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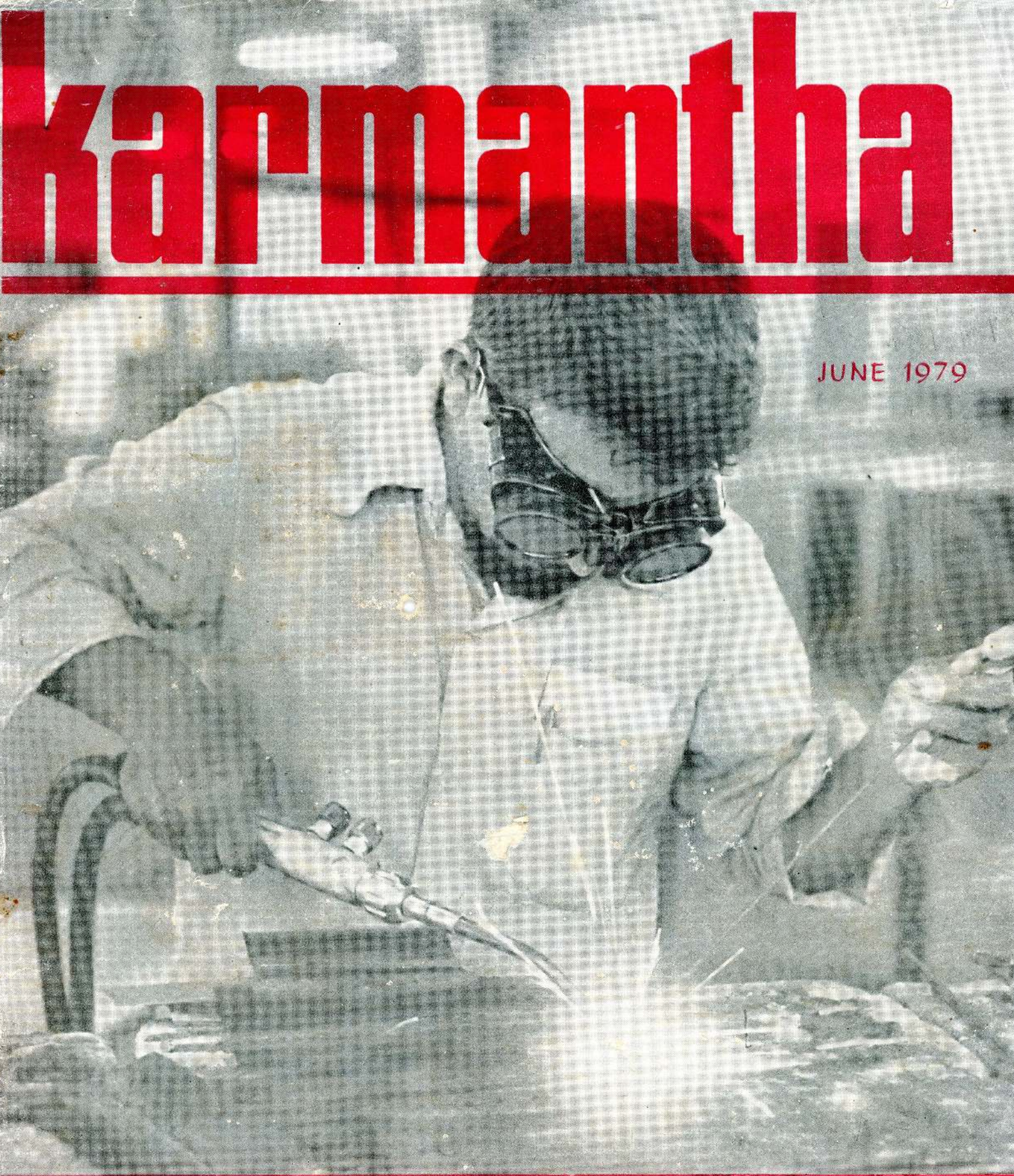

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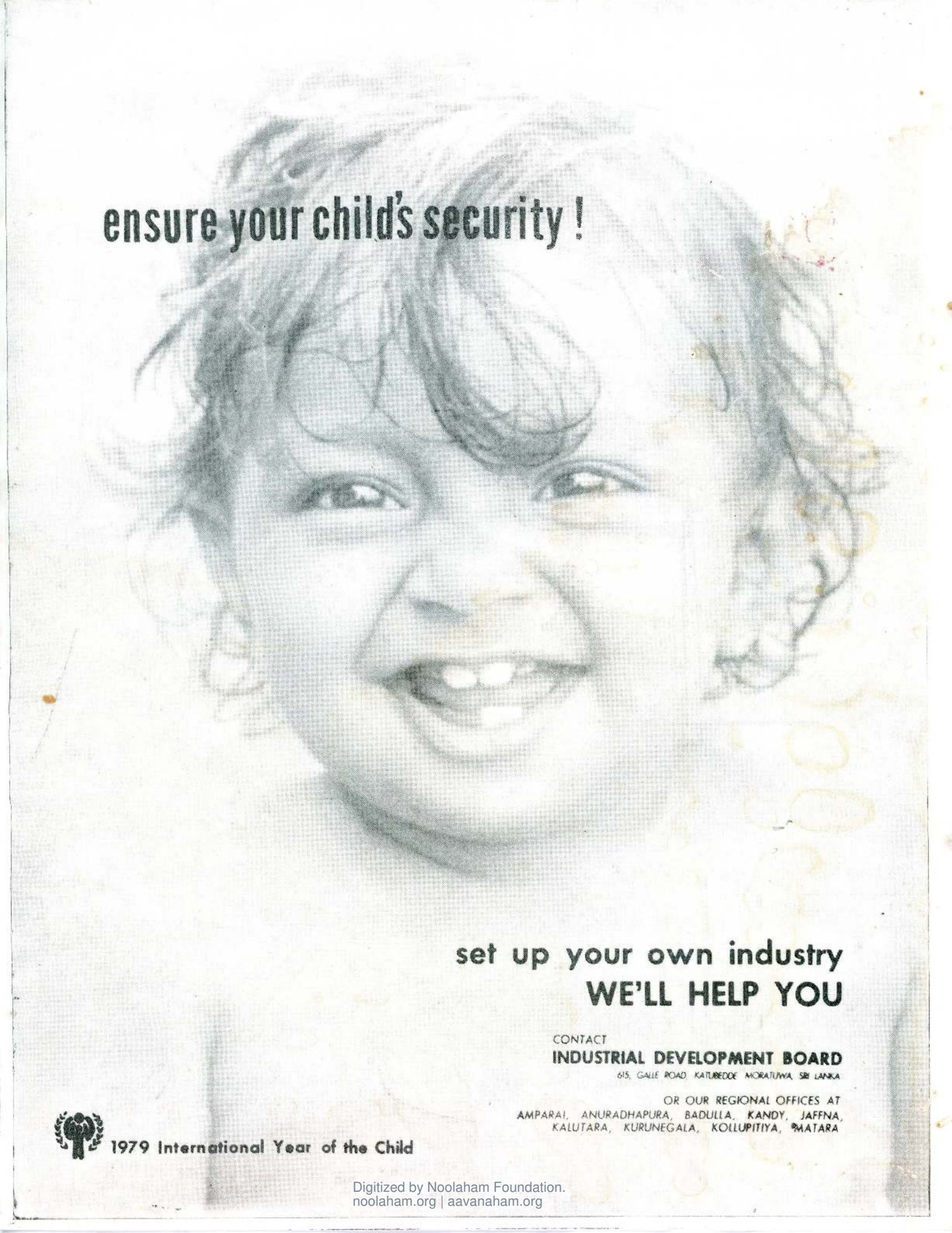

KARMANTHA

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Industrial Development Board of Ceylon
615, Galle Road, Katubedda, Moratuwa.

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Edited by
Philip L. Ramenaden

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The Welding of metals

By S. M. Jayawickrama
IDB

With the vast advances that have been made in industry and in modern technology, welding has come to play an important role today. In practically very field of industry dealing with metals, welding is essential. Therefore if the finished product is to have a good appearance and quality, welding has to be done carefully. These are various processes that are used for welding today. However among these, the commonly used ones are the gas and arc welding processes.

