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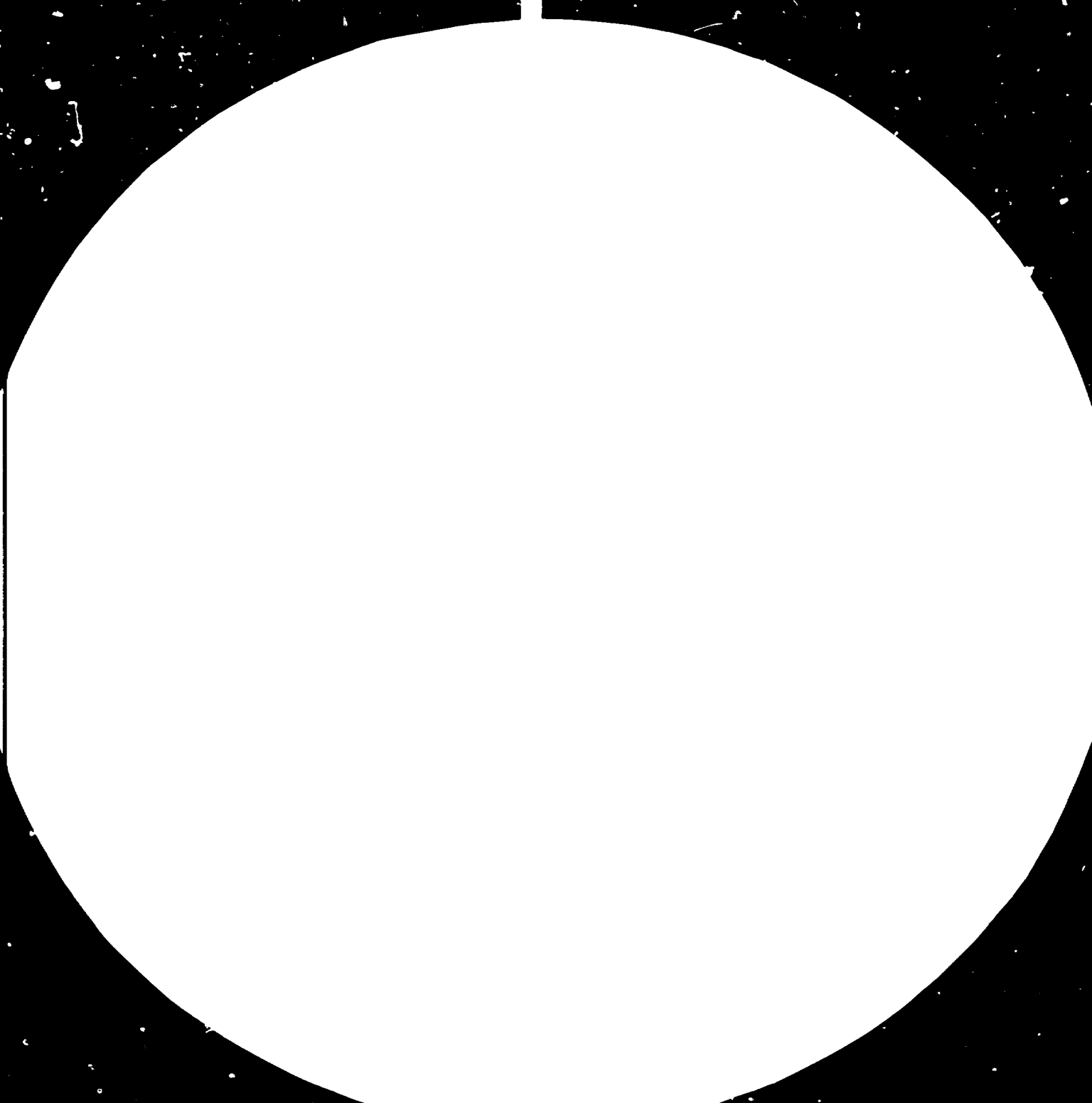
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AGRI CULTURAL HAND TOOLS AND IMPLEMENTS .

REPORT ON
THE FEASIBILITY OF MANUFACTURE IN MAURITIUS^{1/}

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SYNOPSIS

Present situation, future trends and status of engineering industries reviewed.

Agricultural tools divided into "suitable" and "unsuitable" for production in Mauritius, according to availability of processes required.

Existing and potential markets justify production in new plant recommended to be set up by existing manufacturer with established products and markets in this area.

UNIDO to negotiate on behalf of the Mauritian Government.

INTRODUCTION

This report is the outcome of a study made, at the request of the Government of Mauritius, by a UNIDO expert between 29th March and 30th April in Mauritius.

The object of the study was to analyse the feasibility of manufacturing, in Mauritius, agricultural hand tools and implements at present being imported, and to make recommendations for future lines of action towards the establishment of such manufacture, should this prove feasible, and the further assistance which could be rendered by UNIDO.

Working in close collaboration with Government Departments and private industry, the expert commenced by studying the background information available in the form of reports, surveys and other publications, as listed in Appendix 4.

The first practical step was to compile a list, agreeable to agricultural experts and users in the country, of all agricultural tools and implements used in sufficient quantities to justify consideration, and to establish the quantities of each item imported annually (Appendix 5).

The existing level of mechanisation was determined, and discussions with Government officials and directors of private industry coupled with visits to factories and workshops revealed the status and potential of the existing agricultural machinery and engineering industries (Appendix 3).

Future trends in usage, design, and market potential were identified as accurately as possible, and a range of products suitable for manufacture and justified by quantities was assembled, and the feasibility of diversification of existing industry was compared with the setting up of a new industry for tool manufacture.

In either case processes and techniques not currently available in Mauritius would be necessary, without which the local product could not compete in quality or consistency with existing imports.

Government policy and forward thinking was investigated with regard to planned agricultural expansion, investment assistance, tariff protection, customs rebates, tax remission etc.

The report details the enquiries made, the information received and the conclusions reached, and contains recommendations for action by Government, by private industry and by UNIDO.

I. EXISTING LEVEL OF MECHANISATION

1. Mechanical Equipment - The volcanic origins of Mauritius have produced a soil containing a high proportion of large rocks and boulders, which in some parts of the island, are continually working their way to the surface.

This presents a major problem and with the exception of self-loaders, haulage tractors, lorries and trailers, the mechanical equipment available is devoted almost exclusively to boulder clearance and land preparation.

The existing (1969) level of mechanisation has been based on figures produced in January 1970, and relating to 1968. These figures have been corrected by the addition of imports for 1969 given in the annual report of the Customs and Excise Department for the year 1969. Although the latest figures available relate to 1969, the rate at which this type of mechanical equipment is imported, as shown in the Customs report, indicates that the figures used are sufficiently accurate for the purpose of this report.

The total area of Mauritius is 461,000 acres of which 257,000 are under intensive cultivation using the following mechanical equipment :-

205 crawler tractors	that is 1 per 1,253 acres
62 wheeled tractors	that is 1 per 4,146 acres
138 self loaders	that is 1 per 1,862 acres
231 haulage tractors	that is 1 per 1,112 acres
* 108 lorries	that is 1 per 2,379 acres
404 trailers	that is 1 per 630 acres

* This figure applies only to lorries used in agriculture and does not include those used for general transport purposes.

2. Implements - For the purpose of this report "Implements" has been taken to mean tools and accessories for attachment to mechanical equipment and does not include mechanical equipment itself or hand tools.

To increase the versatility of the mechanical equipment used, attachments are available all of which are used in land preparation as follows :-

* 86 bulldozers	that is 1 per 2,989 acres
18 stumpers	that is 1 per 14,277 acres
115 rippers or subsoilers	that is 1 per 2,159 acres
34 rock rakes	that is 1 per 7,558 acres
86 plows	that is 1 per 2,989 acres
19 furrowers	that is 1 per 13,526 acres

* These are bulldozer attachments and not complete bulldozers.

3. Hand Tools - Planting, secondary cultivation, spraying herbicides, distributing fertilizers, collecting and loading crops are all carried out manually, with the assistance of hand tools.

Existing estimates of the number of hand tools in use proved to be very approximate, to cover only the most common items, and to take no account of the rate of usage.

It was therefore necessary to compile a complete list of all the hand tools used in agriculture, and determine the quantity of each item currently being imported. This basic list of tools was compiled with the assistance and approval of the Ministry of Agriculture and the user industries (Appendix 5)

The annual import figures however presented considerable difficulty, as the only figures available in the Customs Department give the bulk weight of items under general headings which include things other than agricultural tools.

To obtain valid figures it was necessary to check through bills of lading for twelve months and extract the quantities imported against specific tool names. The assistance of the Central Statistical Office was obtained for this search, but even so it took three weeks to extract the figures required, and these do not give a detailed or completely accurate presentation of the import situation.

Many of the tool names used in Mauritian agriculture differ from those used in the bills of lading, making identification difficult, and it was also found that certain tools called by different names proved on examination to be in fact one and the same tool.

The figures finally adopted and used in this report are a compromise based on the Customs Department record of imports and adjusted to conform more closely to the estimates of importers, users, and agricultural experts, where the Customs figures did not appear to be representative.

The figures quoted may only be regarded as an approximate guide to the individual tool position, but they give a reasonably

accurate picture of the overall agricultural tool imports.

For convenience in considering their subsequent manufacture, the tools listed in Appendix 5 are shown again in Appendix 6 classified into groups according to the method of their manufacture. The annual import quantities are also shown in Appendix 6.

The classification is into the following groups :

- A KNIVES (FORGED)
- B HCES (FORGED)
- C KNIVES (STAMPED)
- D SHOVELS
- E FORKS
- F STRIKERS (FORGED) that is hammers, picks etc.
- G COMPLEX

II. STATUS OF EXISTING INDUSTRIES

1. Agricultural Machinery, Implement and Tool Manufacturing Industries

Industries for the specific manufacture of agricultural machinery, implements and hand tools do not exist in Mauritius.

The manufacturers of large tractors and mechanical equipment are represented by distributors with workshops capable of carrying out routine servicing, replacements, and in some cases local repair of non-critical items.

The only forms of agricultural mechanical equipment made on the island are self-loaders and trailers for the sugar industry. Of the total island inventory of 138 self-loaders 94 were built in Mauritius and of the 404 trailers 144 are of local manufacture. Some of these self-loaders and trailers were built by the engineering firm which originally developed this system, and some were built by the users to a design proved by experience in the sugar industry.

"Implements", in the context of this report being attachments to mechanical equipment, are imported by the distributors and not made on the island.

Hand tools of certain types are made by local blacksmiths from second-hand material, usually old spring leaves from motor transport. This is in no sense an organised industry; the quantities are small and the output is individually commissioned and does not pass through the normal tool distribution network.

Quality varies considerably with the availability of raw material and the skill of the craftsman. The price of these locally made tools is about 25% of the price of the imported equivalent.

All tools having wooden handles are imported without the handles, which are made locally. There is no industry for handle making as each handle is made by the ultimate user of the tool.

2. Engineering Industries

The engineering industries in Mauritius have grown up to satisfy specific industrial requirements,

and, apart from a small number of general engineering companies, are specially equipped for this purpose.

These specialist engineering industries include manufacture of sugar milling and processing equipment, shipbuilding, steel-rolling. (concrete reinforcement rods), iron-founding, overhead irrigation equipment, and special purpose machinery on a one-off basis.

There are no companies with equipment suitable for the manufacture of agricultural tools, although a number of companies would not require much additional plant to enable them to enter this field on a limited scale. For a review of the resources available at the companies visited see Appendix 10.

During these enquiries various industrialists expressed their interest in the manufacture of tools, if this study proves it to be a feasible proposition.

3. Other Relevant Industries

The other relevant industries examined as having a possible potential contribution to make to a future tool industry were woodworking, mainly furniture and represented by about three or four small companies. The woodworking industry does not make any wooden handles for tools, but a Furniture Industries Association has recently been formed, and one of its objects is the joint purchase of special high output equipment which will be available to all members of the association, who individually could not justify its purchase.

Hot dip galvanising installed for the manufacture of metal window frames could well be utilised in the future manufacture of tools and implements, as the plant has spare capacity.

Electro-plating was investigated but found to exist only on a very small scale in connection with the jewellery trade, and is of no use in its present form as potential tool manufacture.

4. Essential Operations Missing

The range of agricultural hand tools used in Mauritius requires for its manufacture a number

of operations, some of which are missing from Mauritian industry.

No doubt some of these missing operations can be provided by individual craftsmen, on a very small scale and suitable only for individual unit production, but it is unlikely that this could ever progress beyond the hand craft stage.

Tool production on a scale to meet present and planned future requirements, with potential available for exports, must be planned on the basis of modern production processes scaled down to the requirements of the market.

The missing operations are those for the production and manipulation of steel forgings, the hardening and tempering of steel to accept a cutting edge, and production grinding and finishing of cutting edges.

In considering diversification it was found that existing engineering industries possess equipment for the manipulation of forgings, but this equipment is obsolete and unsuitable for modern production.

Heat treatment facilities also exist which could be modified to provide the hardening and tempering required.

Automatic grinding does not exist however and this would be essential to ensure consistent quality of the cutting edges of the finished product.

III. FUTURE TRENDS

1. Increased Tool Requirements - The requirements for agricultural hand tools in Mauritius can only increase to any significant degree as additional land is brought under cultivation, and on a volcanic island this becomes progressively more difficult as the more inaccessible and boulder strewn areas come under land clearance schemes.

