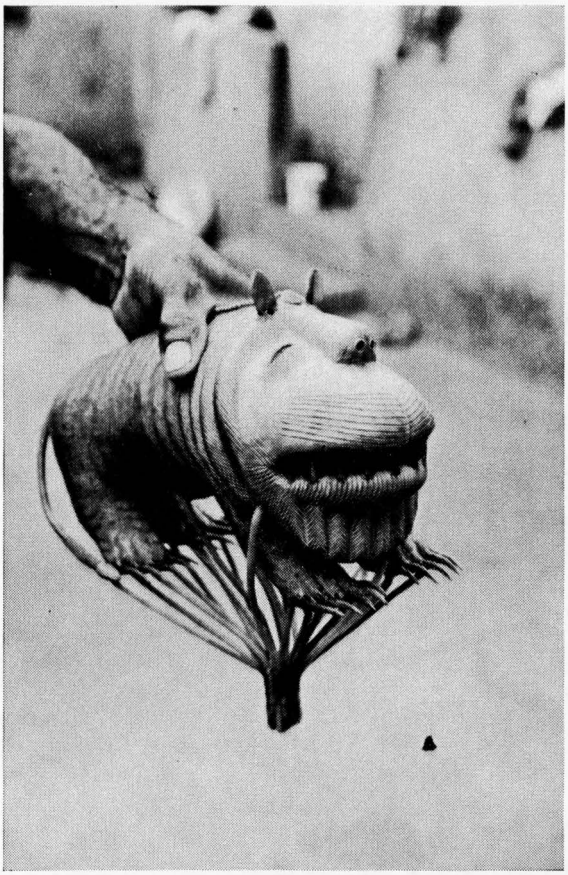

Plate 24. The wax lion with 26 runners and pouring cup attached.

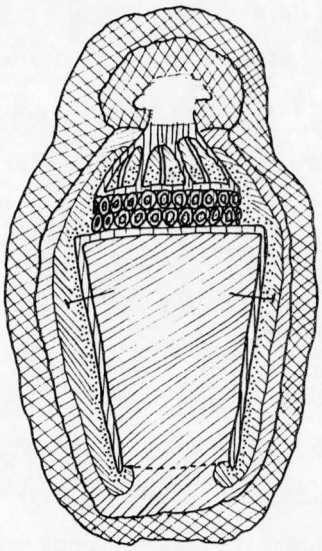

Figure 5. *Kuduo* container within a mould. The diagram shows four layers of the mould with the core held with metal pins. The crucible containing molten brass has been turned and poured into the cavity.

Key:

Thin slurry

Medium slurry

Thick slurry

Outer case and cup for holding brass chips

Cavity

Brass

2. Two parts charcoal, two parts clay, two parts *ludo* were mixed with water to a thick whipped cream slurry for building up around the runners and strengthening the shape of the inner mould.

3. One part charcoal, two parts clay, two parts *ludo* were roughly ground and mixed to a heavy pudding-like substance to be applied by fingers to complete the strength of the inner mould.

Any wax models that contained cores were dipped in water so that a maximum amount of water was absorbed by the cores to ensure a strong grip between the inner core and the mould at the carefully left openings. Five pointed feathers of a white chicken were tied together as an ideal and symbolic brush for painting on the first layers of finely ground thin slurry. The sacrifice of a white chicken to the spirits of casting occurs in many parts of West Africa and I think that the use of such feathers was considered essential to the success of the casting. The applied slurry was vigorously blown to ensure that the feather brush had spread it into every fine engraved or coiled detail of wax, and that any air bubbles that might have been accidentally trapped were broken and filled. When the wax model had been firmly coated with a layer of at least 3 mm, it was laid out in the sun to dry, and as it whitened with drying, but before it cracked in the hot sun, further layers were applied.

Wax boxes of a small size, which had not been built over cores, were filled a third full with the thin slurry and then allowed to dry. More slurry was poured in as cracks appeared, until finally the boxes were filled with core material successfully dried and solid. The same pouring method with this slurry was used between the many runners of larger sculptures such as the lion. Runners could also be dipped and the thin slurry painted into the cracks between runners with the chicken feathers as shown in Plate 25. If a mould

dried too quickly in the sun and showed cracks it was splashed with water or even briefly immersed. It must not be quite dry before the application of more layers, otherwise the various layers of the mould might separate and the seeping metal might cause 'flashes' on the final sculpture. These metal flashes would need to be ground back with cutlass or files, so destroying the detailed modelling of the finished sculpture. Thick slurry was then pressed by fingers over the developing mould, and the surface was smoothed to a rounded shape showing no sharp corners, whatever the shape of the wax model within. Coverages of about 2 – 3 cm for small waxes, 3 - 4 cm. for larger waxes and 4 cm or more for the large sculptures were essential for the inner coat of the mould.