The heat required for welding in the gas process is provided by a flame which is produced by burning a mixture of gases. Thus this type of welding, which is performed by the combustion of gases, is known as 'Gas welding'. Though a variety of gases are used commercially, an oxy-acetylene mixture, is most commonly used because of its high temperature and the ease of handling the gas. In this mixture, the oxygen is produced by either the "electrolytic" process or by a separation method known as the "liquid air" process, while the 'acetylene' is a hydro-carbon gas that is produced by the action of water on calcium carbide. For welding purposes, it is dissolved in acetone and stored in steel cylinders.

When acetylene and oxygen are mixed in the correct proportions and ignited, the resulting flame is of a temperature of 6,300° F (3,482° C). This heat is

intense enough to melt all commercial metals, therefore it is then easy to join them by either using mechanical pressure or by hammering. Except in the case of very thin material, extra metal in the form of a wire-rod, which in welding parlance is called a 'filler rod', is usually added to the molten metal inorder to strengthen the seam.

Metals which could be welded with oxy-acetylene flame are iron steel, cast-iron copper, brass and aluminium. However it is also possible to join some dissimilar metals such as steel and cast-iron, brass and steel, copper and iron, brass and cast iron. The oxy-acetylene flame is also used for cutting metal, case hardening and annealing.

Though there are various welding processes in vogue, the ones that are commonly used are the low pressure system using pressure between 1.72 KN/m^2 and 620.53 KN/m^2 and the high pressure system wtih a pressure of 1551.3 KN/m^2. The difference between the two is the difference in the method of manufacture of acetylene. In the high pressure system, the acetylene is manufactured and stored in a liquid or dissolved state at high pressure in steel cylinders, while in the other system, it is manufactured as and when it is required. However, of the two, the high pressure system is more commonly used especially in Sri Lanka, because it has a number of advantages over the low pressure process.

The Advantages are as Follows:

* *Portable equipment could be used for welding and cutting metals. Therefore the operator need not be tied down to one particular loca... He could take the equipment where it is needed.*

* *The gases in the cylinders are under perfect control and do not need any maintenance either in or out of use.*

* *The acetylene in the cylinder is always of the highest degree of purity and this facilitates the operation because it enables the operator to make welds of the best quality. Furthermore it also ensures that there is no danger to either the operator or to the place of storage.*

* *The equipment needed for the high pressure welding is easy to handle and transport. Therefore it is best for jobs like car body construction and repair.*

Equipment

High pressure Welding Equipment comprises:

1. A cylinder of dissolved acetylene.
2. A cylinder of oxygen,
3. High pressure welding torchs with separate oxygen and acetylene controls and various sized tips' for different thicknesses of materials,
4. Acetylene and oxygen regulators with gauges,
5. High pressure rubber canvas hose with clips,
6. Keys and spanners, welding goggles and cylinder trolley

Low Pressure Welding Equipment consists of:

(*a*) A supply of acetylene from a generating plant,

(*b*) A supply of oxygen in a cylinder,

(*c*) An injection-type welding torch with welding nozzles.

(*d*) Rubber hose for connecting welding torch to acetylene and oxygen supply,

(*e*) An oxygen pressure regulator

(*f*) The spindle key for oxygen cylinder.

Welding Rods

Good quality metal must be used in the Filler rods which are used in oxy-acetylene welding because it has a considerable effect on the quality of the finished weld. Good welding rods are therefore designed to give deposited metal of the correct composition. They are also manufactured to allow for changes during welding. Some have a copper coating to keep their surfaces free from oxides or rust. However clean uncoated rods too are equally efficient.

Filler rods in the following metals are available: mild steel, high carbon steel, wrought iron, alloy metal, stainless steel, cast iron, copper, copper alloys, alluminium and alluminium alloys and zinc based die alloys.

However it is impracticable to incorporate in welding rods all the elements necessary to overcome oxidation.

Therefore de-oxidizing agents or fluxes would have to be used to ensure perfect welds. It is necessary to use a flux with the following if good results are desired: cast iron, high carbon steel, stainless steel, copper and its alloys, alluminium and its alloys and magnesium alloys. In most cases, the flux residues should be removed after welding is complete.

Types of Flame

When acetylene is burnt with an equal volume of oxygen, a maximum flame temperature of over 3,200°C could be obtained. However by varying the proportions of oxygen and acetylene, various types of flames having varied intensities could be obtained.

The most commonly used flame is the one obtained by using equal quantities of acetylene and oxygen where combustion is complete. This is the flame used to weld mild steel, copper and magnesium.

The gases could be adjusted so that all the acetylene expelled is not burnt and the oxygen supply could be regulated so that there would be an excess of acetylene and an insufficient supply of oxygen.

A flame of this type is ideal for welding high carbon steel aluminium, inconel and monel metal in the technique of stelliting for stainless steel and wherever excess of oxygen on metals would cause detrimental oxidation. This type of flame however sometimes deposits carbon which leads to the formation of hardenable material which cracks.

Oxidizing Flame

If the oxygen supply is increased, the flame emitted would be of the characteristic purple because of the excess oxygen available. However in this case, the molten metal would be less fluid during welding and excessive sparking too would occur. This type of flame is meant for special applications and for welding of brasses. bronzes and copper-silicon alloys but not for steel welding.

Heat Valve

The heat valve or power of the flame is governed by the size of the orifice in the tip used, and the power required depends on the thickness, mass, melting point and heat conductivity of the metal to be welded.

The power of the torch depends on the volume of acetylene consumed in an hour with the flame perfectly regulated. This is sometimes marked on the welding torch itself. However care must be taken to ensure that the heat valve of the flame is adjusted by changing the tip instead of by unduly increasing or decreasing the pressure and the volume of the gases used because a too low pressure would give too short a cone' which would cause lack of penetration and fusion, frequent back firing and deflection by particles of metal and slag thrown up from the weld, while a too high pressure would cause overheating and lack of control of the molten metal and this would result in adhesion and over penetration.

Technique

Welding is done using either the rightward or leftward techniques. However the rightward technique is favoured because this process is quicker and it consumes less gas than the leftward method. This method is recommended for welding steel plates over 4.763 mm thickness. In this method, the weld is started at the left hand end of the joint and the torch is moved steadily along the weld seam.

The leftward technique however is recommended for welding steel, cast iron and non-ferrous metals.

However apart from the quickness and economy of the rightward welding method, there are other advantages as well in this process. They are:

(1) The direction of the flame holds back the molten pool thus preventing any tendency to adhesion

(2) The flame being held directly towards the root of the weld, causes a hole to form as the edges melt, thus ensuring complete penetration

(3) No preparation is necessary on thicknesses upto 7.938 mm.

Method

The characteristics of the rightward technique are as follows:

(1) Position : Flat

(2) Direction of welding : Flame points towards finished weld.

(3) Angle of welding torch : 40° to 50°

(4) Movements of welding torch : Straight along seam with sufficient side swing to ensure complete fusion of the edges.

(5) Power of welding torch : 6 cube feet (0.1699 m^3) per 1/16 inches (1.58 mm) thickness Neutral flame.

(6) Filler rod angle : 30° to 40°

(7) Filler rod position : Follows welding torch

(8) Filler rod movement : circular forward action.

(9) Filler rod size : Half the plate thickness upto a maximum of 1/4 inches (6.350 mm)

In both techniques, edge preparation becomes necessary at 1/16" (7.938 mm) and 1/8" (3.175 mm) respectively inorder to obtain complete fusion without adhesion. This involves extra cost and additional filler material, therefore if the edge preparation could be avoided, welding costs could be reduced.

Edge Preparation

In order to produce a satisfactory 'butt' weld—that is a weld in which the edges face each other directly—it is essential for the plate edges to be joined throughout their entire thickness. This would mean that the edges have to be completely melted.

Square Edge

This type of welding is used for material upto 3.175 mm thickness. In this type of welding, the edges are left square and separated by a distance equal to 1/2 the thickness of the sheet. Such joints are known as 'open Butt joints'.

Single 'V'

This preparation consists of bevelling the edges of each plate so that a 'V' is formed when they are brought together. For material over 7.938 mm thickness, the angle of the 'V' should be 60°. For material of 3.175 mm and 4.763 mm, an 80° bevel is used leaving a small gap at the bottom edges.