The plans of the various agricultural interests on the island were considered and over the next few years (say five) a general increase of 15% to 20% in the annual requirements for agricultural tools can be expected.

In addition to this general trend, the Mauritius Tea Development Project will have considerable impact on the annual requirements for tools over the next ten years.

Without further detailed study it is not possible to project the annual increases, and in which years they are likely to occur, but if the land projected for tea development in the next ten years is related to the land at present planted with tea, there will be an increase in acreage of 293%.

When a further detailed study of tool requirements is made, it must take into account the effects of the FAO Land and Water Resources Survey, and any other planned or projected developments which could effect future tool requirements.

The industries and agriculture of Mauritius are at present orientated to labour intensive practices, and it is therefore reasonable to assure that the number of hand tools in use bears a direct relationship to the area of land under cultivation.

Taking the quantities at present imported annually as a basis (Appendix 6) the effect of the 15% and the 293% increases on the various tool groups is shown in Appendix 13. It is not possible at this stage to say which tools are more likely than others to be affected by this increase, so for the purpose of this report the increase has been applied to the whole list of tools.

2. Future Design - The adherence to tradition in agricultural communities tends to defeat the forward progress in tool design which is more easily accepted by industrial communities. This is most evident in the use of the traditional cane-knife or bill-hook designed for use with a wooden handle, but in Mauritius always used without it.

The design now in use is reputed to be especially adapted for the Mauritian market and not in use in this form on any other sugar plantations.

Attempts have been made to introduce types of cane knives used in other parts of the world, and imported in small experimental quantities from Australia and Germany, but without success.

In considering the future design of agricultural tools this traditional reserve must not be forgotten, but if possible a compromise must be achieved between what the Mauritian market will accept and what the export market requires.

Investigation of possible export markets for Mauritius is being carried out by the Ministry of Commerce and Industry, and the tool requirements of these markets must be evaluated and where possible incorporated in any new designs.

If the two requirements can be unified into one design for each tool, production problems will be kept to a minimum.

3. Market Potential - The market potential in Mauritius is as detailed under III.1., but for agricultural hand tools can have only a limited future expansion, due to the limited amount of agricultural land available.

There are distinct possibilities however that agricultural tool manufacture once successfully established could be extended to embrace tools used in building and other trades, many of which are of similar form and could be produced by similar methods and equipment.

Recommendations are made later in this report which if

successfully implemented, will exploit the export markets of companies whose products have been well established in this part of the world for many years, and in this case the export potential would be very considerable.

IV. SUITABLE PRODUCTS FOR MANUFACTURE

1. Range of Products - Considering the whole range of products as shown in Appendix 6, certain groups of items, namely :

B. HOES (FORGED) E. FORKS, F. STRIKERS and G. COMPLEX are not suitable for manufacture in Mauritius in its present stage of industrial development, because certain essential operations for their manufacture are not available on the island.

Fortunately these four groups contain the lowest quantity of items imported per annum and are the least interesting to manufacture for economic reasons, even if manufacture was otherwise practicable.

This leaves groups

A. KNIVES (FORGED) C. KNIVES (STAMPED and D. SHOVELS as the tools most suitable in design and construction for manufacture in Mauritius with the minimum of additional manufacturing facilities.

These three groups contain the highest quantity of items imported per annum, which in addition to their simple construction, goes a long way to justify their manufacture in Mauritius.

2. Quantities - The quantities of hand tools at present imported per annum (Appendix 6) are shown below in descending order of magnitude.

GROUP D.		49203	imported	per	annum
"	C.	36002	"	"	"
"	A.	13500	"	"	"
"	E.	3672	"	"	"
"	G.	2857	"	"	"
"	B.	2536	"	"	"
"	F.	1572	"	"	"

Groups A, C & D contain a total of 98705 items, whereas the remaining four groups together contain only 10637 items.

The estimated normal increase in requirements (see III.1) would raise these figures by 15% in the next few years (say five)

and the export markets, which must be won against the competition of existing established suppliers, are unlikely to have a substantial effect for a number of years, and at this stage that effect is not predictable.

The largest known increase, from the Mauritius Tea Development Project, will come over the next ten years and is likely to increase the annual tool requirement by 293%.

The adjusted figures are therefore :-

Groups A, C & D 98705 + 15% = 113510 + 293% (of original figure) = 402715
" E, G, B & F 10637 + 15% = 12232 + 293% " " " = 43398

The final quantities shown may only be achieved in ten years time with the completion of the Tea Development Project, and in the further study recommended, it may be possible to interpolate figures for the intermediate years with reasonable accuracy.

During this ten year period any successful foothold gained in export markets will, of course, increase these final figures still further.

3. Modifications to Local Requirements - In considering modifications to local requirements it must not be forgotten that the traditional nature of agriculture will make the local modifications unacceptable in other areas, that is in the export markets, and therefore in the initial stages of establishing this industry in Mauritius every attempt should be made to manufacture and popularise the type of tools which will ultimately be acceptable to a wider market.

There may prove to be certain minor variations required for the local market which can be incorporated without major manufacturing changes, and these can be accepted but any tools designed specially and exclusively for Mauritius will be pandering to a limited market and creating unnecessary production complications.

4. Establishment of Standard Designs and Specifications - At this stage the establishment of standard designs and specifications for

agricultural hand tools cannot be justified for a number of reasons.

- a. The size of the market could not support the amount of research and technical development work necessary to formulate, agree, specify and promulgate these designs and specifications.
- b. Unless manufacture is carried out in one factory, considerable supervision would be needed in the early years, until the industry acquired the self discipline to exercise this supervision itself.

If manufacture is carried out in one factory by a company with previous experience of this type of manufacture, economic and commercial factors will dictate the adoption of designs and specifications most suited to the market requirements.

In such a traditional field as agricultural tools it is better to formalise and gradually reduce the variants of existing patterns, accepted by the market, rather than to arbitrarily establish standard designs and specifications which may encounter customer resistance.

- c. There are now, and no doubt will continue to be, a number of individual craftsmen making hand tools to traditional designs so that there cannot be complete conformity with the standards.

V. MANUFACTURING FEASIBILITY

1. Justification of Manufacture - There are a number of basic factors necessary to justify the manufacture of any article in any particular country. In addition to these basic factors there may also be special factors peculiar to the geography, economics or politics of the area.

The basic factors normally considered necessary, are :-

- a) availability of raw materials.
- b) availability of labour.
- c) accessibility to adequate markets.
- d) availability of investment capital.

Examining these factors as they apply to the manufacture of hand tools

- a) there are no raw materials available in Mauritius, with the exception of wood for tool handles, and therefore all the iron and steel must be imported. The small quantities of reclaimed steel used by individual blacksmiths for small scale tool manufacture are not adequate in quantity or quality to sustain a tool industry.

This absence of raw materials is not peculiar to hand tools, but is shared by all industries on the island, other than those using locally grown timber or crops as a raw material.

- b) labour is available in abundance, and of a quality which can be easily trained to the required industrial standard, and adequate training facilities are available.
- c) the only immediate known market is Mauritius itself, which at present can absorb the output of a small tool factory producing at the rate of 40 items per hour.

The normal anticipated increases, plus the effect of the Tea Development Project, are expected to increase the capacity of this market to the point where in ten years it could absorb production capacity of 167 items per hour.

These figures take no account of the potential export markets which appear promising but are all in the future,

have not yet been assessed, and will need to be won against long established competition.

The Mauritian market although small in terms of modern industrial outputs is large enough to justify the production locally of a limited range of tools (IV. 1 Groups A, C & D) and offers the additional advantage of guaranteed increases over the next ten years, provided the quality and price of the products are acceptable to the user.

- d) enquiries in industry and commerce, together with the policy of the Development Bank of Mauritius, indicate that sufficient capital would be available for investment in a project of this nature.

In addition to the basic factors necessary for setting up any industry, there are the special factors which apply in the case of Mauritius and which are, firstly the determination of the Government to create employment preferably in labour intensive industries, and secondly a desire to introduce a form of import substitution, by replacing the expensive foreign labour content of products by the cheaper local labour.

These two special factors go a long way to offset the severe disadvantage of having no raw materials, and on balance the establishment of tool manufacture on Mauritius can be justified.

2. Diversification of Existing Industries - The diversification of existing engineering industries to form an agricultural tool industry has a lot to commend it, and offers a number of advantages.

The additional equipment required to bring some of the existing engineering industries into tool production would not require high capital investment.

Increase in overheads due to the addition of tool manufacture would be a small proportion of the overheads already being carried.

An existing organisation and management structure could be extended to cover the additional requirements of tool manufacture. Purchasing, transportation, recruitment and training facilities already existing could

be utilised.

During enquiries for this study a number of engineering companies were visited (see Appendix 3) and their buildings and equipment inspected for tool manufacturing potential. There are a number of companies having some of the equipment and facilities required, but nowhere in Mauritius do the full facilities for tool manufacture exist. (see II. 4).

Many of these companies have spare capacity in terms of plant, space and labour and would be interested in entering this field, if this study proves it to be feasible, and the appropriate incentives are available.

There appears to be reluctance to enter this branch of manufacture, which is regarded as having a very small market. If the Government want private industry to take up tool manufacture, then accurate information must be made available to them on the size of the existing and potential markets.

3. Establishment of a New Industry -

The agricultural hand tools suitable for manufacture in Mauritius (see IV. 1) will be required in comparatively small quantities in the initial phase (see IV. 2), but with an assurance of substantial increases in the future, the majority of which will be realised in the next ten years.

Of the tools most suitable for initial manufacture, that is Groups A, C & D (see I. 3) there is an immediate requirement for 98,705 items per annum, rising to 402,715 items per annum in 10 years. These figures present production rates of 41 and 167 items per hour, respectively.

The demands of the export markets, when fully assessed, may justify the inclusion in the range of the less suitable groups B, E, F & G (see I. 3) and if so, then these figures will be increased to an immediate requirement of 109,342 rising to 446,113 in ten years, representing production rates of 45 and 185 items per hour respectively.

These market conditions ideally favour the establishment of a new industry, where the modest initial requirements allow for a gradual start up, and as income is earned and production increases, the market automatically

increases to absorb it.

During the next ten years, while the home market is expanding, export markets can be found and consolidated for continued expansion after the home market has reached its limit.

The establishment of a new industry will create more new job opportunities than diversification of existing industries, and it is estimated that a new tool factory will provide a minimum of 18 new jobs, rising to the region of 23 - 25 as production reaches its peak, and later, when other than agricultural tools are added to the range, possibly rising to 30 - 35.

These figures, which are a very conservative estimate, tend to be on the low side. The actual figures will depend on the managements assessment of Mauritian labour potential, and how little mechanisation is essential to maintain quantity and quality of output on an economic basis.

4. Alternative Proposal -

There is however an alternative proposal which combines the advantages of proposals 2 and 3 above, but in addition eliminates much of the risk and uncertainty and also immediately ensures the export markets, which in the other two proposals are not available initially, and doubtful in the long run.

For many years agricultural tools and equipment have been exported to Mauritius, Madagascar, East Africa and the associated areas by a number of manufacturers having well established markets in these areas.

These manufacturers, with tool patterns and export markets established in the area, must be vitally interested in any local tool industry which may be set up, and if Mauritius is seen to be determined to manufacture agricultural tools and to obtain an export foothold in the area, then this is a commercial threat they cannot afford to ignore, particularly when they appreciate the planned increases in the Mauritian market alone.

Further research is necessary to determine the import figures over a longer period than the one year used for this study, and to find out which agricultural tool manufacturers have the largest interest

in this market area.

When this research has been completed it is proposed that the manufacturers with the greatest interest in this area be approached with a suggestion that they set up an agricultural tool factory in Mauritius, and they be put in possession of all the details of Government incentives and concessions, together with the detailed import figures and their projected increases.

These figures when added to their own exports to this area, should build up into a worthwhile production programme and one that would certainly merit serious consideration by the manufacturers concerned.

From the point of view of the Government of Mauritius this proposal has a number of advantages over the other two. First there is the minimum risk of failure, as any company, expert in the manufacture of tools, which sets up in Mauritius under these circumstances will have satisfied itself that this is a viable proposition.

Second, the proven technology of agricultural tool making will be transferred to Mauritius with no danger of unsuccessful experiments.

Third, the problems of breaking into export markets dominated by established and powerful rivals does not arise.

Fourth, an established tool manufacturer may be prepared to set up this industry with the minimum call on local capital.

Fifth, the experience and expertise of a company which has specialised in this branch of manufacture for many years will probably produce effective results in the shortest time.

Sixth, Mauritius will have working on behalf of her agricultural tool industry the production and sales resources of a company whose products have been long established in the area, and which under any other arrangement would be actively working against her.

Seventh, further diversification is possible, as established tool manufacturers have, in addition to agricultural tools, a wide range of other tools of proved patterns and with established export markets. This additional manufacture can be taken up as and when required.

The attractions of this alternative proposal are such that all efforts should be directed to establishing whether or not any of the tool manufacturers are interested before proceeding further with either of the other alternatives.

VI. RECOMMENDATIONS

This study yielded four alternative courses of action from which the final recommendation has been selected.

The justifications for each have been confirmed or refuted on the examination of information collected from Government and Industry and by the personal observations of the expert in Mauritius.

The alternative courses of action are :-

- a) make no change in existing arrangements, and continue the import of agricultural tools
- b) encourage the diversification of existing engineering industries to include the manufacture of a selected range of agricultural tools in Mauritius.
- c) establish a new agricultural tool industry in Mauritius
- d) invite existing exporters of tools to this area, to set up a factory in Mauritius.