The gold-weights were invested in groups of six, and each weight was painted with thin slurry until covered by about 3 mm. They were then dipped into the slurry, allowing each layer to dry, until there was a skin of about 1 cm, as shown in Plate 26. These partly moulded weights were put aside to dry in the sun whilst further moulding continued. When they were almost dry, two were dipped in slurry and laid together being joined with a painted layer of slurry. A third, a fourth, a fifth and a sixth weight was dipped in slurry and added to the first two, any cavities in the mould being again carefully filled with further slurry. The six weights were finally joined together in one mould making a compact mass with their wax bases all exposed at the same level. These wax bases were then scraped clean of mould, one runner being attached to each of them, for they had not been attached earlier owing to the small scale of the waxes, see Plate 27. The runners were sorted and squeezed to make the required bunched cup to receive the metal. When the wax had hardened thin slurry was applied to fill between the runners and build up the form of the moulded cup to make a solid round mass.

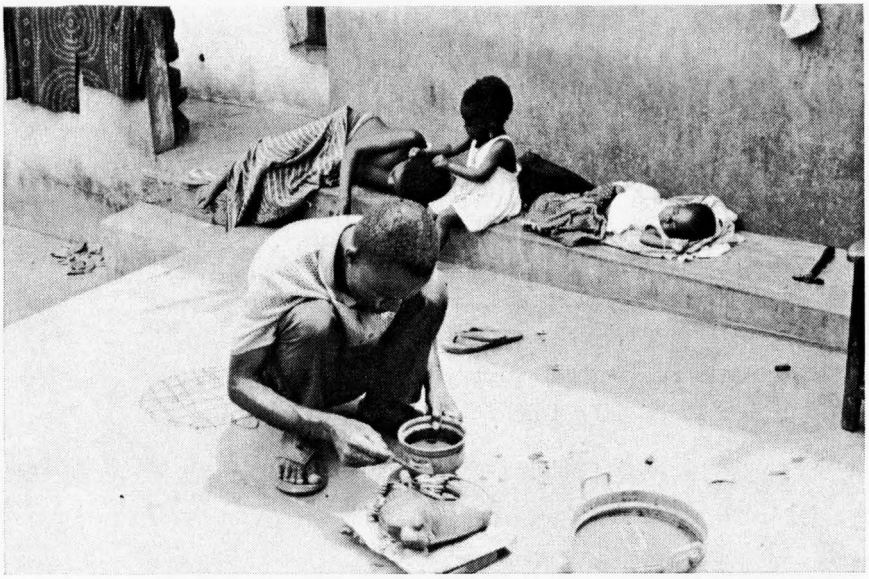

Plate 25. Kramo paints slurry onto the wax lion with a chicken feather brush. His wife sleeps, with her waist beads exposed, her elder daughter plaits her hair and the baby sleeps.

The grinding of the mould materials for the outer coatings continued daily, but now with greater speed as coarser materials were used for added strength. Kramo, using a covering phrase for all measurements of 'half an' half', judged by eye the exact mixture and consistency required. The waxes, covered with a solid case of inner mould, required no further attention to detail, strength having become all important. Another 2 – 4 cm of pudding-like substance was pressed on with fingers and the runners and cup were built out further, extending the width and depth of the cup ready for receiving the molten metal.

When these inner moulds were completed and whilst still wet, having if necessary been quickly immersed in water, they were placed upside down on a very low charcoal fire that showed no glow of embers, but hot enough to melt the wax so that it ran out into the fire, but not into the wet mould which resisted the molten wax. Wax deposits in the mould would have spoilt the detail and finish of a metal cast, for the molten metal would have ignited the wax within the mould and disturbed the surface detail. Charcoal was placed around the edge of the stove, not touching the mould, and as the draining wax burnt in the hearth the charcoal was moved towards the mould, finally being placed on its top to drive out any wax residue. When the burning of the wax finally ceased, Kramo removed each mould from the fire and held it to his ear to ensure its silence from any internal burning wax, then he shook each mould to make sure that there was no residue of smoke within.

The warm and hollow mould was then rubbed with finely ground charcoal to fill any external fissures and so ensure that no metal would seep out. The outer case mixture for the mould had already been prepared by pounding freshly dug clay containing layers of sand, with palm nut fibres which had been taken from the husks of local palms and pulled into fine loose strands. The two ingredients were pounded together using a large wooden pestle and

Plate 26. Kramo dips gold-weights into thin slurry to form first layers of mould.