Double 'V'

If the material to be welded is thicker than 15.875, it has to be welded on both sides of the plate. Therefore a 'V' must be provided on both sides. The top 'V' should be 60° and the bottom one, 80°. The edges should be separated by a gap of 3.75 mm to 3.96 mm.

Distortion

Care must be taken when welding to ensure that distortion or buckling is minimized. This distortion occurs when the molten or heated up iron solidifies once again and the welded seam tends to shorten in length—causing the parent metal to buckle. As iron shrinks approximately in the proportion of 3,175 mm to the foot when solidifying, the tendency to produce distortions is considerable.

Buckling and distortion could be controlled to a great extent by adopting some of the following methods:

1. **Efficient tacking or clamping which would maintain the edge position.**
2. **Tapered spacing of the plates so that they pull together during welding.**
3. **Using the intermittent weld technique and back step welding techniques.**
4. **The off-setting and pre-setting of plates so that they are pulled correct by the contraction of the welds.**
5. **Using chilling bars and wet asbestos and chemical foam barriers.**
6. **Using of planishing when the weld is in the cold state.**
7. **Using jigs and fixtures.**
8. **Therefore, because of the ease with which the equipment could be handled, and also because of the comparatively uncomplicated process involved, gas welding is extensively used in most of the small and medium scale units in Sri Lanka. Gas welding is popular especially in the numerous small units that do Panchikawatte.**

SUB-CONTRACTING : A NEW TREND

By **Annesley Abeysinghe**
Director of Marketing
IDB.

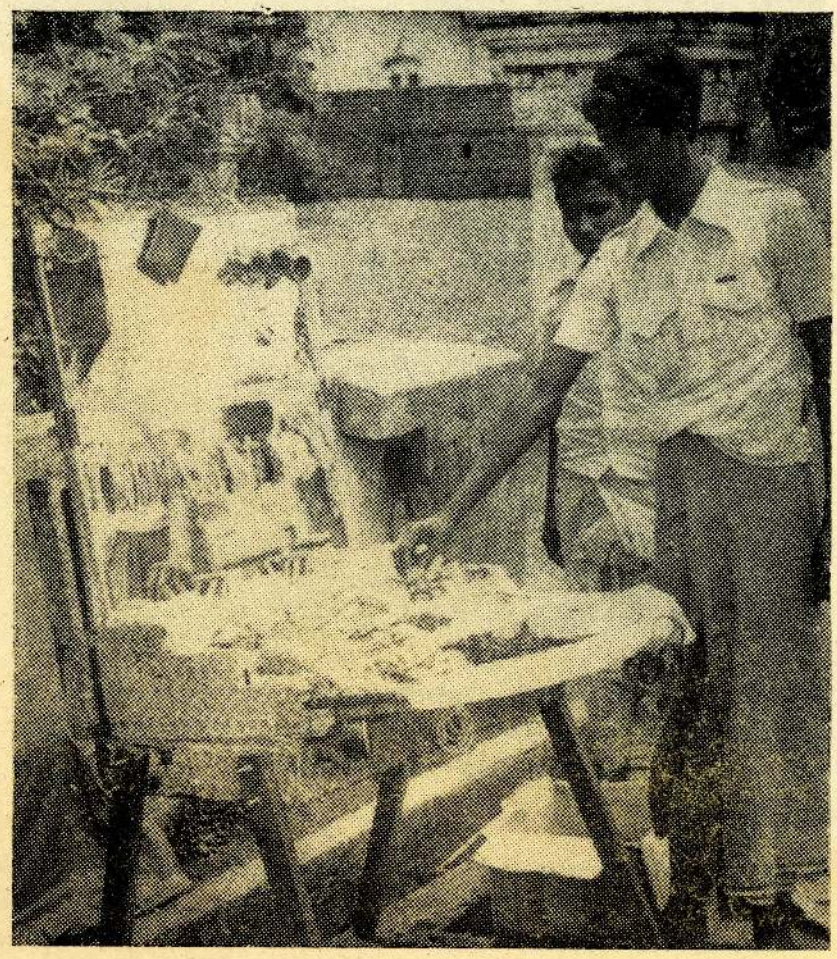
With the opening up of the Free Trade Zone and the programme of industrial development that is underway at present, it has become necessary for many of the larger industrial units to look for sub-contractors. At the same time the Industrial Development Board is also planning to set up a Sub-contracting Exchange in its Marketing Division with World Bank assistance. Therefore it is relevant for us to consider what sub-contracting is.

Not New

Sub contracting however is nothing new. It had been carried on long years ago in fact almost from the inception of commerce and trade itself; only it had been called by different names by different people at different times—it has been called "operational designations","Division of labour" and also "Specialisation". However, whatever name it is known by, sub-contracting, simply means, asking someone to do something for you, because he or she could do it more efficiently. This may be ordering the food for your party at home from a caterer instead of your wife making it or a radio manufacturer getting the wooden cabinets for his transistor radios made by a carpenter in Moratuwa or the IDB workshop case-hardening a metal item for an industrialist, because it is not economical for that industrialist to do it at his own factory.

Knew Each Other

In ancient times, the craftsmen were on first name terms with each other, and they knew each other's capabilities and idle capacities. Not only did they know their capacities and capabilities of craftsmen in their own towns and villages but also of those in other towns and villages as well. Therefore if they were in need of any special service or capability, they knew whom to approach and what quality of work to expect. Thus in those days, when one craftsman was unable to cope with a particular job or assignment, he always called on a fellow craftsman who had idle capacity or was specially suited for the job in hand. Even today sub-contracting on these lines is



With the present-day expansion in trade and commerce, today's craftsmen do not sell their wares in the manner portrayed here because it is not economical. In the same way, even in the manufacture of goods, there are ways of getting specialised jobs done through sub-contracting.

In the fireworks industry, sub-contracting has been carried on for years where at various stages of production the raw materials are given out to various individuals.

being carried on—especially in the furniture industry in Moratuwa. Here specialised sub-contracting based on adequate standards of technical competence and mutual trust have resulted in permanent and secure relationships, between the small and large industries in the area.

However, even here, as the industry grows and the demand from outside the district increases, supplier's lists and directories would have to be compiled for firms to find out which units could do something they cannot do, or make something they are unable to turn out at their own factories. This supplier's list or directory would in essence be a sort of sub-contracting exchange where the type of information needed is made available in a limited way.

Similar

Even in the fireworks manufacturing industry, a similar type of sub-contracting has been carried on for years. In this case, the raw materials are given out to various individuals living around the factory and they turn out the products according to the specifications laid down by the manufacturing firm.

Another Type

However apart from these, there is another type of sub-contracting which is completely different from both these forms. Here for example, a firm specialises in turning out components and other firms purchase them. Here the components are made according to the specifications of the manufacturing firm and not to those of their customers. Thus the customers have, in this case to modify their requirements to suit the specifications of the components that have already been manufactured. This is the case for example with Lucas which manufactures bulbs, lighting and other accessories etc. for the motor car industry. The motor car manufacturers have to use these components in common with the others. Thus it is possible that the Ford cars and Chryslers may have the same identical Lucas components.

So far in Sri Lanka however, this type of sub-contracting has not been carried out extensively.

Problem

However, it is evident that the era when industries concentrated on making everything they required themselves, is over. But yet, industries are facing an ever increasing problem of deciding whether to make or to get it done, as a result of the growing complexity of technology.

"A sub-contracting exchange would fill a big void. It holds on a selected Data Processing System, detailed informatlon af a large number of firms".

Today, for example, welding is no longer "a method of joining metals together with heat" but a skilled branch of engineering. The decision, therefore is not "are we able to do it", but "can we make it at an economic" price and meet the delivery dates".

Emphasis

The emphasis in engineering has therefore changed from one of technology to one of marketing today. This need to practice the best division of labour, the best allocation of the country's scarce resources of skill and machine time, has given sub-contracting a new dimension. Therefore as a result of sub-contracting, the large companies can, most profitably apply its resources to the fields of Research and Development, Marketing etc. requiring large reserves of capital and long term planning. The small industry, on the other hand is at its best in specialised work, requiring detailed know-how of one or two skilled processes.