The fears of certain Mauritian industrialists, that the tool market is too small led to serious consideration of "a", but it was found that existing and potential markets are large enough to justify manufacture, therefore alternative "a" can be discarded.

Diversification "b" has many advantages (see V. 2) and cannot be rejected outright, but at this stage there are other courses of action which offer better prospects.

Establishment of a new industry "c" although probably the best long term solution for Mauritius will present higher risks than "b" in terms of finance, speed of implementation, transfer of technology and export market exploitation. (see V. 3)

Alternative "d" offers the greatest number of advantages as it combines the best features of "b" and "c" and could provide Mauritius with a viable new agricultural tool industry in the shortest possible time and with the lowest financial risk. Transfer of technology and exploitation of existing established export markets are implicit in this alternative (see V. 4) and

it is therefore this alternative "d" which is recommended as the course of action to be taken. Full details as to how the recommendation should be put into effect are contained in the next section VII. of this report.

VII. FUTURE ACTION TO BE TAKEN

1. By the Government of Mauritius - The first step in the sequence of events leading to the establishment of a successful tool factory, is the compilation of a more comprehensive and accurate tool import survey than the one used for the preparation of this report. (see I. 3)

The information required is available from Government sources, and where that is indeterminate, from private importers.

As this information is all in Mauritius it seems most appropriate and time-saving that the Government initiate this analysis project with local staff.

The work will consist of searching, extracting and classifying details of tool imports over the last five years, and does not justify UNIDO assistance at this phase.

It is recommended that this analysis be carried out by a team of three students from the School of Agriculture of the University of Mauritius, working in conjunction with the Customs Department and the Central Statistical Office.

During enquiries for this report it became obvious that many of the tools have a variety of names, some Indian, some French, some English, some African and some Creole, and that the same name is not always used for the same tool. Before searching the Customs records therefore, a glossary of tool names should be compiled, by reference to all competent agricultural and commercial authorities. This should enable tool imports to be identified, whichever name they may be imported under.

The list of hand tools, Appendix 5, forms a good basic list with which to start, and to which any agricultural hand tool imports not already listed can be added.

While carrying out this search, tools of similar design and construction should also be extracted and separately listed for the "additional" manufacture referred to in V. 4 "seventh".

Some tools falling into this "additional" classification would be :-

Slashers
Scrapers
Mattocks
Trowels, bricklayers
" plasterers
Hawks "Chisels, cold
" wood
Screwdrivers
Tyre levers

Industrial knives of all types
and other tools of similar form and construction.

At the same time as this tool analysis is proceeding, the Ministry of Commerce and Industry should prepare a complete dossier of all the background information which could be of assistance to a potential tool manufacturer from overseas and containing information on :-

Available factory sites and costs
Building costs
Labour rates
Freight rates
Details of Development Bank loans, tax exemption, etc.
Housing, Schools etc.

Much of this information is already available in "Mauritius export processing zones" but would no doubt create a greater impact on the prospective manufacturer, if presented in a package tailored to his specific requirements.

This dossier when completed by the addition of the tool analysis list, forms the basis for negotiations with the largest tool exporters to the area, to convince one of them of the advantages of setting up tool manufacture in Mauritius.

If after approaching several of the largest tool manufacturers no interest can be stimulated in manufacturing in Mauritius, the Government should then approach Mauritian industry. (see 2 below)

2. By Private Industry -

There is little action which can be taken by private industry at this stage, but if it ultimately turns out that none of the foreign tool manufacturers can be interested in a Mauritian project, then the statistics obtained in the tool analysis, together with the planned increases, should be circulated to the engineering industries in Mauritius, by the Government, with an invitation to submit their proposals for entering this field of manufacture, either by setting up a new factory, or by diversification within existing industries.

When the interest of private industry has been assessed, terms and conditions, mutually acceptable to both sides can be worked out between Government and the industries concerned.

3. By UNIDO -

With the present and projected tool figures and the dossier of industrial information prepared by the Ministry of Commerce and Industry in Mauritius as a basis, UNIDO, acting as agents for the Government of Mauritius, will approach the three largest tool exporters to Mauritius and associated areas, to interest them in a proposal to set up tool manufacture on Mauritius.

Assuming that one or more of these manufacturers are interested in the proposals, UNIDO will organise meetings between company representatives and the Government of Mauritius, and assist in every way possible the negotiations leading to establishment and smooth start up of a Mauritian tool industry.

It is recommended that this work be carried out by an expert based in Europe, but having a knowledge of the agricultural tool situation and industrial conditions on Mauritius. (see Job Description Appendix 11).

In view of the intermittent nature of this work, it could best be handled by a consultant who would be prepared to undertake it as and when required.

In the event that none of the foreign tool manufacturers are interested in setting up an agricultural hand tool factory in

Mauritius, then the alternative recommendation "b" should be implemented.

This involves the diversification of existing engineering industries, and the initial step lies with the Government by inviting the industries to submit their proposals, and in circulating to them the results of the tool import survey.

UNIDO assistance should be provided at this stage, by an expert who can advise on the form of the invitation to industry, can assist Government and industry in planning a range of hand tools, with which manufacture can be initiated.

Once specific companies have been selected for the manufacture of tools, the expert will assist them to select, order, install and start up the additional plant and equipment necessary for production of the initial range of tools. (see Job Description Appendix 11)

4. Timing -

The approximate timings of the various phases are shown below but as some of these run concurrently, the complete timing schedule is shown graphically in Appendix 12.

Recommendation

Tool import analysis	4 months
Selection of expert to carry out negotiations	4 "
Preparation of dossier	4 "
Approaches to tool manufacturers	6 "
Negotiations with Mauritian Government	4 "
Factory construction, staff selection equipment installation etc.	16 "
	total 30 months

Alternative "b"

Government invitation to Mauritian industry	9 months	
Negotiations with Mauritian Government	3 "	
Acquisition of additional plant and facilities	11 "	
		total 33 months

As "b" is an alternative, its first phase cannot start before the first two phases of the recommended solution have elapsed. See Appendix 12.

VIII. ASSISTANCE TO INDUSTRY

1. Government Policy -

The Mauritian Government is committed to a policy of economic diversification which has resulted in the establishment of a number of new industries over the past few years, and although the import substitution phase is almost completed and priority is now given to export orientated industries, the manufacture of agricultural hand tools in Mauritius, combines import substitution with potential export orientation and the creation of a number of new and permanent jobs.

The home market is planned to expand considerably over the next ten years, and the export markets will depend on tool quality and design, aggressive sales policies and satisfactory political relationships with other agricultural nations in the area.

Government assistance is mainly confined to providing industry with fiscal and other incentives for its establishment and growth, but it is actively encouraging the setting up of new industries, preferably labour intensive, with good export potential.

For this purpose the Government has created the Mauritius Export Processing Zones, which already contain a number of highly successful companies exporting to all parts of the world.

Many of the incentives and conditions associated with the existing Export Processing Zones would be available to the agricultural tool manufacturer, but to what extent will of course depend on the immediate export potential and foreign exchange earning capacity of this new industry. It should be noted however that the official Government publication "Mauritius - export processing zones" lists "Tools and implements" amongst the types of industries that would be particularly welcome in the export processing zones.

2. Plant Investment -

The company prepared to set up agricultural tool manufacture in Mauritius, and particularly in the export processing zones, will find that the Government offers a number of concessions and incentives to facilitate plant investment.

Wherever possible, priority will be given in the allocation of investment capital by the Development Bank of Mauritius.

Loans of up to 50% of the total building cost can be made available for a period of ten years.

Complete exemption from payment of import duty on capital goods (Plant and Equipment).

In addition to this investment assistance there is also a Corporate Income Tax Holiday for a period of 5 to 8 years, and many other advantages designed to stimulate the interest of the industrialist.

3. Tariff Protection -

This would take the form of restricting the issue of import licences for agricultural tools, as and when the quantity and quality of locally produced tools enabled this to be done without detriment to the agricultural tool user in Mauritius.

4. Assured Market -

An existing market is assured at the present level of imports (Appendix 6) and it is known that this will increase by nearly 300% over the next ten years, as the Tea Development Project proceeds, and larger areas of land come under tea.

The export markets are less certain as a number of established tool manufacturers are well entrenched in the African markets, and any drive for exports in that area would have to compete with these manufacturers.

Some of the new African countries are either manufacturing or considering the manufacture of agricultural tools, and unless Mauritian made tools can offer considerable and demonstrable advantages over the local product, it is doubtful whether any effective foothold can be gained in these countries.

5. Industrial Training -

From Chapter III. para.4 it will be seen that certain essential operations for agricultural

tool manufacture are missing from Mauritian industry, and if these are added to existing industries or established as new industries, the skills required for these operations will be new to Mauritius and therefore the operating staff will require training.

The existing Industrial Trade Training Centre at Beau Bassin is adequate for this purpose, and if any skills require to be taught for which the centre does not have capability, this can be acquired and courses organised for the new skills, as they have been in the past.

APPENDIX 1

PERSONS VISITED

Mr. J. Birt, U.N.D.F., Residential Representative

Mr. M. Foogoo, Parliamentary Secretary, Ministry of Agriculture and
Natural Resources

Mr. B. Arouf, Secretary for Industrial Development, Ministry of
Commerce and Industry

Mr. B.D. Boy, Chief Agricultural Officer

Mr. A. Mulder, U.N.D.P./T.A., Chief Agricultural Adviser

Mr. Michel Lenoble, Industrial Adviser, Ministry of Commerce and
Industry

Mr. A. Diouman, Administrative Assistant, Ministry of Agriculture and
Natural Resources

Mr. R.G. Ulfax, U.N.D.P./U.N.I.D.O., Expert in Industrial Export
Development

Mr. J.Y. Appasary, Comptroller of Customs

Mr. P. Boulle, Secretary, Chamber of Commerce and Industry

Mr. Ah Kong, Director Central Statistical Office

Professor E. Lim Fat, Head, School of Industrial Technology - University
of Mauritius

Professor A.I. MacDonald, Head, School of Agriculture

Mr. M. Leal, Chairman, Development Works Corporation

Mr. B. Mungar, Director, Development Works Corporation

Mr. S. Woodrow, Adviser to Development Works Corporation

Mr. D. Allen, U.N.D.P./T.A., Tariffs and Trade Adviser

Mr. Robert de Labauve d'Arifat, Managing Director, Ireland Fraser and
Company Ltd.

Mr. M.P. Pougnet, Company Sales Representative, Ireland Fraser and
Company Ltd.

Mr. P. Rogers, Managing Director, Forges Tardieu Ltd.

Mr. G. Maujean, Director, Forges Tardieu Ltd.

Mr. J.M. Paturau, Technical Director, Forges Tardieu Ltd.

Mr. P. Clarenc, Managing Director, Hall Geneva Langlois Ltd.

Mr. M. Lagesse, Manager, C.assis Ltd.

Mr. J.A. Smith, Director, Taylor Smith & Company Ltd.

Mr. I.A. Smith, Director, Taylor Smith & Company Ltd.

Mr. G. Coombes, Director, Taylor Smith & Company Ltd.

Mr. B. Seneck, Director, Desbro International Ltd.

Mr. R. Raffray, Factory Manager, Flacq United Estates Ltd.

Mr. K. Burns, I.L.O. Project Manager
Mr. Ramlogan, Tea Experimental Station Wooton
Mr. I.M. Sayed, Managing Director, Plyform Ltd.
Mr. J. Herve Lagesse, Managing Director, F. Hertogs & Company Ltd.
Mr. Gaston de Speville, Director, Doger de Speville Ltd.
Mr. Jacques de Speville, Director, Doger de Speville Ltd.
Mr. L.M. Mungur, Director, Plastic Industry (Mauritius)Ltd.
Mr. C. D'Arifat, Director, Blyth Brothers & Company Ltd.
Mr. G.C. Dalais, Director, Blyth Brothers & Company Ltd.
Mr. J.E. Bruneau, Service Manager, Blyth Brothers & Company Ltd.
Mr. Jean Desmarais, Egeco Ltd. (Blyth Brothers)
Mr. G. Dufourg, Manager, Crittal-Hope Ltd.
Mr. O. Czivis, Senior Industrial Field Adviser U.N.D.P./U.M.I.D.O.