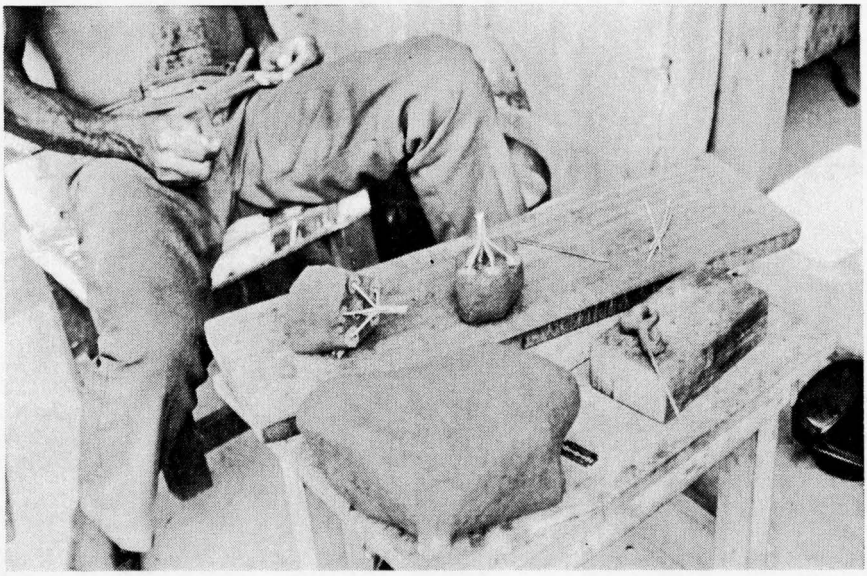

Plate 27. Two partly formed moulds containing six gold-weights each, with runners attached, the inner mould for one lion is seen in the foreground.

mortar (*woma aduro*), similar to that used domestically. The proportions were 'half an' half' and water was added for malleability. The mixture was pressed around the inner mould forming another 2 – 4 cm layer, according to the size of the castings, again emphasising the strength of the cup and developing its cavity. Great care was taken to ensure that nothing fell into the exposed cavity within the mould, particularly when the cup area was being enlarged and pressed smooth to receive the molten metal during casting. Any internal debris would have been cast into the metal sculpture causing faults. Separate cups or miniature crucibles (*semua*) were made approximately 2 cm thick, and the exact size to fit the original cup at the head of each mould. These crucibles were lined with leaves to support the small chips and fragments of broken brass which were placed in each of them. They stopped the metal from cutting into the wet clay and damaging the strength of the cup. The brass (*ayowa*) was bought in the Kumasi Central Market, either in brass trade rods (*ntwea*) or as junk, such as pipes and broken machine bits, which were sorted by hand, heated and broken into small segments with a hammer (*asae*), before being used for casting, with all proportions gauged by eye rather than scales. An ideal brass alloy would be 75% copper and 25% zinc, and 0.5 to 2% lead, an alloy which melts below 898°C (1635°F), being the temperature reached by small Akan furnaces fired with charcoal. Metal, sufficient to fill the cavity in each mould, was judged and allowance was made for a small surplus to cover errors of judgement or casting faults. The crucibles, now filled with brass, were placed beneath the moulds they fitted, so that the runner cup joined the crucible containing the brass. The moulds were kept upside down so that no chips of metal fell into the cavity damaging its surface. More of the clay and palm nut fibre mixture was pressed around the joins and over both crucible and mould so that it formed one oblong-shaped mould of considerable

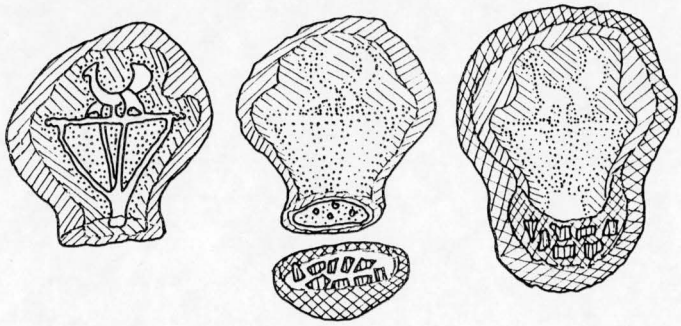

Figure 6. (A) Shows beeswax *kuduo* lid with runners and cup enclosed within three layers of inner mould.

(B) Shows wax having been burnt out of mould leaving the *kuduo* lid cavity within the inner mould. Brass chips lie in a crucible with a leaf lining.

(C) Shows mould completed with outer case of fibre and clay ready for firing.

Key:

Thin slurry

Medium slurry

Thick slurry

Outer case and cup for holding brass chips

Cavity

Brass

strength. These various stages are shown in Fig. 6 which also shows the mould fully prepared for firing.

CHAPTER VII

Firing the furnace containing moulds and pouring the brass

The Asante furnace (*ebura*) is usually quite small, holding only one to six moulds at a time. The walls are made of well pounded palm nut fibre (*ahoma*) and clay (*esan*) containing sand, prepared as for the outer casings of the moulds. Alternative fibrous materials, such as coconut, may be used, according to the availability of local materials. Sometimes a container wall in the form of an old oil drum is used, as shown in Plate 5. This small furnace, used by the caster in Kentenkrono, held only one mould at a firing, and would therefore be useful for single castings in gold.