Inadequate

With this important role of sub-contracting, the general vagueness and inprecision of present day methods of recording detailed capacity information has become inadequate. Many Companies waste time replying to enquiries totally unconnected with their line of business.

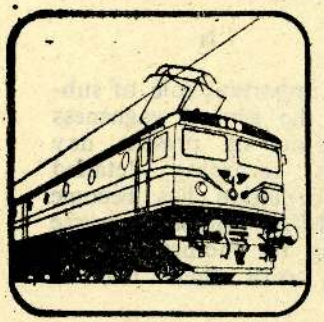
Today, there is a gross waste of time, trying to find specialist sub-contractors, and of capital invested in machines that are under utilized due to ignorance of their existence.

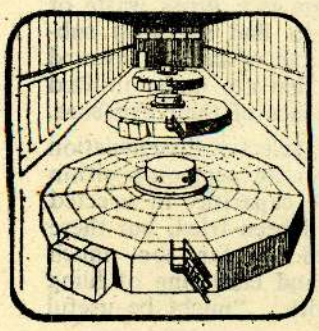
Directories, selective dissemination of information, advising on position regarding idle capacities in selected fields have all been tried, but these have resulted in far too much paper work and cluttering of filing cabinets with "might-be-useful files".

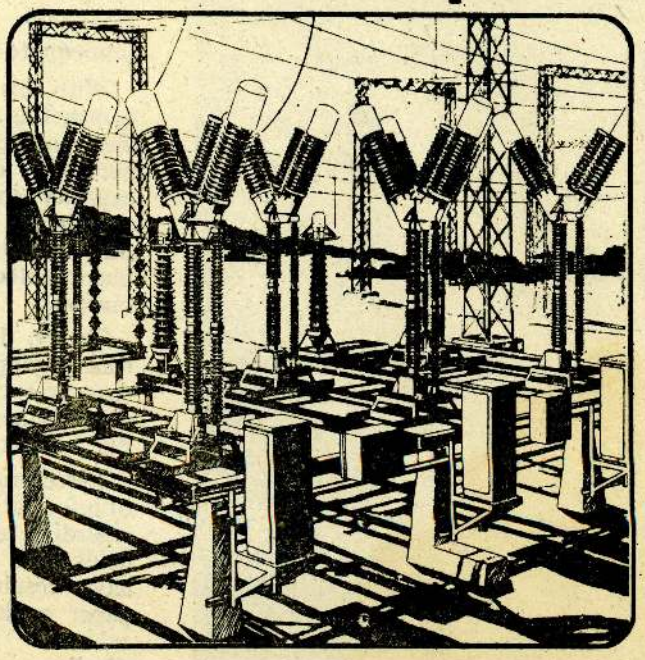
In this context therefore, a sub-contracting exchange would fill big void, because it publishes nothing—unless it is asked for. It deals in engineering capacity of all kinds in materials and even bought out components. It holds on a selected Data Processing System, detailed information of large number of firms, covering many specialities in engineering and associated fields, and it can produce answers to queries for any type of engineering work.

The exchange is an active system, working on a day-to-day basis. It is triggered by an enquiry from a buyer wanting to locate the capacity of any kind outside his own factory. He wants to find a competent sub-contractor quickly and easily while the sub-contractors want to load their machines fully at all times. The sub contracting exchange provides the 'clearing house' function of relating the supply and demand of such machine capacities.

ASEA in power in industry in transportation





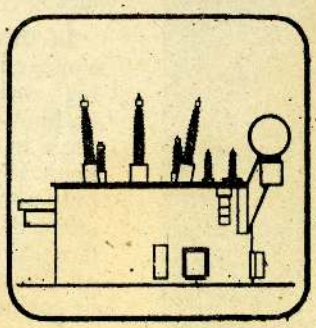


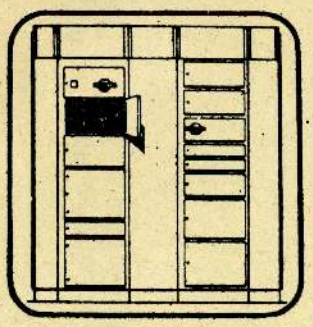
ASEA has a world-wide reputation as an international company with an extensive product range and considerable technical resources.

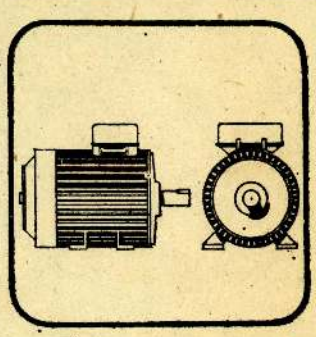
They have factories in ten countries and are represented in more than 80. In 1977 sales outside Sweden amounted to 52% of the total sales of US $2.085 million.

ASEA employs over 43,000 persons in its organisation.

Their programme covers the entire field of electrical engineering-from standard products to complete plants and systems for power stations, industries and transport undertakings.







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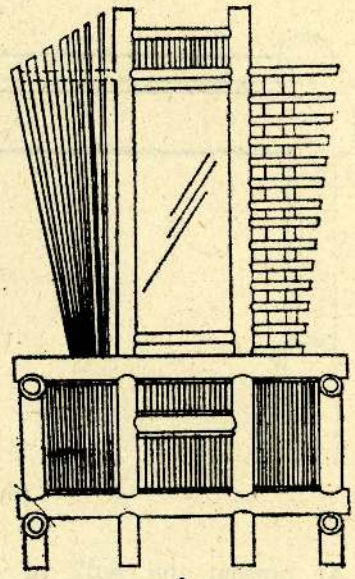
BAMBOO FOR ALL PURPOSES

By Philip L. Ramenaden, IDB

Bamboo which is found in plenty in our country, which we, at present use mainly as scaffolding, is not only a hardy wood, it is a very versatile one as well. Even though we in Sri Lanka have very little use for this unique tree, other Asian countries have, from very ancient times utilized it for many purposes. In many ways, to most people of Malaysia, Japan and China and even in Indonesia, the bamboo is what the coconut palm is to us. In these countries, apart from the use of the stout canes as structural members for houses and thatching for roofs, bamboos of larger diameter are fashioned into food recepticals and cooking utensils while the succulent shoots are eaten—and eaten with knives or chopsticks which have been turned out—yes, of course, from the twigs and branches of the bamboo tree.

Apart from these, the remarkably hard-wearing dense wood is also used for the manufacture of furniture, baskets, ornaments, toys and a variety of other utility and household goods. Therefore it is evident that because of the wide domestic and commercial uses to which bamboo could be put to, a very lucrative small scale unit for the manufacture of various products could be set up in Sri Lanka. Furthermore due to the free availability of bamboos and the remarkably low investment needed, only enterprise is needed to set up a viable venture to manufacture these products for both the local and foreign market.

Exquisite furniture could be turned out entirely from bamboo. TOP: a dressing table made entirely from bamboo. BOTTOM RIGHT: dressing table and chair, ON LEFT: is a stool.