APPENDIX 2

GOVERNMENT DEPARTMENTS AND INSTITUTIONS VISITED

1. Ministry of Agriculture and Natural Resources
2. Ministry of Commerce and Industry
3. Chamber of Commerce and Industry
4. Customs Department
5. Central Statistical Office
6. University of Mauritius
7. Development Works Corporation
8. Tea Experimental Station

APPENDIX 3

PRIVATE INDUSTRIES VISITED

1. Blyth Brothers & Co.Ltd. - Importers, Engineers, Caterpillar Agents
2. Cassis - General Engineers
3. Crittall Hope (Mauritius)Ltd. - Steel Door and Window Frames
4. Desbro International Ltd. - Steel Rolling Mill
5. Doger de Speville & Co.Ltd. - Irrigation Engineers, Equipment Manufacturers
6. Flacq United Estate Ltd. - Sugar Millers
7. Forges Tardieu Ltd. - Iron Founders and Engineers
8. Hall Geneve Langlois Ltd. - Merchants and Engineers
9. Hertogs Ltd. - Tool Importers
10. Ireland Fraser Ltd. - Shipping Agents, Importers & Exporters.
11. Plastic Industry (Mauritius) Ltd. - Plastic Injection & Blow Moulding Ltd.
12. Plyform Ltd. - Woodwork and Furniture
13. Taylor Smith & Co.Ltd. - Marine Engineers
14. Gustave Maurel - General Engineers

APPENDIX 4

REFERENCES

Reports and publications consulted during the mission

1. Copy letters from UNIDO files relevant to the project.
2. Report on the "Expert Group Meeting on Agricultural Machinery Industry in Developing Countries". 18-22 August, 1969 UNIDO Vienna.
3. "New Commonwealth" trade and commerce. Special focus feature "Mauritius" projecting Commerce, Industry, Investment, Tourism and Development.
4. Mauritius "Commerce and Industry" 1967 edition.
5. Mauritius "Commerce Industry Tourism" 1970 edition.
6. Report on "Status of Agricultural Machinery Industry" as per 1st January, 1970.
7. "Land and Water Resources Survey". Mauritius Final Report Volume 1 by U.N.D.P./ F.A.O. of the United Nations.
8. "Bi-annual digest of statistics" Volume 4 No. 2 December, 1969, by the Central Statistical Office of the Ministry of Economic Planning and Development.
9. "Agricultural Diversification in the Mauritian Economy" by R. Lalusse reprinted from la Revue Agricole et Sucriere de l'Ile de Maurice. 1970 49 212-217.
10. "Annual Report of the Customs and Excise Department" for the year 1969.
11. "Industrial Projects Selection" by R. Ulfsax 1971 Economic Planning Unit, Ministry of Economic Planning and Development.
12. Mauritius "Export Processing Zones".
13. "Industrial Trade Training Centre" Ministry of Education and Cultural Affairs.

APPENDIX 5

LIST OF TOOLS

	<u>Comments</u>
1. Pruning knife (small)	
2. Pruning knife (large)	
3. Grass sickle.	
4. Cane knife.	Identical to "Bill Hook"
5. Rangers knife.	
6. Sledge hammer (straight pein 14 lbs).	
7. Tetu hammer.	
8. Hoe (cheeling)	
9. Hoe (West African)	
10. Hoe (light)	
11. Axe	
12. Alavangoe (straight)	Not used.
13. Alavangoe (curved)	
14. Scythe (29" blade)	
15. Bill Hook	Identical to "Cane knife".
16. Hand shears	
17. Pick axe (24" cross point)	
18. Sledge hammer (6 lbs)	
19. Spade.	
20. Spade narrow	not used.
21. Shovel.	
22. Trowel.	
23. Rake (12 teeth)	
24. Fork (4 prong)	
25. Fork (hand)	
26. Crow Bar.	
27. Watering can.	Made locally.
28. Hand duster	Made locally and imported.
29. Hand or knapsack sprayer.	

APPENDIX 6

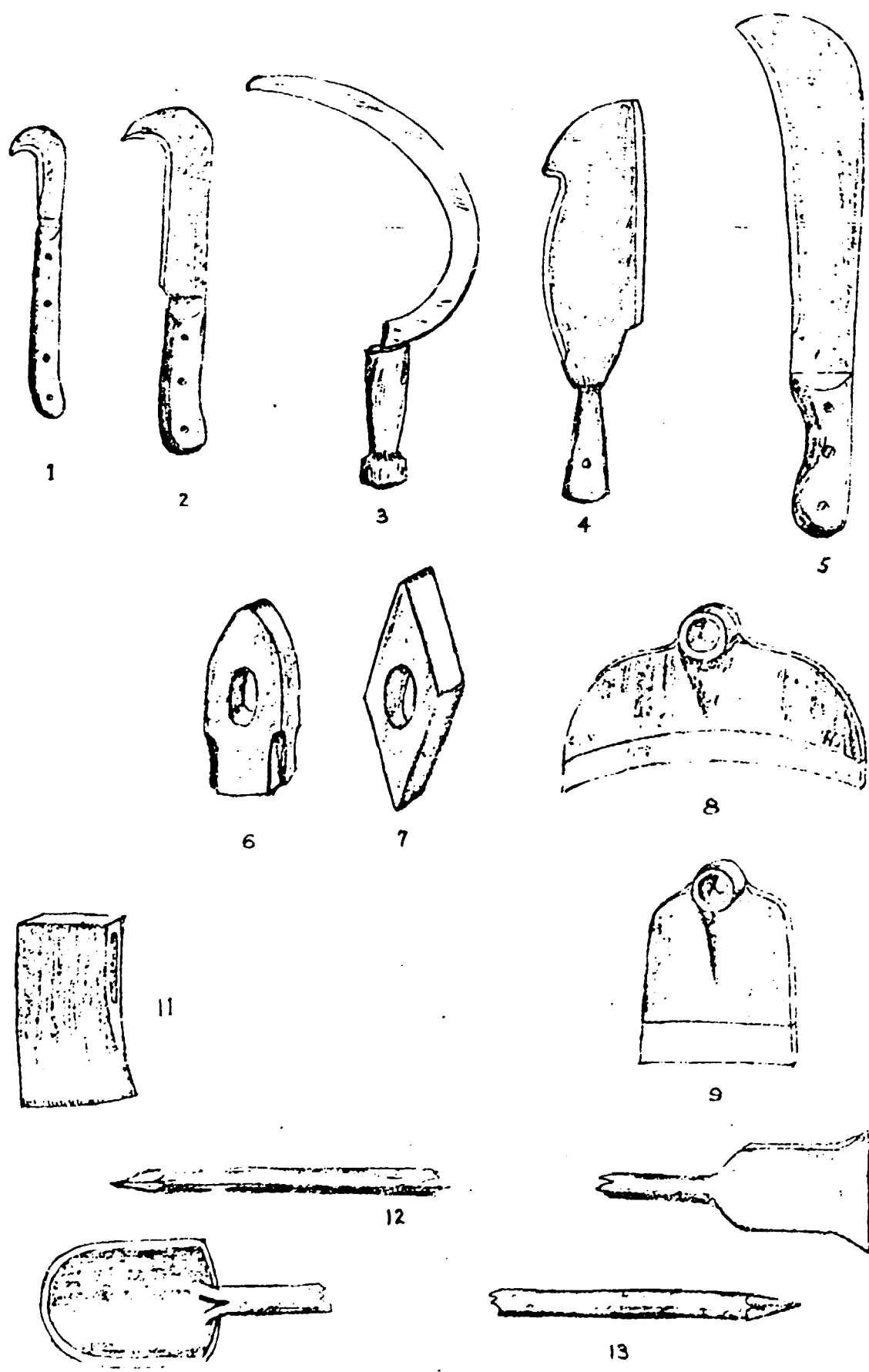
TOOLS

(Classified according to method of manufacture)

		<u>Annual</u> <u>Imports</u>	<u>Group</u> <u>Total</u>
A. Knives (forged)			
Cane knife or bill hook (4)		13500	
			13500
B. Hoes (forged)			
Hoe-Cheeling' (8)	}	2536	
Hoe-West African (9)	}	2536	2536
C. Knives (stamped)			
Pruning knife (1) (2)		1452	
Rangers knife (5)		792	
Scythe (13)		290	
Grass sickle		33468	36002
D. Shovels			
Shovel		2044	
Spade		60	
Trowel		635	
Hoe - light		46464	49203
E. Forks			
Fork (hand))	2460	
Fork (4 prong))		
Rake (12 teeth)		1212	3672
F. Strikers (forged)			
Axe (11)		864	
Pick axe		216	
Sledge hammer		333	
Tetu hammer		70	
Crow bar		48	
Alavangoe - total inventory 41		-	
(12) (13)		-	1531
G. Complex			
Hand duster		6	
Knapsack sprayer		638	
Hand shears		2213	2857

Note Figures in brackets refer to Tool Identification Sheet Appendix 7

APPENDIX 7



TOOL IDENTIFICATION SHEET

APPENDIX 8

TOOL DESCRIPTIONS.

Note. An asterisk indicates that the tool is illustrated in Appendix 9.

* 1. Pruning knife (small).

This knife is used in the tea plantations and the stamped sheet steel blade is $3\frac{1}{2}$ " long x $\frac{3}{4}$ " wide x $\frac{3}{16}$ " thick.

The blade is hooked towards the tip and sharpened on the hooked side only, below the hook.

The 9" long handle consists of two pieces of wood, one fitted on each side of the handle and rivetted through. The overall length of this knife is $12\frac{1}{2}$ ".

* 2. Pruning knife (large).

This knife is used in the tea plantations and the stamped sheet steel blade is 8" long x $1\frac{1}{2}$ " wide x $\frac{7}{32}$ " thick.

The blade is hooked towards the tip and sharpened on the hooked side only, below the hook.

The 6" long handle consists of two pieces of wood, one fitted on each side of the handle and rivetted through. The overall length of this knife is 14".

* 3. Grass sickle.

This sickle is in general use and the cast steel blade is $7\frac{3}{8}$ " across the chord x $\frac{7}{8}$ " wide x $\frac{3}{16}$ " thick. The upper surface of the blade is ground overall and the lower surface has angular serrations behind the cutting edge.

The tang of the blade passes right through the 5" wooden handle and is nobbled over at the end. The overall length of this sickle is 15" and there is also a model with a stamped sheet steel blade.

* 4. Cane knife or Bill Hook.

This bill hook, so called because that is how it is listed in the "Elwell" catalogue, is in fact the most commonly used form of cane knife.

Made of cast steel it is $15\frac{1}{4}$ " long and the 4" wide blade has two cutting edges, one almost straight and the other curved and slightly hooked at the upper end.

The handle is an integral steel taper socket, designed to take a wooden shaft but always used without it.

* 5. Rangers knife.

Otherwise known as a Matchet, this knife is in general use, has a stamped sheet steel blade 16" long x $2\frac{5}{8}$ " wide x $\frac{1}{8}$ " thick and is sharpened on one side only and curved slightly towards that side.

The 6" long handle consists of two pieces of wood, one fitted on each side of the blade and rivetted through. The overall length of this knife is 22".

* 6. Sledge Hammer (straight pein).

This is the normal type of straight pein sledge hammer, and is in general agricultural use.

* 7. Tetu Hammer.

Used for breaking stones, the Tetu hammer is a form of sledge hammer with a straight pein at each end. The straight peins however have a sharper edge than those of the normal straight peined sledge hammer.

* 8. Hoe, Cheeling.

The forged steel blade has a $1\frac{3}{4}$ " handle socket with its centre line at right angles to the face of the hoe.

The slightly curved hoe blade is 13" across the straight bottom edge, and 7" high. The top edge curves in from the ends to the handle socket in the centre.

* 9. Hoe, West African.

The forged steel blade has a $1\frac{2}{3}$ " handle socket with its centre line at right angles to the face of the hoe.

The hoe blade is flat, $6\frac{1}{2}$ " across the bottom edge, 6" across the upper shoulders, and $8\frac{1}{2}$ " high.

10. Hoe, Light.

Normal type of garden hoe.

* 11. Axe.

The type of axe preferred is an old (possibly obsolete) "Elwell" model of felling axe. The forged steel head is $9\frac{1}{2}$ " long, with a blade length of $4\frac{1}{2}$ ".

This and many other of the "Elwell" models may no longer be available due to the recent merger of the Elwell Forge with other agricultural tool manufacturers in the United Kingdom.

* 12. Alavangoe (straight)

This tool, special to tea plantations, is shaped like a small flat spade.

The blade is flared out slightly at the bottom edge, but even so is only 4 $\frac{1}{2}$ " across and 7" high.

This tool is of heavy construction, made of forged steel $\frac{3}{4}$ " thick. The handle is $\frac{7}{8}$ " diameter, forged integral with the blade and terminates in a point at it's upper end.

This tool is very little used nowadays.

* 13. Alavangoe (curved)

Special to tea plantations and similar in construction and materials to the straight version above, except that the bottom edge of the blade is curved, and the blade is also curved across its width.

The blade is 5" wide x 7" high x $\frac{1}{2}$ " thick, and the $\frac{7}{8}$ " diameter steel handle is forged integral with the blade, and pointed at the upper end.

This tool is very little used nowadays.

14. Scythe

A normal 29" straight bladed scythe having a pressed steel blade. There are no special features.

* 15. Bill Hook or Cane Knife.

See "4" above - Cane knife.

16. Hand Shears

Normal type of garden hand shears.

17. Pick Axe.

Normal pick axe having a point at one end and a cross point at the other.

18. Sledge Hammer (light)

In addition to the sledge hammer described in "6" above, there is also in use a light sledge hammer of 6 pounds weight, but otherwise of normal construction.

19. Spade

Normal type of garden spade.

20. Spade (narrow)

A curved spade with a pressed steel blade 15" long x 6" wide at the bottom, and 7" wide at the top, with treads on both sides of the top edge of the blade. A wooden "D" handle is fitted. Where the wooden handles are closely integrated with the blades, as in this case, the handles are not made locally.

21. Shovel

Normal square mouthed shovel of pressed steel with a wooden "D" type handle. Where the wooden handles are closely integrated with the blades, as in this case, the handles are not made locally.

22. Trowel

Normal hand trowel as used for domestic gardening.

23. Rake (12 teeth)

Normal metal garden rake with a wooden handle.

24. Fork (4 prong)

Heavy duty fork with flattened prong tips and metal reinforcing to the front and back of the wooden shaft.

A "D" handle is fitted having a metal stirrup and wooden cross piece.

25. Fork (hand)

Normal hand fork as used for domestic gardening.