Kramo had built his own furnace with clay and palm nut fibres found locally, and had erected it just outside his compound on the piece of waste land where he dug his clay. After digging to remove the clay which contained deposits of sand, he filled the pits with refuse then tidied over the surface with earth for safe walking. The single pit that was left open was carefully covered at night with a metal sheet.

Kramo's furnace was 80 x 80 x 80 cm with a 20 cm thick wall formed in a deep crescent and open at the front, as shown in Plate 28. It had been repaired over the years, and had a metal tie bar in one place, and had been reinforced with the same clay and fibre mixture whenever cracks had appeared. The base of the furnace had three draught holes, one at the centre back and one on each of the two sides, but only two of them were used as no really

large-scale mould was fired and perhaps because only two pairs of bellows were available. The bellows (*afa*), which were of European style, were made of hardwood and leather and were 50 cm long and very powerful. Most of the tools around the hearth of the furnace had been made locally: long furnace tongs (*dawa*) with jaws opening wide to grip the largest of the moulds, long pincers for removing clinker, a long poker to keep draught holes clear of clinker. Baskets of charcoal awaited firing, damp clay and fibre mixture lay on leaves for emergencies and there were bowls of water for extinguishing the fire and cooling the metal castings.

We started work at dawn, as the air was cool and there was much work to be done. Live charcoals, always available in the compound, were placed in the hearth and a thick flat floor of new charcoal was arranged carefully across two thirds of the hearth. Two *kuduo* moulds, now emptied of their wax boxes but containing the brass chips ready in the bottom sealed crucible, were firmly embedded vertically in the fresh cold charcoal, which was packed tightly around each mould until they were enclosed and rigid. A row of firebricks was placed in front of the charcoal, about 15 cm higher than the moulds and closing the front of the furnace. A pair of bellows was placed behind the hearth, a second pair on its right side, pointing through the cavities towards the dormant charcoal. When all was prepared a few puffs from the bellows started the fire, the charcoals at the bottom of the hearth becoming ignited. The tops of the moulds still showed level with the fresh charcoal, but as soon as it was clear that the furnace was well lighted, the cavity behind the wall was filled up with further charcoal so that the moulds were covered by at least 20 cm. Both bellows worked in unison with long powerful blows, slowly operated by Kramo and a young boy and sometimes by Kramo and myself. Surprisingly dense smoke appeared from the open top of the hearth.

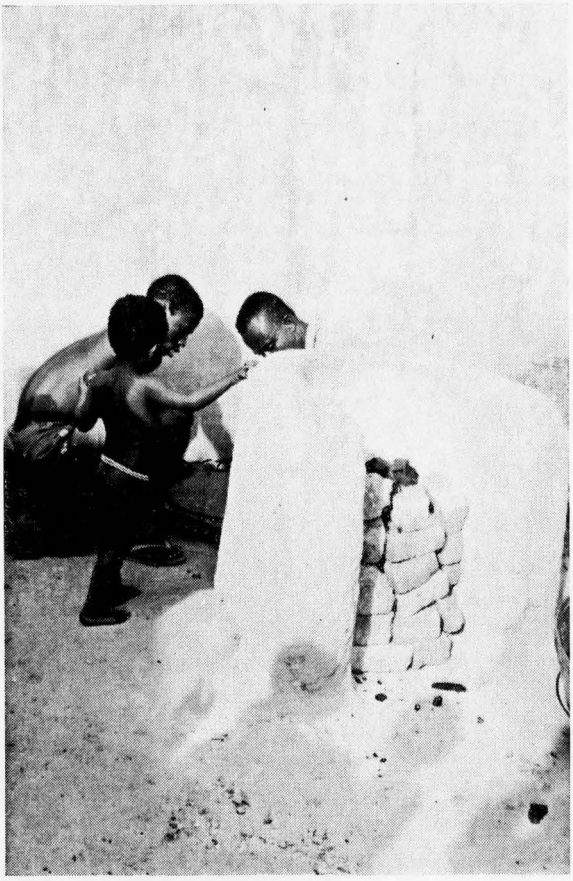

Plate 28. Furnace with moulds embedded in charcoal supported by firebricks. The air vent at the back has bellows inserted.