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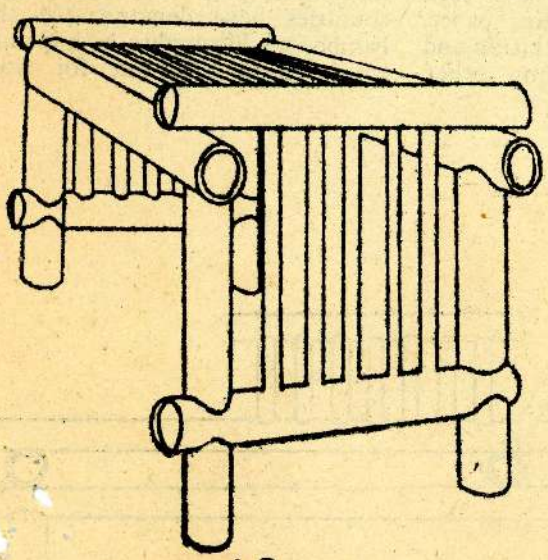

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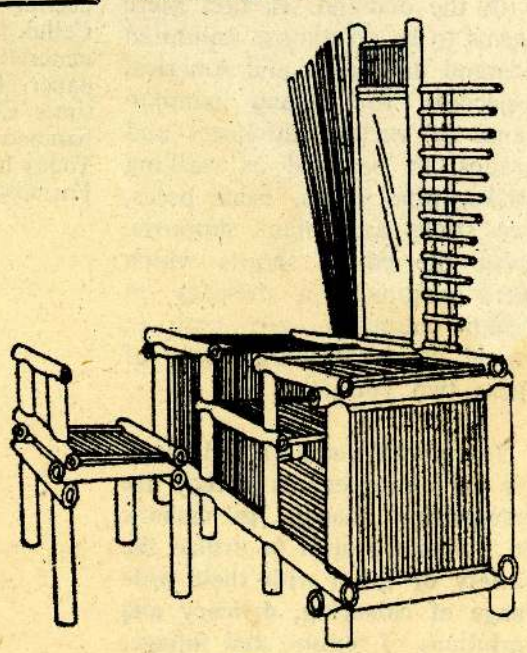

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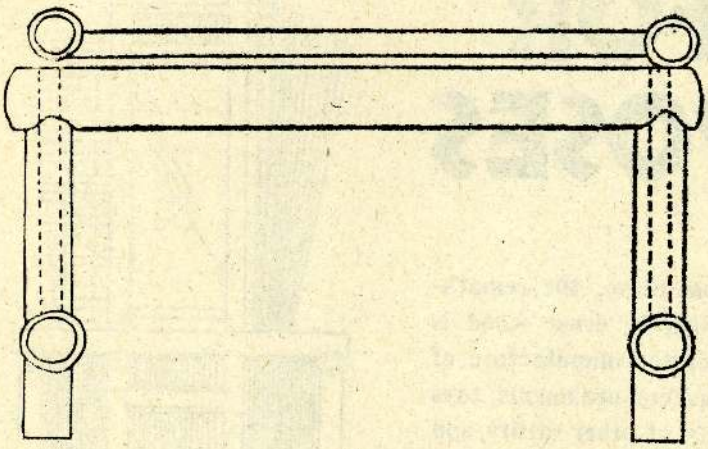

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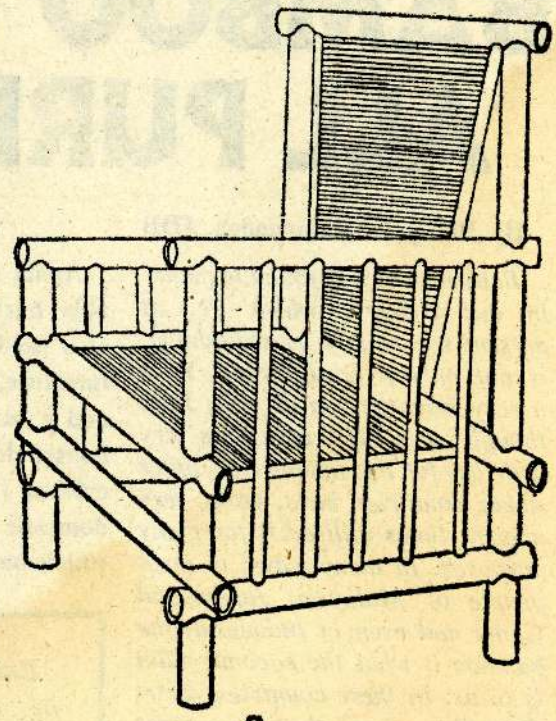


B

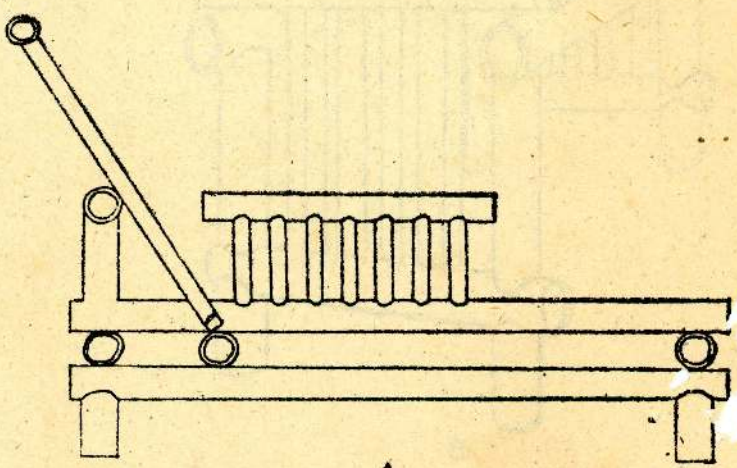
TOP LEFT: table showing how joints could be made. ON RIGHT: an arm chair, BOTTOM: side view of an easy chair.

At present the bulk of the goods manufactured from bamboo that are available on sale in Europe and America, are from Japan, China, Indonesia and Malaysia. Even though these countries are marketing a variety of novelties, ornaments and even furniture to America, England and Europe, the demand for these products in these markets seems to be insatiable, so much so that the traditional suppliers appear to be incapable of coping with the demand. In fact there seems to be an almost unlimited demand in Europe and America, especially for strong bamboo canes of various thickness and grades, to be used as walking sticks, pipe stems, bean poles, pea sticks and plant supports. Even the edible shoots which were originally a delicacy in Asian countries, are now in vogue in the fashion spots of these two countries.

Therefore it would not be difficult for our entreprenures if they are enterprising enough, to embark on a viable project to utilize the variety of canes with their wide range of colouring, delicacy and variations of texture and foliage, that are abundantly avaliable in Sri Lanka.

Paper Pulp

Chemically, the bamboo contains four principal substances—starch, pectin, lignin and cellulose. Cellulose of course, is the basic material used in the manufacture of paper. Therefore from very ancient times China and Japan have used bamboo to manufacture paper. Today however, India, Pakistan and Formosa (Taiwan) among other nations, have begun to use this material in their paper manufacturing industries. Since Sri Lanka too is similarly placed as these countries, and we too have to take active steps to conserve our timber and soft wood resources, we too could do no worse than turning to bamboo for paper pulp. As these Asian countries have demonstrated that bamboo could supply a high quality, yet a cheap substitute for wood



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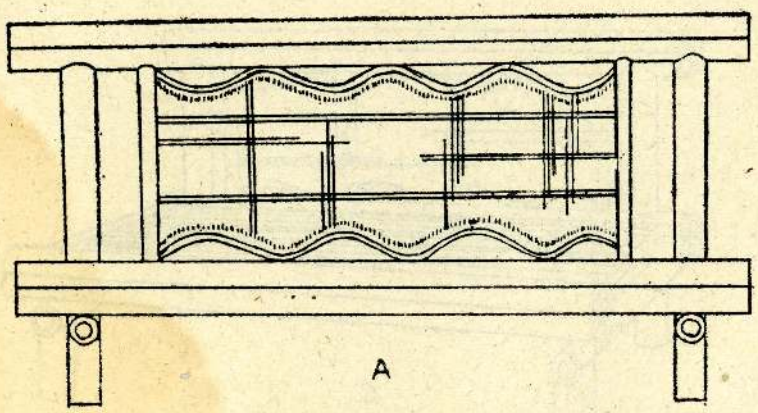

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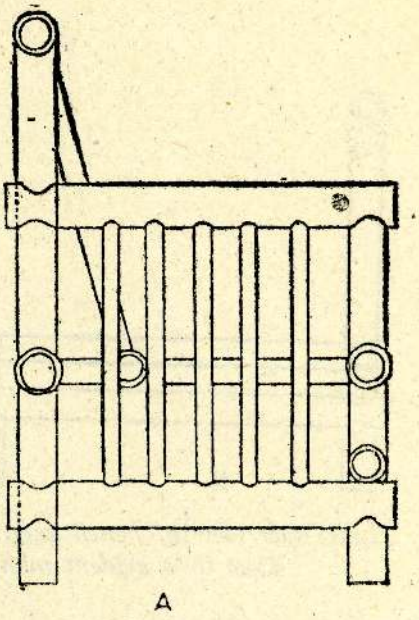


A

On left a glass fronted cabinet or cupboard. On right is a side-view of the arm chair pictured earlier. Note how the joints had been made.

pulp, and because our resources are not unlimited, it is hoped that the Paper Mills Corporation would take a leaf from the Indian experience and turn to bamboo for raw material.