26. Crow Bar

Forged steel crow bar 72" long x 1 $\frac{5}{8}$ " diameter, one end pointed, the other end flat.

27. Watering Can

Heavy construction horticultural type, all made locally.

28. Hand Duster

These assume a variety of shapes but most of them are variants of the concertina principle, in which a fabric tube is closed at each end by a wooden disc pierced by a number of holes. The tube is filled with the powder to be dusted, and a concertina action disperses the dust as a cloud through the holes. Almost without exception these are made locally.

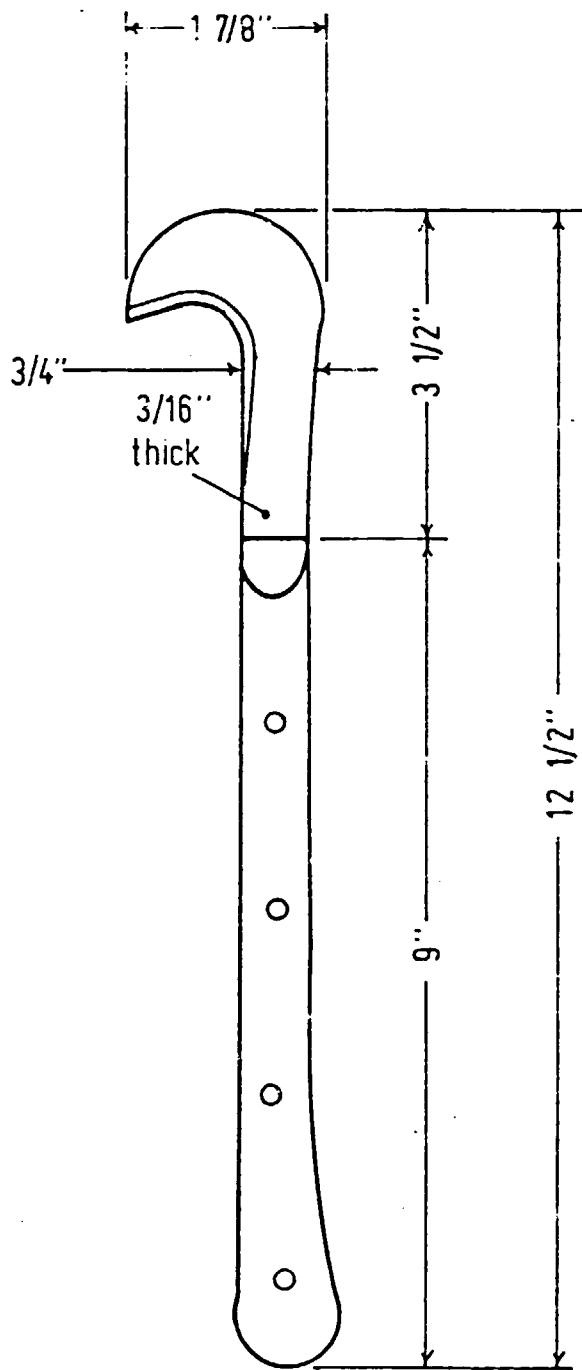
29. Hand or Knapsack sprayer

This consists of a 4 gallon container of metal or plastic, which is mounted by a harness on the back of the operator.

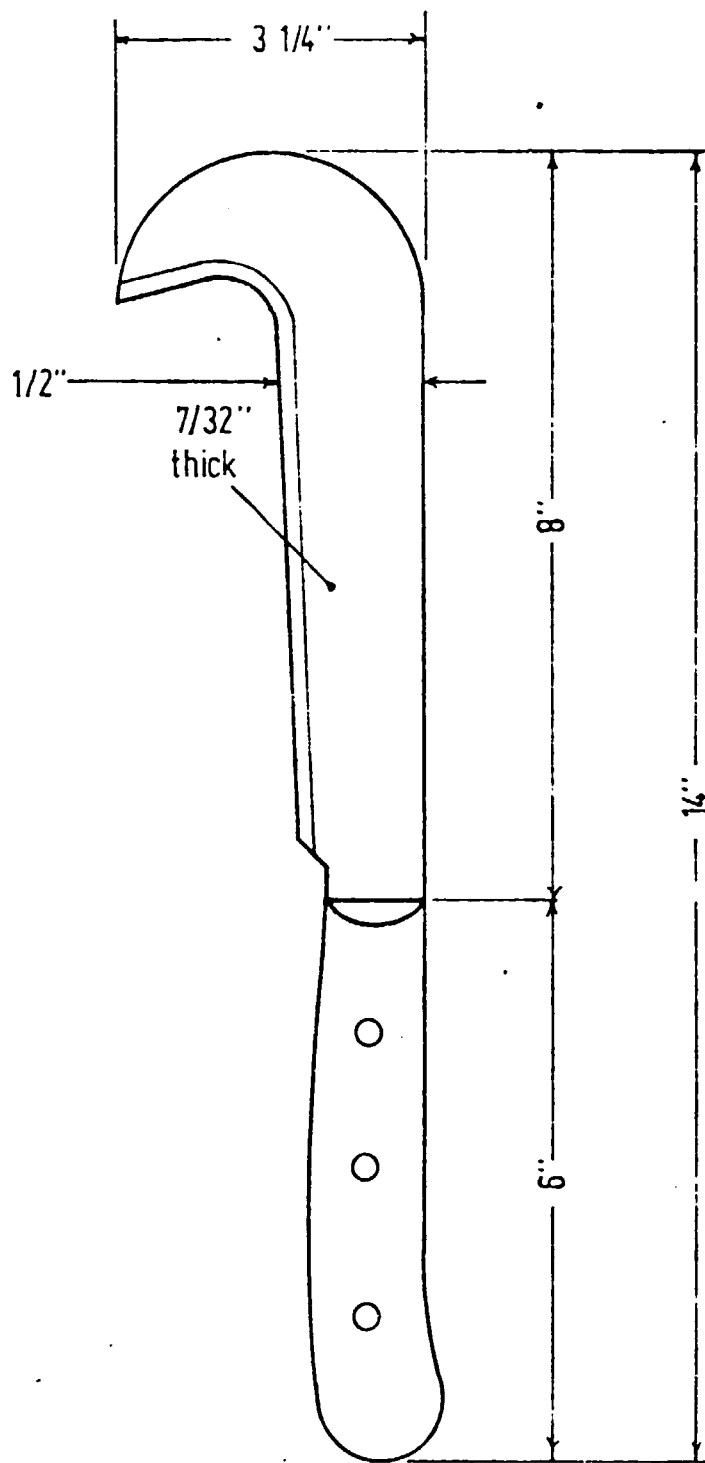
A hand operated pump dispenses the contents of the container through a spray nozzle.

TOOL ILLUSTRATIONS

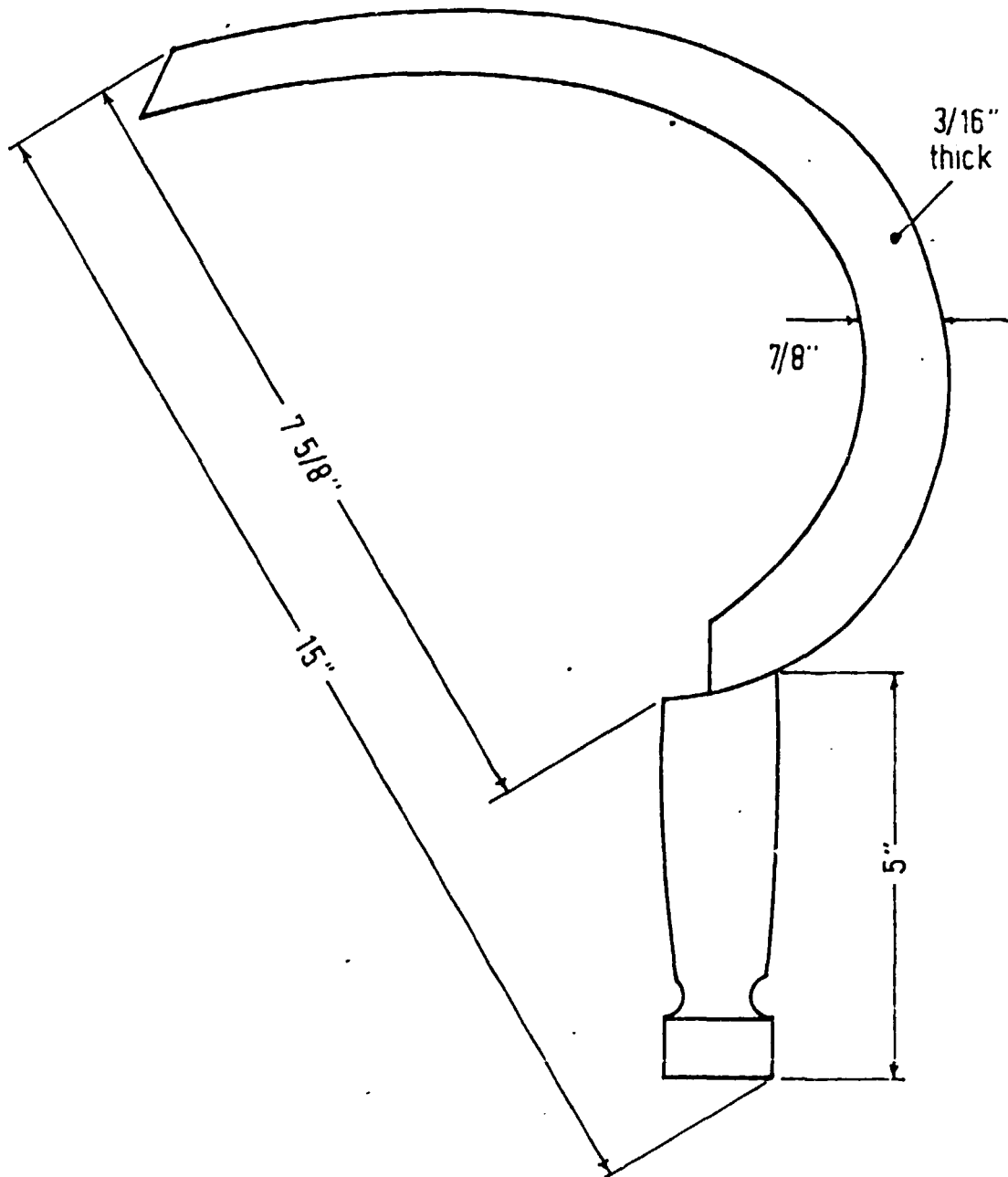
	<u>Page</u>
Pruning knife (small)	46
Pruning knife (large)	47
Grass sickle	48
Cane knife	49
Rangers knife	50
(Straight pein) Sledge hammer	51
Tetu hammer	52
Hoe cheeling	53
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Axe	55
Alavangoe (straight).....	56
Alavangoe (curved)	57
Hand or knapsack sprayer	58



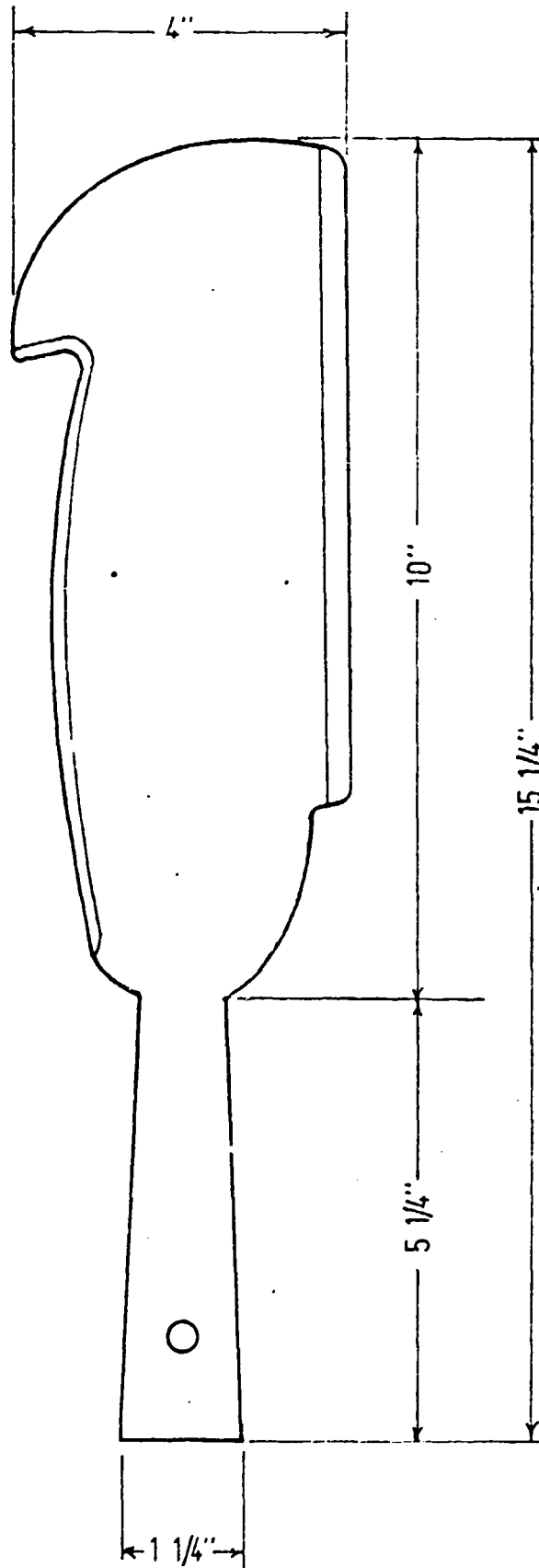
PRUNING KNIFE (SMALL)