A gin libation was poured at four spots on the lip of the furnace, Amadu Kramo then drank and handed gin to each of his children to sip. Then he offered it to all the numerous watching children and finally to those spectators who belonged to the local community, others having been previously chased away. Amadu Kramo returned to the bellows, and as the furnace had lain dormant I had expected the same dense smoke to reappear, but it did not, the fire inside began to burn and crackle and within minutes there was an intense glow, which crept rapidly to the top of the hearth. 'Black man's magic, good libation' someone murmured for my benefit. Kramo and the boy worked their bellows steadily, except when the bellows had to be removed so that the poker might be used to clear the air vents of ash and break up any clinker. The bellows were sometimes used on top of the hearth to ensure free burning of fresh charcoal added during the firing, and any congealed charcoal was always poked free.

In about an hour a yellow glow showed on the charcoal on top of the furnace and a purple flame formed. This was taken as an indication that the correct furnace temperature was approaching, as the purple flame was caused by the combination of carbon monoxide formed in the furnace at temperatures greater than 750°C (1382°F). The charcoal was lightly poked down, eliminating the yellow colour and the air vents were again cleared. Then, with intense bellowing, the red glow of the charcoal revived and the yellow glow and purple flame returned, being held there for 5 to 20 minutes depending on the size of the moulds being fired. The *kuduo* moulds required about 10 minutes of the yellow and purple flame temperature. The temperature required for melting brass is about 898°C (1635°F) depending on the proportions of the alloy – with most metals there is a range of temperature of about 70°C (150°F) for successful pouring. The metal should not be too hot or the surface

of the cooled metal will be flawed with crazing, nor should it be too cool or it will not run properly through the runners to fill the cavity within the mould, resulting in imperfect castings. Experienced casters, pouring from separate crucibles, can judge the temperature of the metal by its colour and appearance. However here in Ghana the metal was encased within the mould and Kramo's experienced eye was judging the temperature through the formation of the colour of the flames on the surface of the charcoal.

This method of melting the metal inside the mould guarantees that any wax deposit or dampness left within the mould is absolutely burnt out eliminating the difficulties associated with steam, and easing the escape of hot gases. It also eliminates the danger of dross entering the casting cavity. When Kramo knew that he had completed his bellowing, having achieved and maintained the desired colour on the furnace, he swept the area before the furnace. The fire, starved of air, immediately burnt lower, the top bricks at the front were removed and the charcoal embers were pulled off the surface of the enclosed moulds and dampened for re-use in the next firing. About one and a half hours after the starting of the fire we were ready for removing the *kuduo* moulds. These glowed in the charcoal, and were carefully protected in a vertical position as more charcoal was removed and the fire was further quenched. It was noted with pleasure that yellow patches had appeared on the surface of the mould, indicating that any impurities had been removed from the metal and deposited on the outer skin of the moulds. These impurities, if retained would have embrittled the casting.

The first mould was then lifted gently out with the long-handled tongs and placed in a vertical position with the crucible containing the now molten brass at the base of the mould. During a two minute wait to allow the metal to stabilise and the deep glow of the mould to change colour, the second mould

was also removed and placed in the same vertical position to cool. Then the first mould was briskly lifted with tongs and turned, which resulted in the pouring of the molten metal, through the runners into the cavity left by the absent wax model. A light tap burst any air locks within the molten metal and then after a very light sprinkling with cold water, the mould was supported in this reversed position.

The second cast proved to have been slightly overheated, showing a crack, and when it was turned, a trickle of metal appeared on the outside of the mould. It was instantly turned back so that the metal returned to the crucible in the base of the mould. Damp clay was pressed by hand onto the intensely hot mould to cover the crack, then the mould was again turned. The tense atmosphere relaxed when the wet clay successfully held the metal flow in place, no burning of hands or naked feet having resulted.

Each crucible, which was now on top of each mould, was broken open, exposing surplus metal in a semi-molten state. The metal was lifted out, as it hardened, with pincers and was broken into small pieces onto a metal sheet, in preparation for future castings.

With both moulds removed and turned, the remaining charcoal in the glowing hearth was pulled out and doused with water ready for the next firing which followed immediately. A thin layer of lighted charcoal was left in the hearth which was further dampened down and a fresh charcoal bed was laid. Six small moulds, each containing groups of six gold-weights were now bedded into this fresh charcoal, filling the entire base of the hearth. One mould showing signs of a crack, was dampened and freshly coated with further clay and fibre mixture, before being placed in the hearth with the others. New and old extinguished charcoal was placed round the moulds which were held, separated by charcoal, in a vertical position as before with crucibles containing

brass chips beneath.