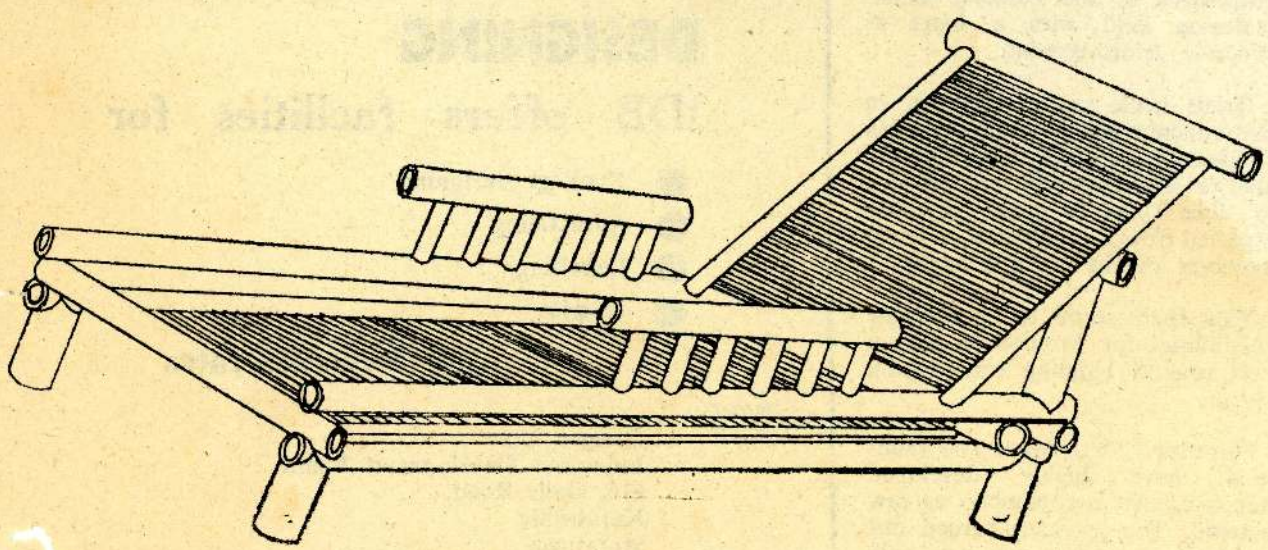
Apart from paper pulp, the leaves of the bamboo too are useful. These selfsame Asian countries have long been using the bamboo leaves as cheap animal feed, as a fertiliser and they have put the oil extracted from the stem, twigs and branches, to commercial use. This oil has also been used as additives to wood preservatives, resins and paints.

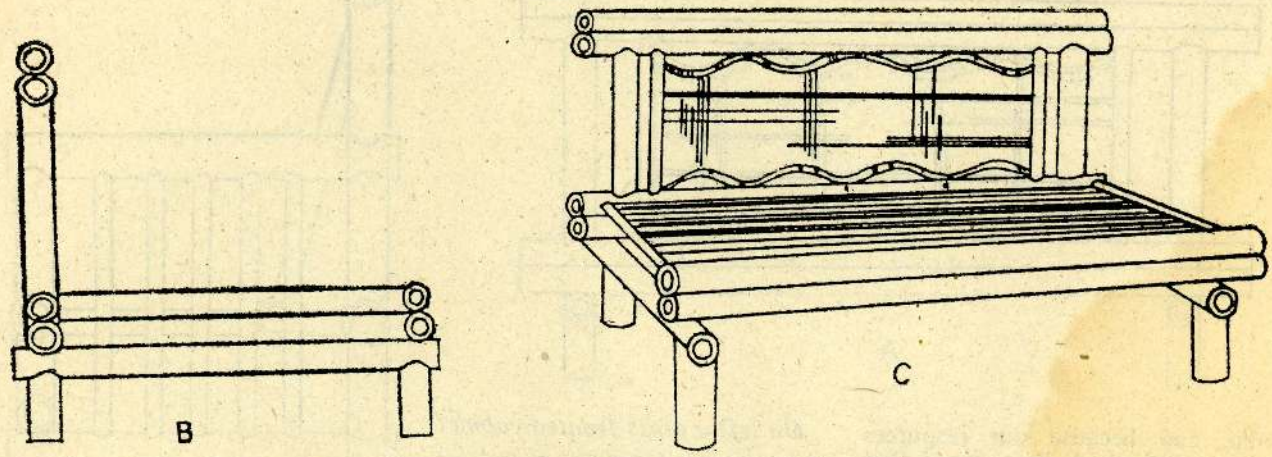
However except for evidence of this oil being used for some medicinal purposes, there is no literature available as to the uses to which it has been put to. According to information received however, experiments are being undertaken in this field.

However though no commercial use has been made of the oil, it is absolutely essential that it be extracted before the bamboo could be put to any practical use because it is only when the excess oil has been removed that the bamboo could be strengthened and the outer skin becomes beautiful. There are various methods in vogue for this purpose and the most suitable one could be adopted by the enterprenures.

Even as the extraction of oil is important, the process of curing too is important. If the bamboo is not cured properly it would not only lose its lustre but it would also be fragile and decay. Therefore if any attempt is being made to set up an industry using bamboo as raw material, it is advisable that the curing process be studied thoroughly .However since the use of bamboo for manufacturing goods has been carried on for so long by so many nations, it would not be difficult for those interested to acquaint themselves with the processes for curing and also for extracting oil.

This is the easy chair that is shown over leaf. Note how even the joints are made of bamboo.





Left: side view of bench seen on the right. The back rest of this bench is also made of bamboo. Thus it is evident many useful items could be turned out from this versatile wood.

Earlier, due, perhaps, to the advent of plastics, fibre glass and other synthetic materials, the popularity of the bamboo suffered in many manufacturing fields. Very recently however, the Engineering Experimental Station at Clemson, North Carolina, U.S.A., has been carrying out various experiments with bamboo.

Therefore, though there is still a demand for high-class bamboo walking sticks, quality umbrella handles and though bamboo rods—that is split cane rods—are still held in high esteem by trout fishermen, if the North Carolina experiments are successful, bamboo may make a come-back to the building manufacturing field with a bang as concrete reinforcement.

Trials made so far have shown that concrete beams reinforced with bamboos placed longitudinally were able to safely carry loads from two to three times as great as those expected from unreinforced concrete members of the same diameter.

Thus there seems to be concrete possibilities for bamboo to play a vital role in building construction too.

However China, Japan and Indonesia have highly developed industries that use bamboo as raw material. The products turned out by these countries are not only exquisite but also durable and cheap. As a result there is an ever increasing demand for knitted wear like hand baskets, shopping and handwork baskets, vanity cases etc. in America. These countries seem to be unable to cope with the demand especially now that there is an increasing market for bamboo stem products as well. Products such as screens, book shelves, garden and easy chairs, drawing-room furniture and oranamental products like vases, ash trays, trays etc. seem to be snapped up no sooner than they are available. Therefore since there is a good market for these products we have reproduced drawings of some of the Indonesian products that have recently been introduced into the European and American markets. Readers who are interested in getting further details regarding bamboo may contact the Librarian, IDB.

LEAD BATTERIES IN SOLAR ENERGY SYSTEM

A Solar power system consists of a solar array and storage battery. The array is composed of solar modules mounted on a suitable frame with series and parallel connections to meet the design requirements. When the array is installed the output cable from the array is connected to the battery terminals. Lead batteries are generally specified because of their reliability. The electrical power provided by the solar cells is stored in two lead batteries in the basements.

The batteries supply this power at night. During day, the solar cells recharge the batteries in addition to handling the power load. A built-in blocking doide in each solar array prevents discharge of the batteries back through the silicon cells in periods of darkness.

The lead batteries provide about 250 ampere hours of storage. They are subject to a regular cycle of charging during day and discharging at night. There is also an annual cycle of gradual discharge during the winter months when power requirements might exceed the amount available from the solar array, followed by a gradual return to the fully-charged state in summer months. Battery life expectancy is 10 to 15 years.