PRUNING KNIFE (LARGE)



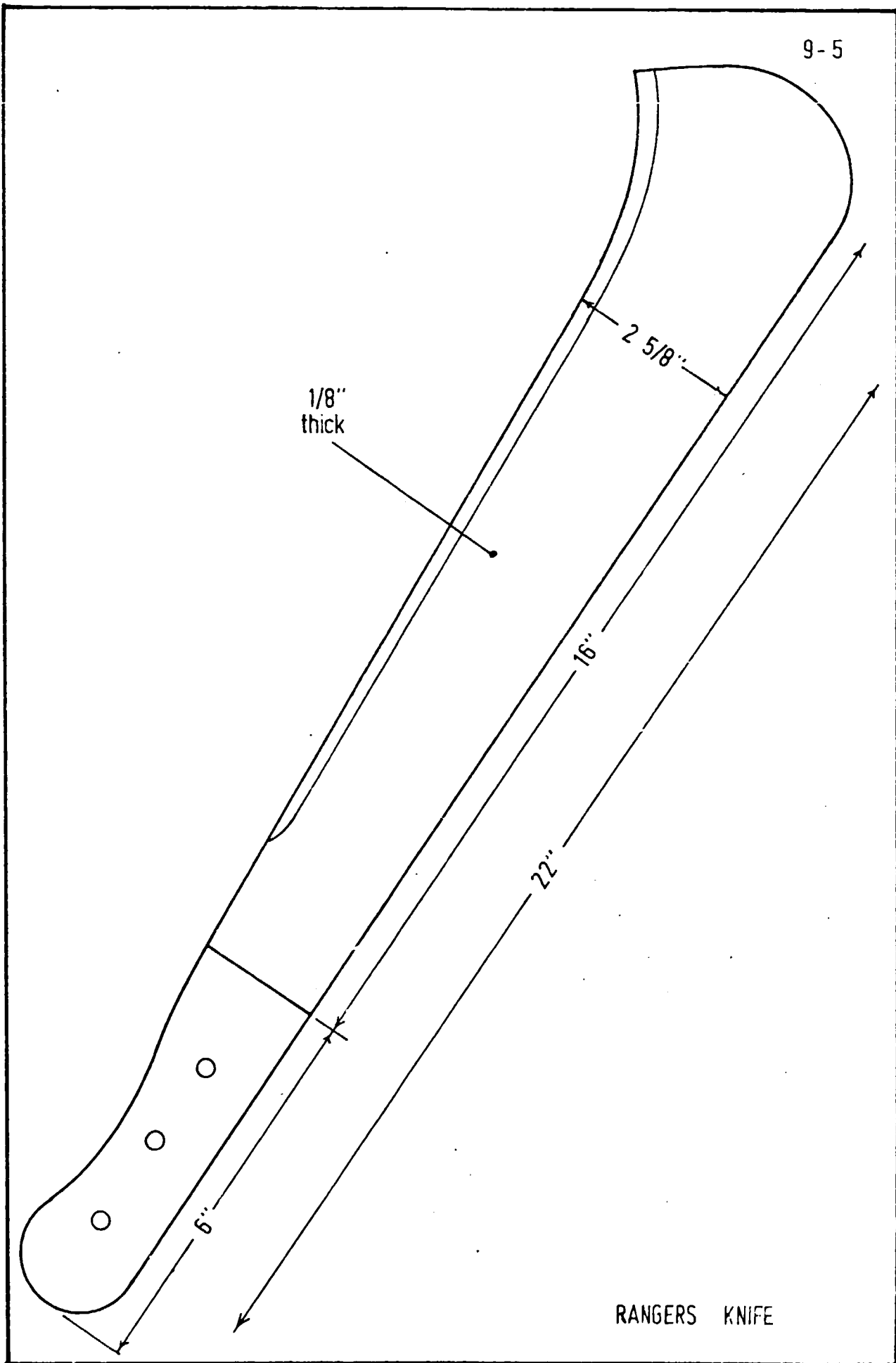
GRASS SICKLE



BILL HOOK

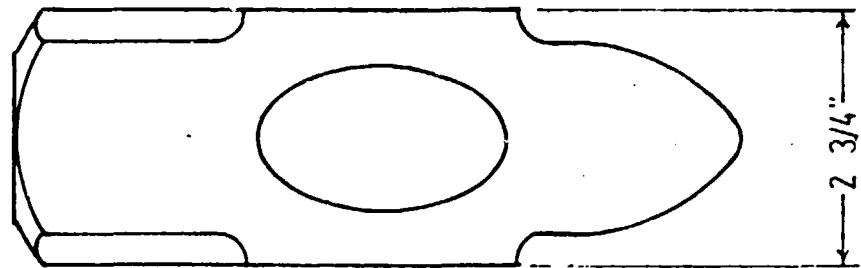
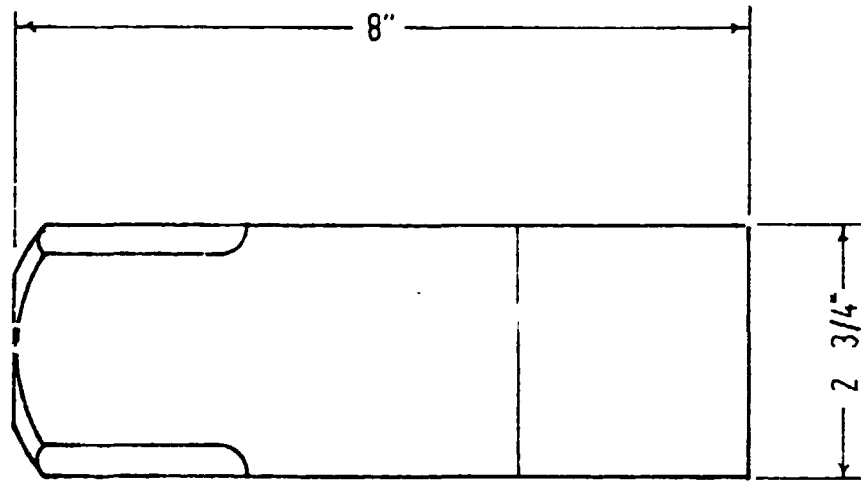
CANE KNIFE

9-5

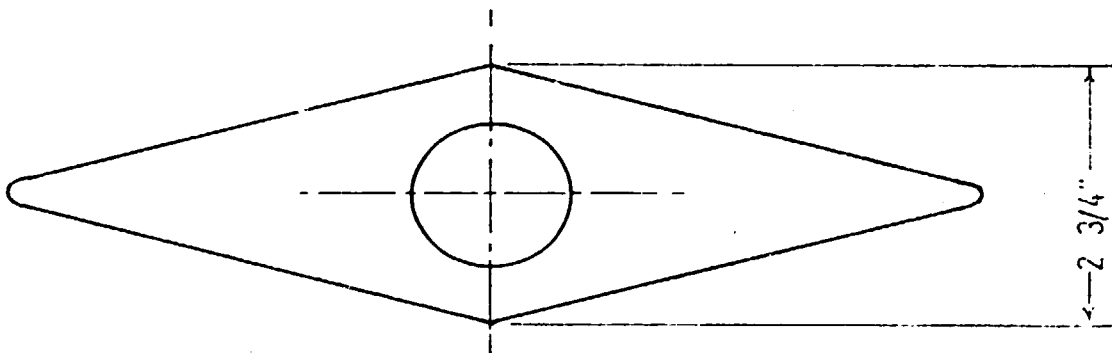
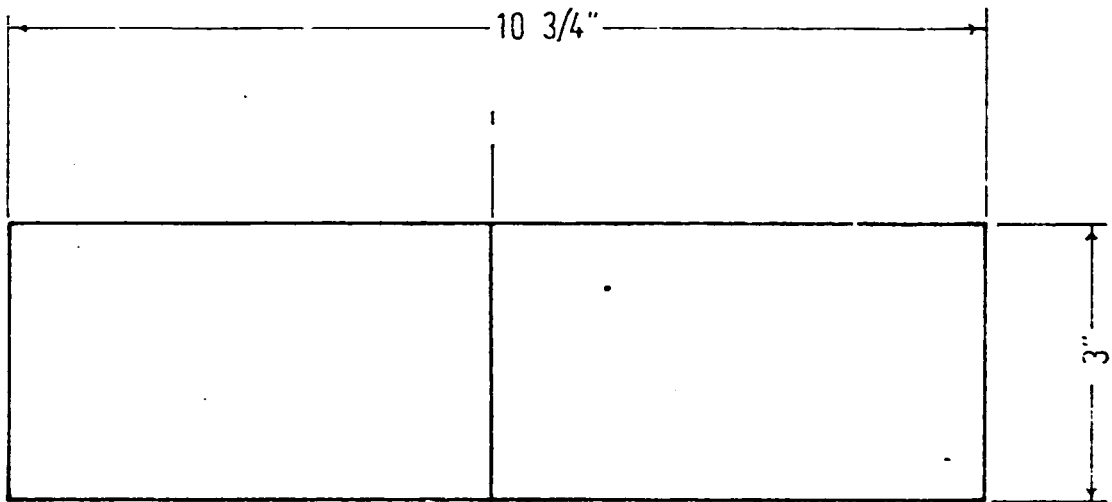