This firing took only one hour, as less charcoal was required than for the tall *kuduo* boxes, so the yellow glow and purple flame appeared on the charcoal after only 45 minutes of bellowing. Each mould when lifted out was cooled, turned, tapped and then sprinkled with water. The metal surplus was collected from the top cup. Then, unlike the procedure for the *kuduo* moulds, these moulds containing solid castings were immediately doused in cold water. This rapidly quenched the molten metal and so improved the malleability of the final casting, and the steam made the retaining moulds burst open facilitating their removal. Groups of six gold-weights with six brass runners and cup were exposed. They were dipped into cold water and when lightly scrubbed free of all the mould materials, rarely showed any flaw. However, one figure had half a leg only, the fault no doubt of Kramo's new apprentice for making a leg too thin for the metal to flow down evenly. Another animal had a trapped piece of loose mould in the tip of its tail, making a short tailed creature, the dangers of angular corners in the runner along which the molten metal pours was thus emphasised.

The two previously cast *kuduo* boxes were then exposed to view by dousing the moulds with water and breaking them open. This dousing was done when they were fairly cool, as otherwise the large core within the box would have burst out and have broken the hot metal box, causing a total loss.

The casting of the gold-weights in the furnace continued throughout the day. When the day's casting was completed the outer clay and palm nut fibre casing of the moulds was thrown away, the inner ground charcoal and clay materials being saved for future ludo, ready for the next making of moulds. It was then that we realised that the air had cooled and that the lack of heat from the fire was making us hurry to complete the work in the dusk. Extra wraps

were sought by shivering children but Kramo was still hot from his arduous work.

During the following two days the two large moulds containing the cavities for the lion sculptures were cast. Each lion required the entire furnace and a longer firing, the purple flame only showing after two hours of bellowing. The work was very arduous and constant with no lingering over the clearing of vents or the breaking of clinker within the furnace. Owing to the large quantity of brass, the flame was retained for a further twenty minutes, before the charcoal was removed and quenched and the mould removed and turned. These large moulds containing cores within the lion were also allowed to cool for a considerable time, before being doused with water. The lions were then completely immersed in water in order to soften and dig out the cores, which had to be removed through the cavities left in the stomach, beneath the paws and through the mouth and eyes.

Each evening, the area was cleared of charcoal, tools and ludo, and the precious castings, roughly exposed to view, were carried into the compound. I left my friends reluctantly, for the air of jubilation and festivity was great, but a car came to take me home to another area of Kumasi as darkness closed around the compound.

The metal castings were now ready for chasing and the metal runners were cut off with a large matchet which was used as a saw. These matchets are made in large quantities and sold locally, being used for chopping and hacking throughout Ghana. It was unfortunate that I had failed to bring a gift of a European hacksaw with a set of blades, which would have been more to scale with the work.

The chasing of several hundred metal casts was minimal owing to the fineness of the casting techniques but the following points were noticed. Single

runners had shrunk away from the edge of two of the boxes, owing to the insecure fixing to the fine edge. However, alternative runners had supplied the metal flow to the cavity so that no faults in the castings were caused. One single runner on a gold-weight was loose and caused a total loss, leaving an empty cavity where the figure should have been. Any air bubbles were easily removed by a punch of the chisel, but there were amazingly few of these, also metal pins were removed and refilled with brass runners, then chased smooth.

The metal castings were scrubbed and cleaned in water, then lay in a bucket of water with one cup full of Omo washing powder for one to three days. They were periodically scrubbed and then rubbed with palm nut fibre and rough sand from the yard, as an alternative to emery paper. The brass sculptures were then left in the sun with red clay caked around them for about five hours, which stained the brass with red oxide (*ntwuma*) from the clay. After this they were again scrubbed clean and boiled in a gallon of water with half a cup of red palm oil to give the metal a richer colour and a smoother polished finish.

The large and small brass castings, now shining with oil and varying in colour from yellow brass to red oxide stains were smooth to touch and fully completed. Kramo sat proudly behind his gleaming castings and it was with great sadness that I finished my apprenticeship and said goodbye to my friends in the compound.

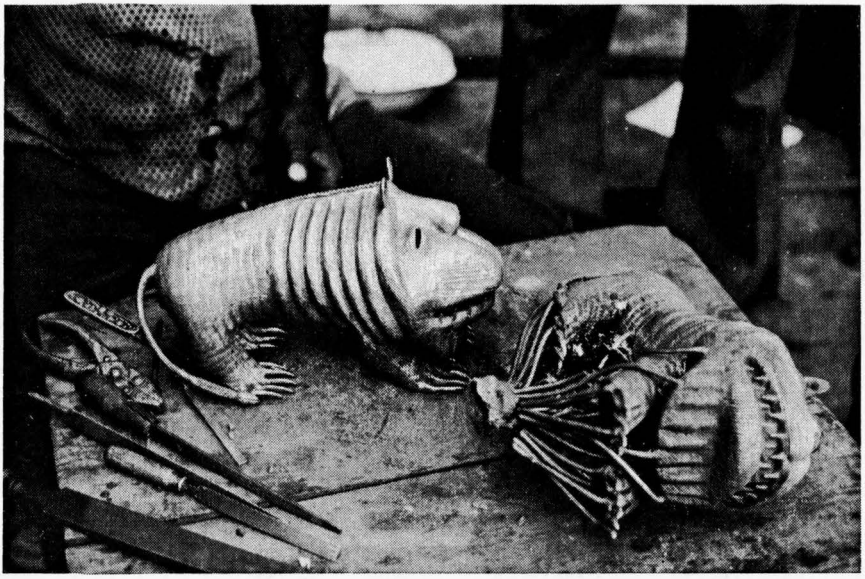

Plate 29. Two cast lions: One chased and completed, the second lion's core and metal runners have not yet been removed.