In December 1973, the Canadian Pacific Railway installed a solar array near Montreal to power a DC tracks circuit. The power requirement was estimated to average 6.5 ampere hours per day at 2.1 volts nominal. The array consisted of 10 solar modules, two in series by five in parallel. A 500 ampere hour lead-acid battery was specified as the energy storage unit. The size of the battery was determined by the maximum ampere hour deficit projected for the winter month plus enough reserve capacity so that the battery would not be discharged below 50 per cent of its capacity to prevent freezing.

Soon the system design was proved to be overly conservative. The average load as measured by a computer between the solar array and the battery was slightly higher than the 6.5 ampere hours expected yet weekly readings of battery specific gravity stayed almost constant throughout the winter indicating that very little battery capacity had been required to make up for the projected ampere hour deficit.

Other applications for this alternate energy source are being explored in Australia by the Lucas Solar Energy System, United Kingdom. With its vast distances, sparse population and plentiful sunshine, this country is proving to be a perfect environment for such a system.

Some interesting uses are signalling equipment for railway lines located in remote areas; warning systems located on fire spotting towers for fire protection; cathodic protection for pipe lines carrying natural gas; radio repeater stations and transmitters. Solar cells, by Lucas are also being used on a vital basis to power a radio receiver transmitter repeater in the Western Isles of Scotland, several thousand feet up a mountain. Although for many weeks a year there is both snow cover and heavy cloud, the solar units have proved to be highly successful and four more similar installations are planned.

Most remote power requirements which currently use heavy duty non-rechargeable batteries are more economically serviced by a solar cell rechargeable battery combination according to Lucas. Periodic replacement of batteries involving unnecessary labour and expense can be eliminated. Maintenance requirements consist of a once-a year visit to the site to top up the batteries and clear the energy absorbing surfaces of the solar cells.

Leather Corp's new unit

A new unit of the Leather Corporation was opened recently at the Ekala Industrial estate.

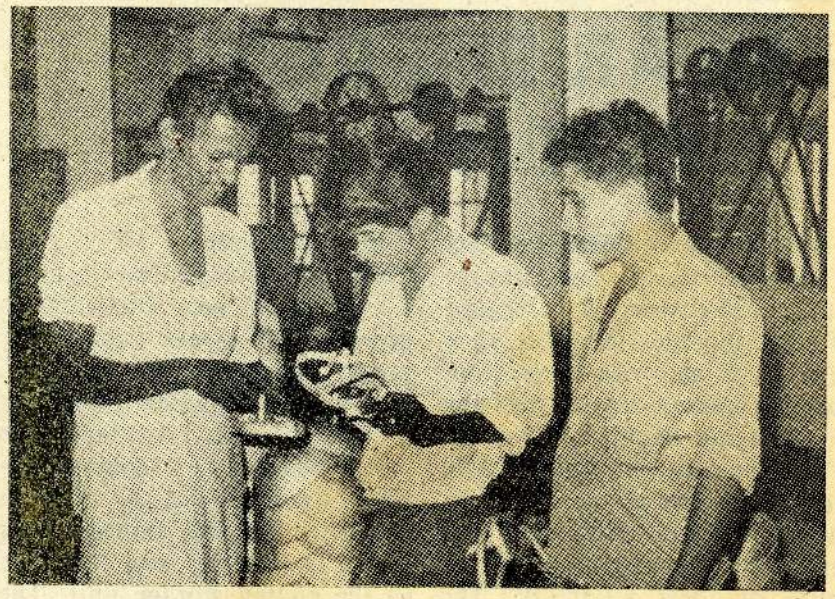
With this unit coming into operation, it is hoped that the Corporation's production would increase appreciably and also that it would provide employment to more people.

Karmantha shows the

By C. S. Ranasinghe
IDB.

It was grit and sheer determination that helped three friends from Weligalla in the Gampola region to become self-employed and to set themselves up in industry.

I consider it my fortune to have come across these true sons of Lanka who have gained a foot-hold on the ladder of success through their determination to succeed. Theirs was an interesting story and, according to them, their story began this way.

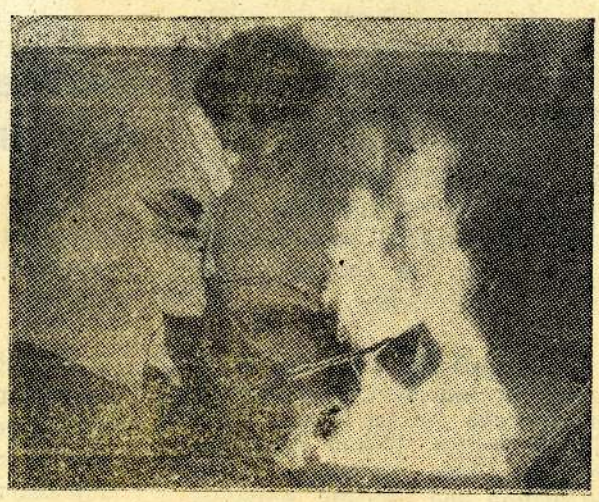


The three partners examining an article turned out by them

One day in August 1972, it so happened that these three friends got together for the usual chit chat on men and matters as was their custom. But unlike the numerous other occasions on which they met, the conversation did not ripple along in the usual manner. All of them seemed preoccupied and listless, until one of them—it was either M. M. Dingiri Banda or K. M. Jayasena – no one remembers who started the ball rolling saying—"Why don't we set up an industry ? Instead of just drifting along, let's start something". "But what ? asked the third, A. R. Tikiri Banda.

The three of them had all worked at various work shops and had some skill in cast iron and foundry work. Both Dingiri Banda and Jayasena had worked at a cast-iron factory while Tikiri Banda had been working at a foundry for over 6 years. Therefore naturally their thoughts turned to the field they were familiar with—cast iron and foundry work. Far into the night the three conferred and finally it was agreed that they should venture out on an industry to manufacture aluminium ware.

Both in Gampola and in Kandy they had found that there was a heavy demand for aluminium ware especially among the estate workers. Therefore they felt tha



"The IDB helped us with the technical proscess."

way

they wouldn't be wrong if they did venture into this field. Furthermore, with the experience they had gained they felt that could produce some quality ware.

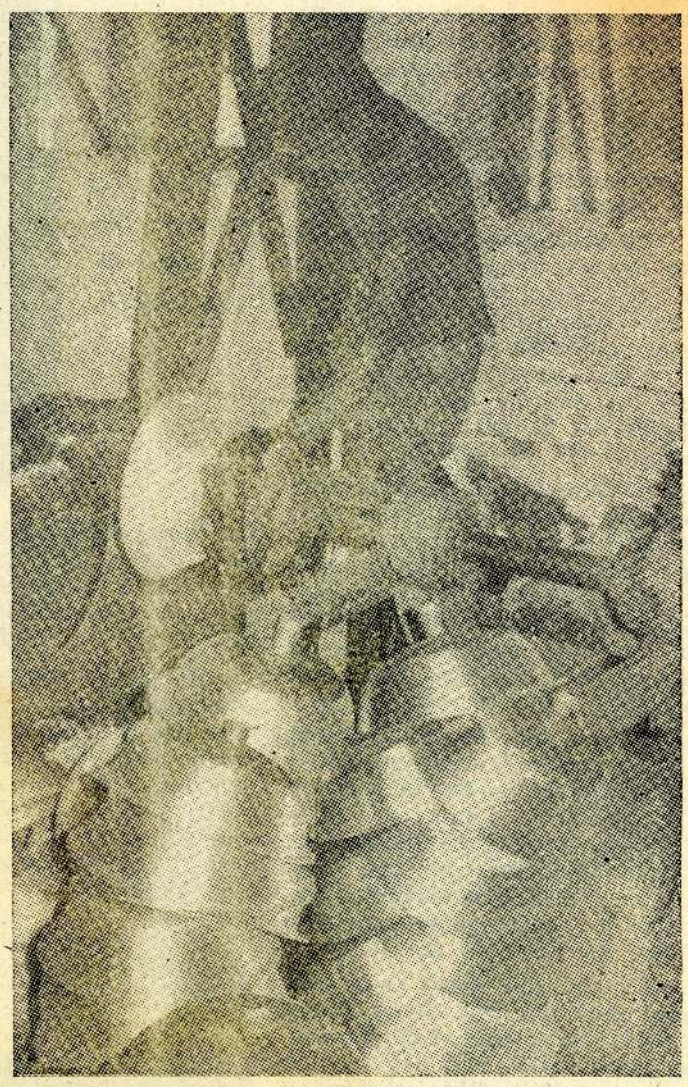
However their main obstacle was money. They had neither the capital nor even a place to set up their industry. But once the decision was taken to set up an industry, they were determined to go ahead. Their pooled resources did not exceed Rs. 3,000/- —but that was merely a drop in the ocean.