RANGERS KNIFE

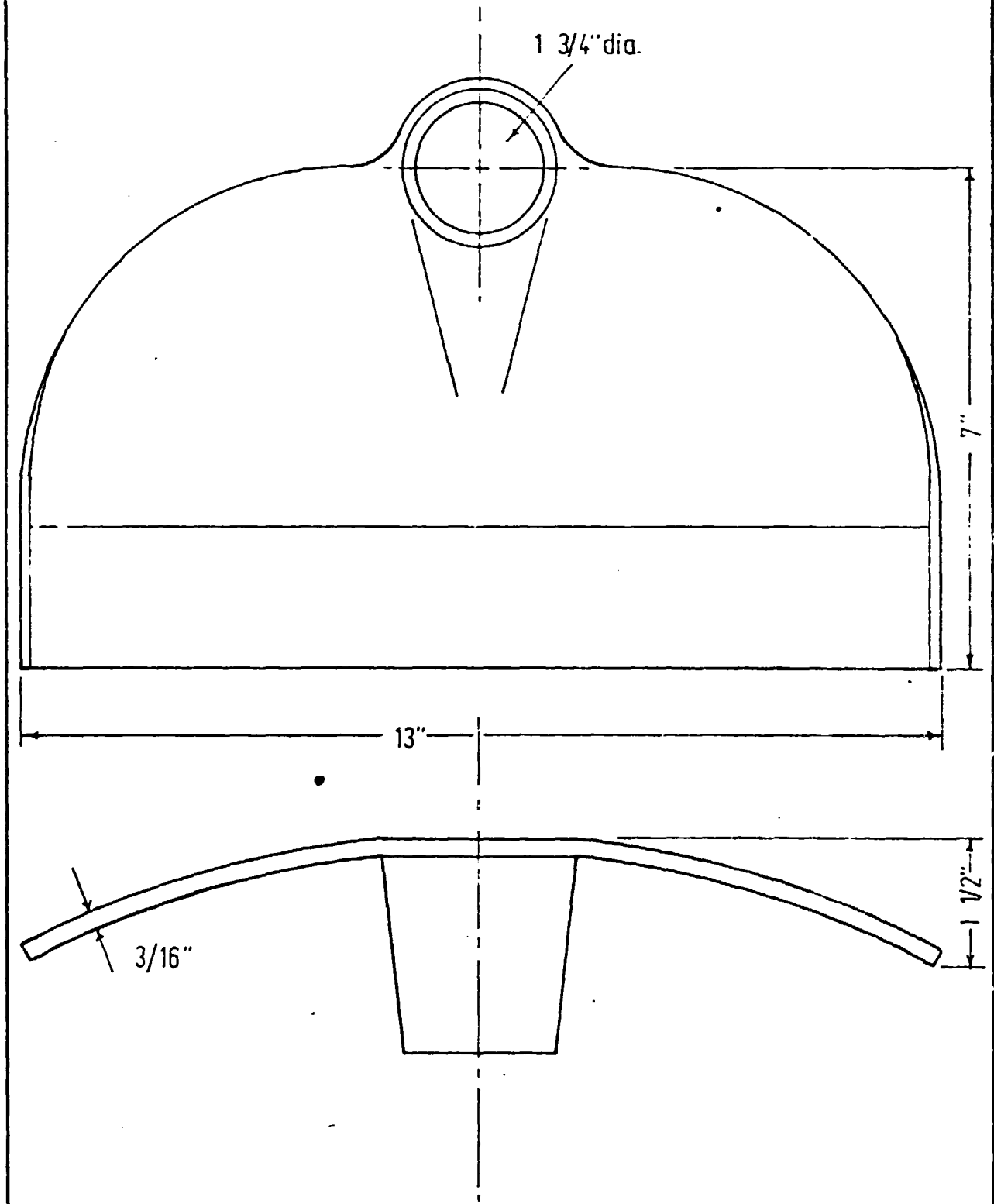
9 - 6



(STRAIGHT PEIN) SLEDGE HAMMER

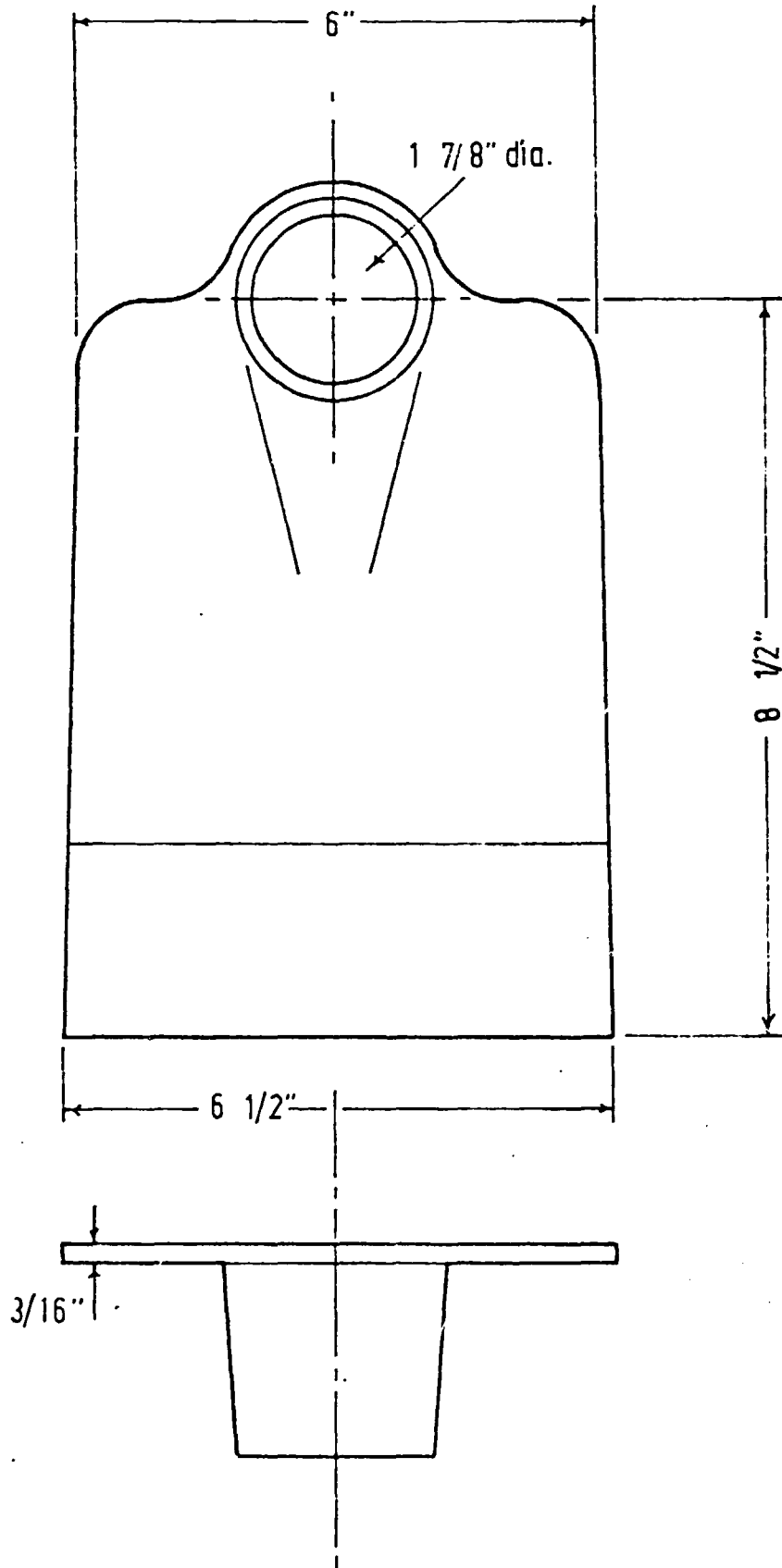


TETU HAMMER



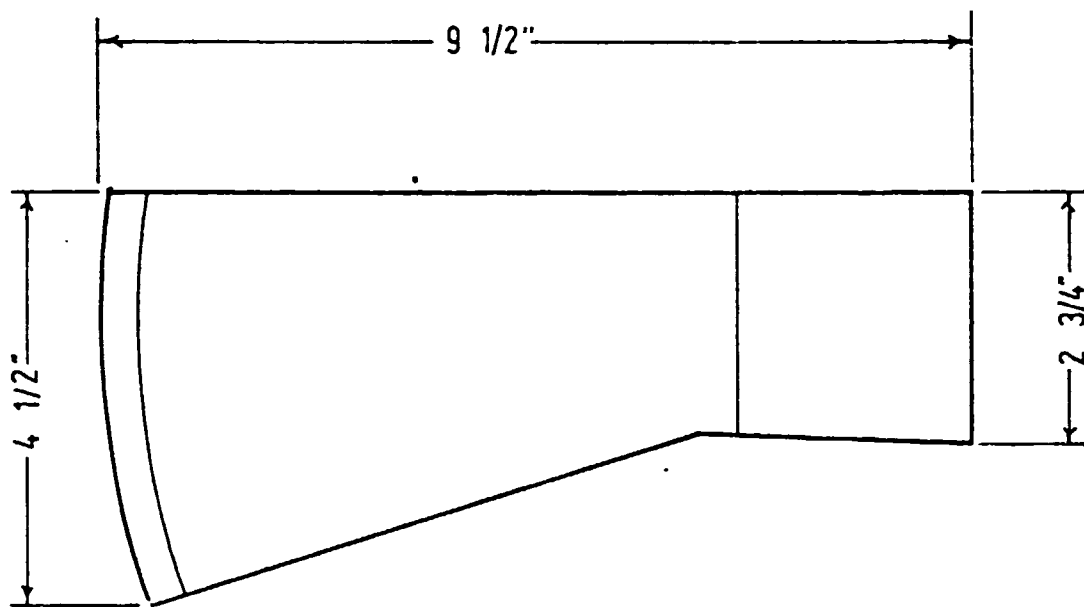
HOE CHEELING

9-9



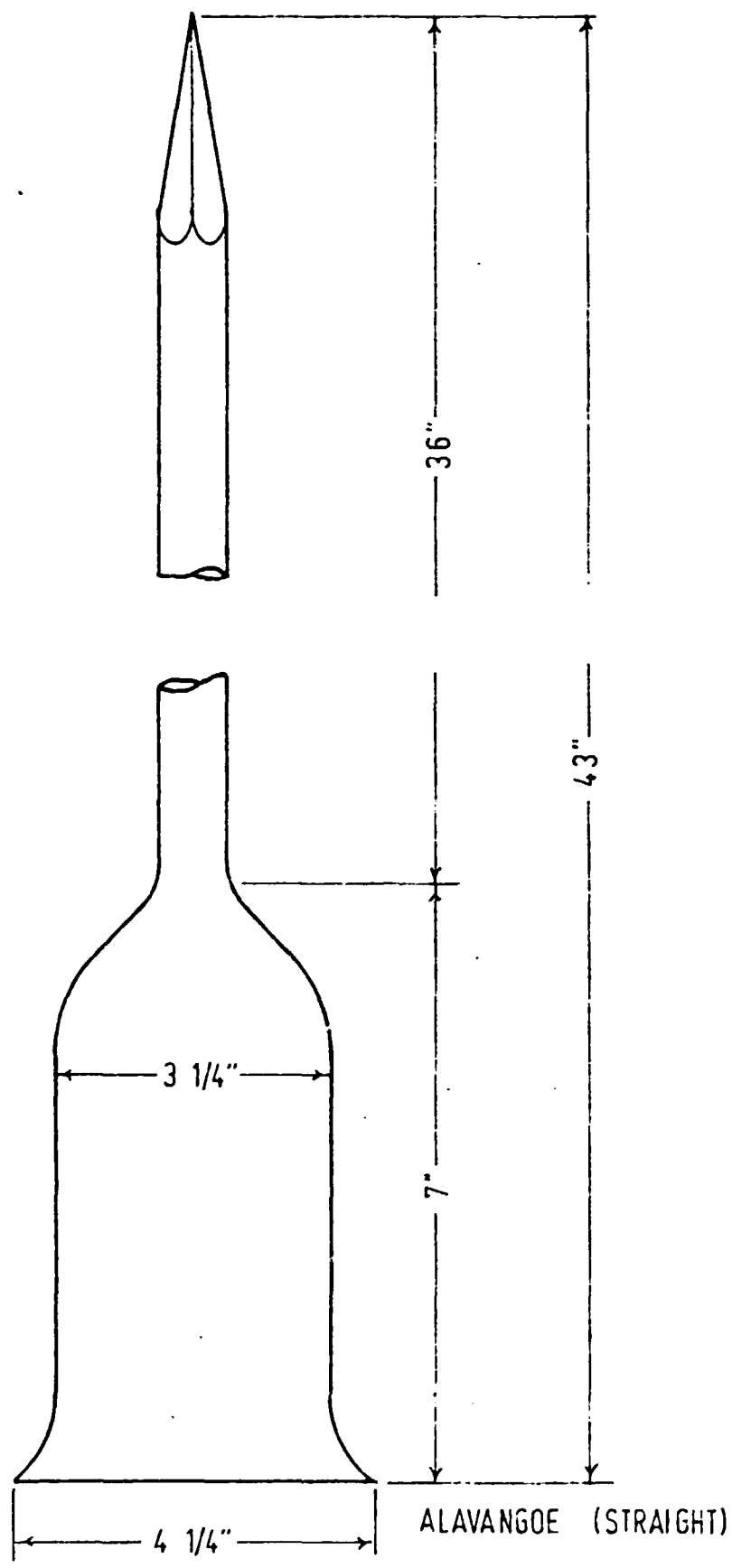
HOE WEST AFRICAN

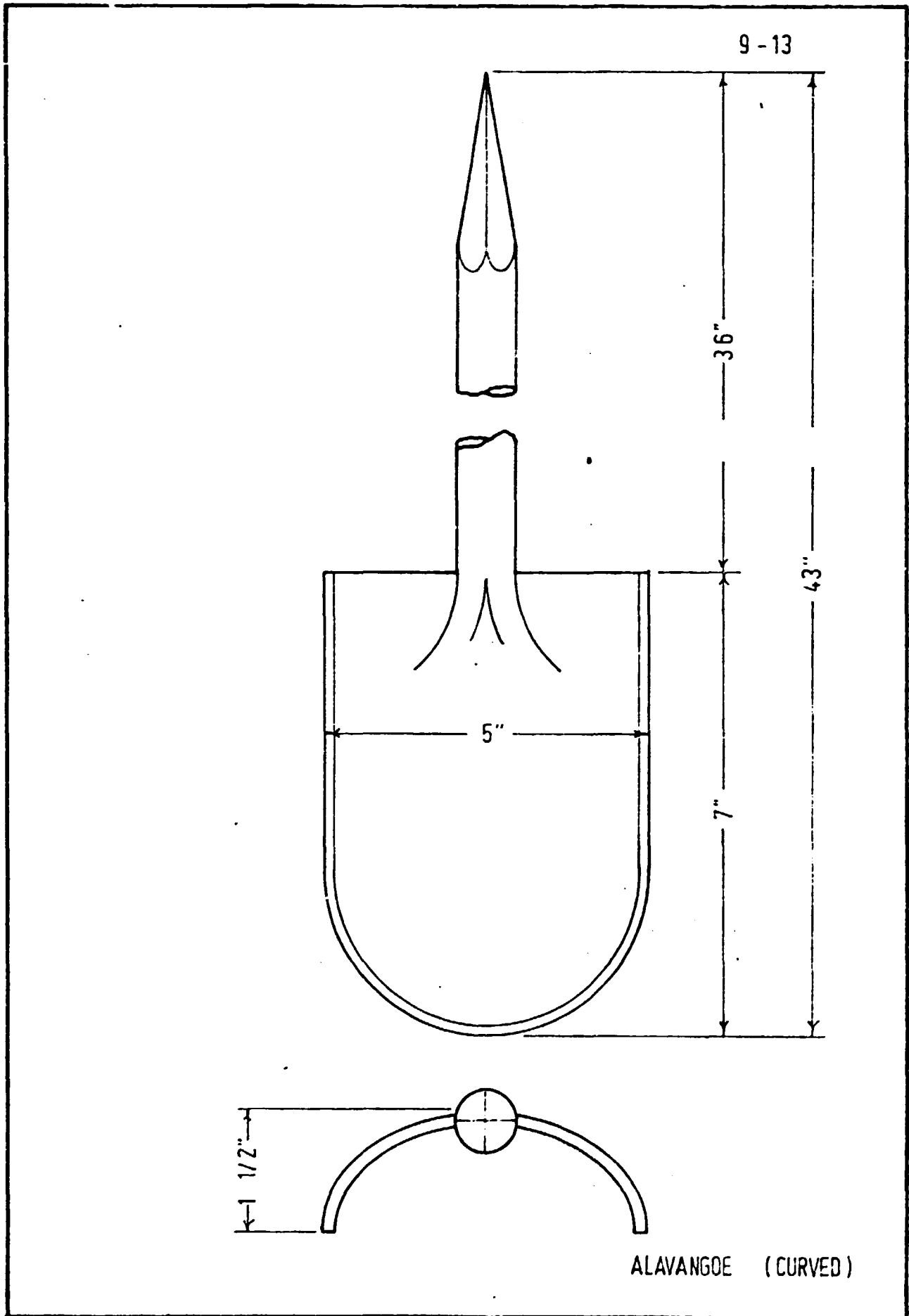
9-11



AXE

9-12



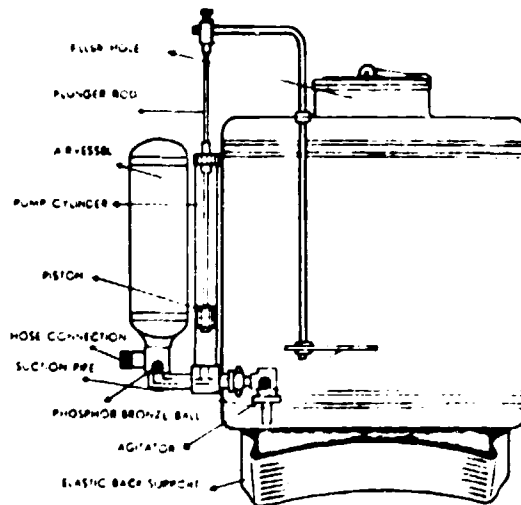


ALAVANGOE (CURVED)