GLOSSARY

Abebusem	Proverb.
Abrambo	Gold-weight
Adaka	Gold-dust box
Adwini	Shaped stick
Adwini ba	Wood or bamboo paddle for rolling wax threads
Adwini dua	Bamboo spatula or modelling stick
Adwini pono	Workboard or wooden modelling block
Afa	Pair of bellows
Ahoma	Fibres
Akaa	Wax
Akaa tatere	Cake of beeswax
Akrakonmu	Pectoral badge, often in the form of a disc, symbol of man's soul.
Alloy	Combination of elements, one of which must be metal
Aggregate	Inert granular material mixed with a binder to form a strong solid
Asae	Hammer
Asantehene	Chief of Asante
Ayowa	Brass
Bellows, pair of	*Afa*
Beeswax, cake of	*Akaa tatere*
Bidie	Charcoal

Brass	An alloy of copper and zinc, sometimes with additions of lead (*Ayowa*)
Brass trade rods	*Ntwea*
Busua	Firebrick
Caked	A description of metal that remains clogged in a crucible owing to lack of alloy
Cavity	The space within a mould after removal of wax sculpture, to be filled with molten metal
Charcoal	*Bidie*
Chasing	Finishing the metal surface with various tools
Chief	*Ohene*
Cire perdue	Lost-wax casting technique
Clay	*Esan*
Cloth	*Ntama*
Cooking pot	*Kyensen*
Core	The inner supporting refractory material within a hollow sculpture
Craftsman, skilled	*Odwumfo*
Crucible	The vessel of refractory material in which metals are made molten (*semua*)
Cup for pouring	The hollow at the head of the mould which receives the molten metal and carries it down the runners

Dawa	Tongs
Direct flow	The technique where the body of the wax sculpture is used as an integral part of the runner system
Dross	Slag found on the surface of melting metal
Dwin' dadie	Iron rod, used for heating and joining wax
Dwoa	Sankofa bird
Ebura	Furnace
Egua	Market
Esan	Clay
Etuo	Gun
Famfa	Shovel or blow pan for gold-dust
Fibres	*Ahoma*
Firebrick	*Busua*
Firing	Heating the furnace or kiln
Flash	The unwanted metal leak through joins or cracks in a mould showing on the surface of the sculpture
Flux	Substance mixed with metal to promote fusion and to increase the fluidity of the molten mass
Foa	Wax model
Foa dua	Casting mould
Frama nsenia	Wind-scales
Furnace	*Ebura*
Futuo	Package in which gold-weighing equipment was kept

Gold	*Sika*
Gold-dust	*Sika futuru*
Gold-dust box	*Adaka*
Gold Nugget	*Sika po*
Goldsmith	*Sika dwumfo*
Gold-weight	Small sculptures commonly made in West Africa, formerly used for the weighing of gold-dust (*abrambo*)
Gun	*Etuo*
Gyinae	Wax runners attached to the models for casting channels
Hair style	*Mpese*
Hammer	*Asae*
Hearth	The floor of the furnace
Huhuamoa	Sieve for gold-dust
Investment	The refractory mould around the wax
Iron	Iron rod with a wooden handle and metal tip beaten to form a spatula for heating in a charcoal fire to join wax parts (*dwin' dadie*)
Knife	*Sekan*
Knot of wisdom	*Nyansapo*
Kra	Aspect of a soul
Kuduo	Ghanaian ritual vessel for storage of personal treasure
Kyensen	Pan, cooking pot

Ludo	The refuse of old baked moulds crushed and re-used in the making of moulds
Market	*Egua*
Merchant	*Oguadini*
Mithqal	Islamic weight series used in Timbuktu and Jenne
Mmebusem	Proverbs (plural)
Mould	The negative encasing form from which castings are made (*foa dua*)
Mpese	Designed hair style
Nim sa	'Had I known that'
Nsannu	Ring
Nsenia	Pair of scales
Ntama	Cloth, worn like a *toga* by Ghanaians
Ntwea	Brass trade rods
Ntwuma	Red oxide in clay for colouring brass
Nweraa	Twist of cloth to wrap gold-dust
Nyansapo	Knot of wisdom
Obatani	A trader or buyer
Odwira	Festival for the purification of souls
Okra	Soul-bearer
Odwumfo	Skilled craftsman
Oguadini	Merchant or market-trader
Ohene	Chief
Paddle	Wood or bamboo spatula for rolling wax threads (*adwini ba*)