PLASTIC



METAL



HAND OR KNAPSACK SPRAYER

APPENDIX 10

REVIEW OF COMPANIES VISITED

- (1) BLYTH BROS. GROUP OF COMPANIES. PORT LOUIS
This company formed in 1830 is one of the largest companies in the island comprising the Parent Company, five subsidiary companies and a trading partnership.
The Engineering Division covers a wide range of activities including the distribution and servicing of Caterpillar tractors and associated equipment, and is also active in the fields of air conditioning and overhead irrigation. The division is anxious to expand its manufacturing and assembling section at present assembling control panels and juice heaters for the sugar industry, and could be interested in any diversification into tool manufacture which could be justified. There are no forging or heat treatment facilities available in the company.
- (2) CASSIS LTD. PORT LOUIS
Subsidiary of Hall Geneve Langlois Ltd.
Mechanical and structural engineers, boiler makers and iron-founders, this company has machine shop and fabrication facilities.
Specialising in structural and general engineering work the company has capacity for diversification and would be interested in entering the agricultural tool field if this proves to be feasible. There are no forging or heat treatment facilities available in the company.
- (3) CRITTALL-HOPE (MAURITIUS) LTD. PORT LOUIS
Recently set up and equipped for the manufacture of metal door and window frames the company carries out complete manufacture from cutting to length of the special section steel, to galvanising of the finished article. The plant includes mechanical power presses, automatic welding machines, acid baths and hot-dip galvanising. The plant is modern and maintained in excellent condition. Spare capacity is available in manpower, plant and buildings and the company would be interested in diversification into agricultural tool manufacture if justified. There are no heat treatment or forging facilities available.

(4) DESERO INTERNATIONAL LTD.

PORT LOUIS

Specialising in the production of steel re-inforcement rods for concrete work, this steel rolling mill has plans for diversification into a wider range of products in the near future, and has already acquired much of the additional plant for this purpose.

Their intention is to manufacture leaf springs for motor transport and also a limited range of agricultural tools of a design suitable for manufacture in the same plant.

A second hand bloom rolling mill has been purchased and is at present lying at the factory premises, awaiting erection as soon as difficulties with the building lease have been resolved. Heat treatment facilities exist and these could be suitably modified for tool production. Forging facilities are not planned as, with the bloom rolling mill in operation, it is intended to roll steel of the correct section for the range of tools to be manufactured. It is envisaged that a hand grinding section will be set up for sharpening the tools after hardening and tempering.

(5) DOGER DE SPEVILIE & CO. LTD.

PORT LOUIS

In addition to being Vauxhall distributors and importers of tools and equipment this company is prominent in the manufacture of overhead irrigation equipment for the sugar industry.

They also developed the self-loader used by the sugar industry and have manufactured a large proportion of those on the island.

The company has machining and fabrication facilities adequate for the irrigation equipment and self-loaders they manufacture, and excellent servicing facilities for motor transport. The directors expressed their interest in possible diversification into agricultural tool manufacture. There are no forging or heat treatment facilities available in the company.

(6) FLACQ UNITED ESTATES LTD.

FLACQ

This company is the largest sugar milling company on the island and a visit was paid here to obtain the users view on agricultural hand tools and to assess whether tool manufacture would fit in with their annual shut-down engineering programme.

The majority of the sugar mills buy only engineering hand tools leaving the individual cane cutter to provide his own hand tools for work on the plantations.

Most of the sugar mills have plenty of man hours available during the shut-down period which they would like to utilise more profitably than at present, and they could be interested in any diversification programme which achieves that purpose.

(7) FORGES TARDIEU.

PORT LOUIS.

This firm of general mechanical and electrical engineers have specialised as millwrights to the sugar industry, and designers and manufacturers of sugar milling plant and equipment.

Engineering facilities include pattern shop, iron foundry, small non-ferrous foundry, machine shop including forging hammers of small capacity. There is also an automatic submerged arc welding machine and ultrasonic testing equipment. Heat treatment is available in the form of an electric top-hat furnace particularly designed for the stress relieving of reconditioned sugar mill rollers. Although tentatively interested in any tool manufacturing project, the majority of their business involves a much heavier class of work.

(8) GUSTAVE MAUREL

RIV. DU REMPART

Situated in the North of the island this company of iron-founders and general engineers, designs, manufactures and repairs sugar milling machinery and process equipment. They also design and manufacture special purpose machines for their own and other companies' use.

Their facilities include, pattern shop, iron-foundry, machine shop and heat treatment furnaces.

(9) HALL GENEVE LANGLOIS LTD.

PORT LOUIS

This company in addition to being importers and machinery merchants, are also erectors of structures and fabrications produced by their subsidiary CASSIS LTD. mentioned earlier in this review. They would be interested in sponsoring any tool manufacture taken up by CASSIS LTD.

(10) HERTOGS LTD.

PORT LOUIS

Tool merchants specialising in the import and factoring of a wide range of engineering equipment and tools. Although not manufacturers this company was visited to obtain the importer's viewpoint on agricultural hand tools.

The previously held opinion about the traditional attitude of the agricultural hand tool users was confirmed and an example of an Australian cane knife, which they had tried to introduce to the Mauritius market without success, was produced in support of this attitude.

(11) IRELAND & FRASER LTD

PORT LOUIS

Shipping agents, importers and exporters and commercial agents for a large number of engineering and other companies. General discussions held with directors of Ireland & Fraser Ltd. were very helpful in the initial stages of the study. A number of introductions were obtained to directors of engineering companies, which subsequently proved to be very useful.

Ireland & Fraser expressed interest in any future agricultural hand tool industry which may be established in Mauritius and may be prepared to set up manufacturing facilities through one of their subsidiaries.

(12) PLASTIC INDUSTRY (MAURITIUS) LTD.

PORT LOUIS.

This company which has only recently been formed is not yet in production, but has a factory building nearing completion at Plaine Lauzan.

Two Krauss-Maffei injection moulding machines are on order which will give moulding capacities of 83 - 450 gms. One blow-moulding machine is also on order with a capacity of 3 litres.

(12) Plastic Industry (Mauritius) Ltd. (contd)

The company expects to start production in July 1971, and has plans for the purchase of another injection moulding machine of 1800 gms. capacity.

The range of items to be produced includes bottles, bottle crates and sundry small items such as rulers and other stationary items. The company could be interested in the blow-moulding of the containers of knap-sack sprayers, and possibly also in other plastic components for these sprayers.

(13) PLYFORM LTD.

PORT LOUIS

Basically furniture manufacturers, this company has recently also commenced the manufacture of plastic foam in a plant of their own construction. This foam is used in their own and other companies' furniture products.

Enquiries were made here as to the potential for the manufacture of wooden handles. There is at the moment no handle manufacture in Mauritius, but a recently formed Furniture Manufacturers Association has ordered a copying lathe on which tool handles could be made, and which would be available for use by any member of the Association.

(14) TAYLOR SMITH & CO. LTD.

PORT LOUIS

This company of marine engineers builds, services and repairs small tugs and harbour going vessels and has a well equipped machine shop for this purpose, together with dry dock and slipway facilities. They are associated with Forges Tardieu Ltd. and therefore have at their disposal the equipment of both companies.

Small fibreglass vessels, advertising signs and other specialities are manufactured by their subsidiary Rexiglas Ltd.

D r a f t

APPENDIX 11

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

Request from the Government of Mauritius
for Special Industrial Services

	<u>JOB DESCRIPTION</u>	<u>SIS No.:</u>
<u>Country:</u>	Mauritius	
<u>Post title :</u>	Expert in industrial negotiations for the setting up of new factories.	
<u>Duration:</u>	Intermittent over a period of 26 months, with possible extension.	
<u>Date required:</u>	4 months after Government of Mauritius agrees and inaugurates programme. .	
<u>Duty Station:</u>	United Kingdom with possible travel to European continent and Mauritius.	
<u>Duties:</u>	<p>The expert will be expected to carry out the following assignment in the agricultural hand tools field.</p> <ul style="list-style-type: none">- examine dossier of information prepared by Ministry of Commerce and Industry, and if necessary arrange for additional information to be supplied.- analyse the present and projected tool import figures extracted by the University of Mauritius, and prepare synopsis for use in negotiations with manufacturers.- establish from these figures the largest exporters of tools to Mauritius.- establish by enquiries through trade organisations etc. the largest tool exporters to East Africa, Madagascar and associated areas.- by analysis determine which are the best three tool manufacturers to approach with a proposal.- approach selected companies with a proposal for the setting up of a tool manufacturing company in Mauritius.- assist companies to obtain fullest information about Mauritius and industrial conditions there, and if necessary organise visits to Mauritius and meetings with Government officials.- provide whatever further assistance may be necessary to achieve agreement between Mauritian Government and company concerned, and to realise the establishment of a tool factory on the island.	

Qualifications:

Knowledge of agricultural and industrial conditions in Mauritius. Extensive experience in manufacturing industries, preferably engineering. The ability to negotiate at Director level is essential.

Language:

English.

Background

Information:

An Agricultural Machinery Feasibility Study (Hand Tools and Implements) was carried out by a UNIDO expert in April 1971.

The expert's report recommends the setting up of an agricultural hand tool factory in Mauritius by inviting existing tool manufacturers, with established markets in that area to open a factory.

A detailed analysis of hand tool imports over a period of five years, and a dossier of industrial information from the Ministry of Commerce and Industry were called for as a starting point for the next phase.

D r a f t.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

Request from the Government of Mauritius
for Special Industrial Services.

JOB DESCRIPTION

Country: Mauritius SIS No:

Post title: Expert in the manufacture of hand tools and selection and installation of industrial plant and equipment.

Duration: 23 months.

Date required: 14 months after Government of Mauritius agrees and inaugurates recommended programme. (This post will only be required as an alternative to the recommended programme).

Duty Station: Mauritius with possible travel to Europe.

Duties: The expert will be expected to carry out the following assignment in the agricultural hand tools field.

- assist the Government of Mauritius in formulating an invitation to the engineering industries to submit proposals for diversification into the manufacture of hand tools.
- assist the Government of Mauritius in evaluating these proposals.
- assist manufacturers concerned in the selection of tool designs and the formation of a manufacturing programme.
- assist manufacturers in the determination of production methods, materials, shop layout, production flow etc., and the selection of plant and equipment.
- assist in the installation and start up of new plant and equipment.
- organise training schemes for new operators in conjunction with the Industrial Trade Training Centre at Beau Bassin.
- assist in setting up a quality control procedure sufficient to ensure the maintenance of an acceptable product standard.
- assist in every way possible the smooth integration of the tool manufacturing programme into that of the existing product range.

Qualifications: Industrial engineering background with extensive knowledge of and experience in the manufacture of hand tools.

Good knowledge of machine tool, plant and equipment selection and experience in the installation and start up of new plant.

Language: English or French.

Background information An Agricultural Machinery Feasibility Study (Hand Tools and Implements) was carried out by a UNIDO expert in April 1971.

The expert's report recommends the setting up of an agricultural hand tool factory in Mauritius by inviting existing tool manufacturers, with established markets in that area to open a factory.

The diversification project, of which this job description is part, is the second recommendation of the expert, to be implemented if no interest can be found among the existing foreign tool manufacturers. in the original recommendation.

TIME SCHEDULE

<u>Recommendation</u>	<u>Months</u>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33			
Tool import analysis	<u>(4 months)</u>																																				
Selection of Expert	_____																																				
Preparation of dossier	_____																																				
Approaches to tool manufacturers	<u>(6 months)</u>																																				
Negotiations with Government and selected manufacturer	<u>(4 months)</u>																																				
Factory construction, equipment etc.	<u>(16 months)</u>																																				

Alternative "b"

Government invitation to Mauritian industry	<u>(9 months)</u>																																				
Negotiations with Government	<u>(3 mths)</u>																																				
Acquisition of additional plant & facilities	<u>(11 months)</u>																																				

PERCENTAGE INCREASE ON TOOL GROUPS

D.	$49203 + 15\% = 56583 + 293\%$	(of original figure)	=	200747
C.	$36002 + 15\% = 41402 + 295\%$	(" " ")	=	146887
A.	$13500 + 15\% = 15525 + 293\%$	(" " ")	=	55080
E.	$3672 + 15\% = 4222 + 293\%$	(" " ")	=	14980
G.	$2857 + 15\% = 3285 + 293\%$	(" " ")	=	11756
B.	$2536 + 15\% = 2916 + 293\%$	(" " ")	=	10346
F.	$1572 + 15\% = 1807 + 293\%$	(" " ")	=	6413