Patina	The colour and texture of a sculpture's surface
Pectoral badge	*Akrakonmu*
Permeable materials	Materials that allow the escape of hot gases through a mould during the pouring of metal
Pestle and mortar	*Woma aduro*, wooden
Pins	The nails placed in both the investment and the core to retain the cavity between the two when the wax is melted out
Pour	The action of filling the prepared mould with molten metal
Pouring cup	The hollow left at the head of the mould, after the wax has been burnt out, which receives the molten metal
Proverb	*Abebusem* (plural: *Mmebusem*)
Red Oxide	*Ntwuma*, for colouring brass
Refractory moulds	Moulds made of materials that remain strong when heated to high temperatures
Ring	*Nsannu*
Risers	The channels in the investment through which gas and air escapes from the mould during the pour
Runners	The channels through which the metal runs to fill the mould (*gyinae*)
Saawa	Spoon for gold-dust

Sankofa bird	*Dwoa*
Scales, pair of	*Nsenia*
Sekan	Knife
Semua	Crucible
Sieve for gold-dust	*Huhuamoa*
Sika	Gold, currency
Sika dwumfo	Goldsmith
Sika Futuru	Gold-dust
Sika po	Gold nugget
Slurry	A mixture of granular materials suspended in water
Spoon for gold-dust	*Saawa*
Tame	Block of hard wood for rolling and beating wax
Tongs	*Dawa*
Touchstone	*Twahoo*, for testing gold nuggets
Trader	*Obatani*
Twaboo	Touchstone
Uqiya	Islamic Ounce of 27.0 grams
Wax	*Akaa*
Wax model	*Foa*
Wind-scales	*Frama nsenia*
Wood	*Adwini*
Workboard	*Adwini pono*
Woma aduro	Pestle and mortar, wooden

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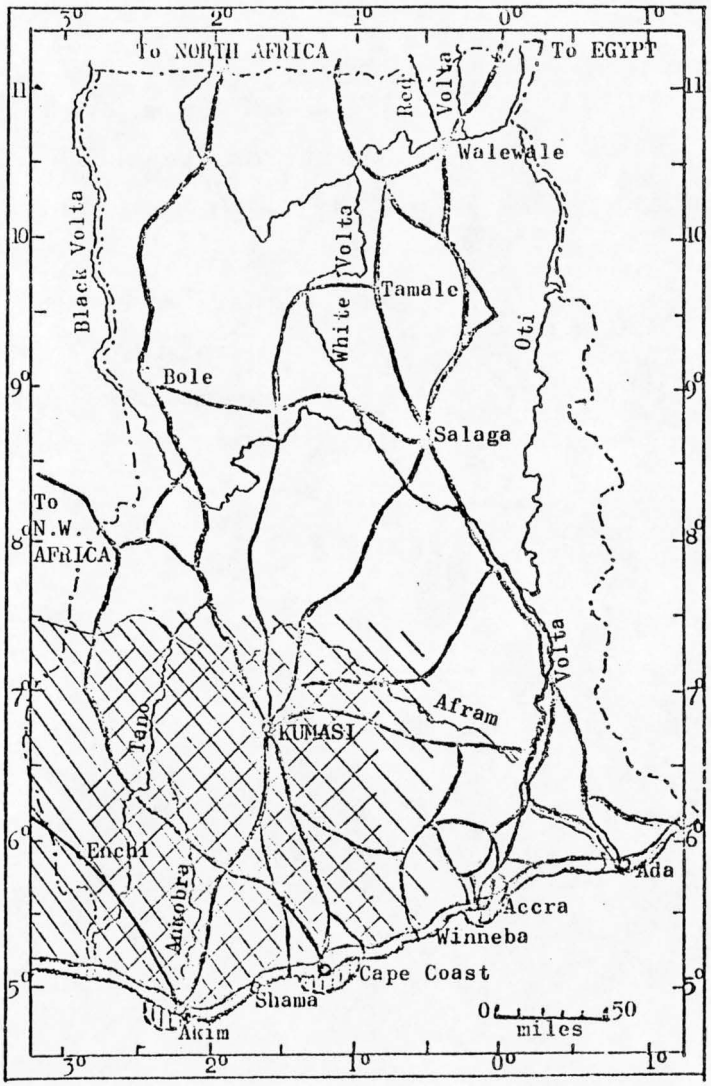
MAP OF THE GOLD COAST



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AKAN GOLDWEIGHTS

COASTAL EXPORTS OF GOLD

TRADE ROUTES CENTRED AROUND KUMASI, 18th to 19th CENTURIES

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