"We needed money badly but we were not going to wait till we got money to start. We knew that we could keep costs down because we had experience. We felt that we could cut down the lathe work costs at least by half."

So, their aluminium products manufacturing industry was started in a cadjan thatched, temporary shed built on a piece of leased out land in 1972 with a capital of less than Rs. 3,000/-.

"At first it was really back breaking work. We toiled from morning till night turning out various aluminium utensils. Then one of us took it to market. We had to wait till we got the money from our sales to buy raw material to turn out the next lot. We kept rolling in this manner, but gradually improving the quality of the goods," said one of them.

"Right from the start we were determined to see that our product was better than the other products available. We wanted to capture the market gradually but definitely. So we had to make our mark. Our product had to be better than the other items in the market".



A stage in the process of the manufacture of basins and pots.

Aluminium pots being given a 'shine'

"This was no easy task. We lacked even the basic amenities—we had no proper crucibles to melt the aluminium nor did we have proper moulds, for casting. But we worked hard—hard enough to double our working capital". the more aggressive of the three, the person who, in fact handled their sales promotion etc. blurted out.

"Grit alone was not enough. We had to have capital. We needed storage space, a permanent building —oh! so many things, We felt that if we progressed at this snail's pace we would never amount to any thing in our life time. We were disgruntled. We did not know how to proceed! he added.

It was around, this time that other problems too began to raise their heads. They had problems in management, accounting and even technical problems. Their limited experience and small education began to be felt. As the business began to expand, they felt that they were fast getting out of their depths.

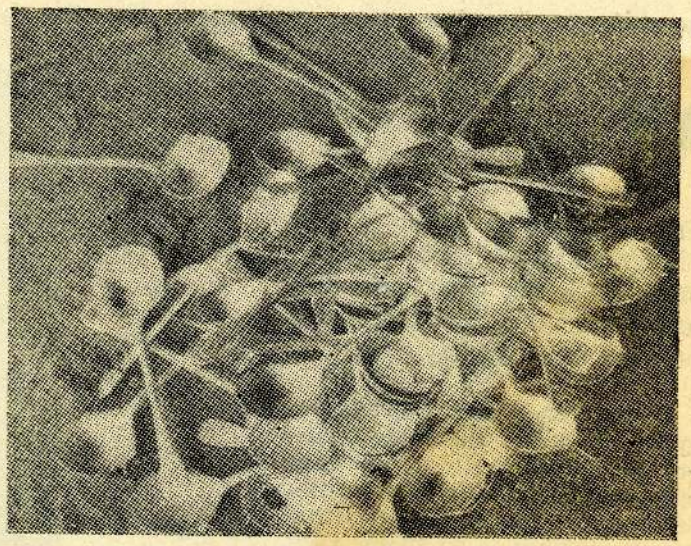
"It was while we were pondering on our problems, wondering whether we should fold up, that we happened to come across a stray copy of the Sinhala edition of the 'Karmantha'. Upto this time, we had never heard of the IDB or the Karmantha. Thus it was through the Karmantha that we heard of the IDB".

"Sir, you just don't know, how many people are there like us. People who have never heard of the Karmantha and the IDB. Why don't you all give more publicity?" he asked me.

"Any way it was thanks to the 'Karmantha' that I came into contact with the IDB. It was as a result of this that I happened to attend a DDC meeting in Geli-Oya in 1973" he said.

"Cha ! if only we had known earlier. Anyway, we realised that the IDB was there to help people like us. We contacted the Regional Manager at Kandy and from there onwards, we were adopted by the IDB".

"We attended an IDB-sponsored training class at Kiriwawula. There we learnt many things. The IDB officials gave us information regarding the latest techniques and processes, they helped us to modify and improvise equipment. They, in fact helped us not only in the technical process and aspects, but also with our management and financial problems as well". said Jayasena.



Some aluminium spoons manufactured by the industrialist

"I am still surprised how things went after that. It was a question of this or that problem—in fact any small hitch that we came across—and off we went to the IDB regional office", he said. "It was like going to the oracle. The IDB had an answer to all our problems".

"Before we knew where we were, we were producing goods that were as good or even better than some of the more expensive imported products" Jayasena said, showing me one of their latest products.

Kettles manufactured by them being subjected to a special process

With the rapid prosperity that their association with the IDB had ushered in, the proprietors of "Udaya Industries" as their enterprise came to be known, were able to get a loan and put up a two storeyed building to house the industry and to increase the production to about Rs. 25,000/- worth per month.

By the end of 1978, this industry which originated in a tumble down shed, had expanded to such an extent that it was capable of giving employment to 13 skilled workers and three apprentices.

Raw Material

The industrialists had one complaint to make. They lamented that they were finding it difficult to obtain raw material, that is, the aluminium. They claimed that middlemen grabbed all the stock available and that they were at the mercy of these people who asked fancy prices.

Plans for the Future

The industrialists, who claim that the value of their present monthly output is around Rs. 45,000/-, hope not only to increase their output but also to embark on other fields as well. They plan to manufacture irons, spares for rice mills, water pumps and power generators. They also hope to purchase a lathe from the money they intend getting as a loan.

(Continued on page 19)

Boost for Rubber Industrialists

By W. Dharmasena,
Development and Project Officer

Although rubber had been one of our major cash crops for several centuries, the industry itself has not kept pace with modern developments. Furthermore it has not been carried on on a large scale so far, and even the small and medium scale entrepreneurs engaged in this field have been handicapped due to lack of capital, and technical know-how.

Apart from this, most industries progress only with the existence of a satisfactory market for the goods manufactured by them. At present with the liberalised imports, locally produced goods have to vie with the sophisticated products from abroad, and as such, if they are not up to specifications they have no demand whatsoever. Therefore the Government has taken several steps to ensure that the locally manufactured goods would not be adversely affected. It has also taken steps to encourage more industrialists to take to this field.

Therefore in keeping with the present policy of the Government and inorder to promote the setting up of small and medium scale rubber based industries, the *IDB's* Rubber Industries Unit, has drawn up a scheme to provide not only technological and management assistance but also financial incentives as well. Furthermore, this unit has prepared feasibility reports and project reports which could be obtained by prospective investors. Thus those interested in investinsg in this lucrative field need have no qualms about venturing out to set up rubber based industries.

Most small and medium scale entrepreneurs are beset by financial problems, therefore the Extension Services Division of the IDB has implemented a scheme to obtain Bank loans on the recommendations made by the Management Development and Credit Unit of that Division for the modernization of existing industries and for setting up of new units.

Since some sectors feel that with the present influx of a variety of imported goods, the locally-produced goods would have unfair competition, the government has taken protective measures to safeguard local industries by introducing taxes and freight charges that would affect the foreign goods.

At the same time the Government has taken steps to improve the quality of the local goods. Stringent specifications have been laid down so that it would be difficult to market sub-standard goods. Thus with the heavy duty imposed on the imported articles and the steps taken to improve the quality of the local goods, there is no fear that the good quality, cheaper "Made in Sri Lanka" goods wouldn't have a demand. The customer is no fool, he merely wants value for money spent. Therefore if our goods are cheaper and of a good quality, they wouldn't be without a demand.

In order to help the industrialists to keep production costs down and to help them to improve quality, the Rubber Unit at the IDB, has geared itself to provide technical and managerial assistance. Any would-be investor or an established industrialist could call on these officers at the IDB for all assistance.

Therefore anyone intending to set up an industry in this field, should ensure that the local standard specifications are adhered to. Best results could be obtained if the raw material used is of good quality and if the machinery and the processes used are of the optimum level. Advice on these, the best machinery to be obtained, the best process to be adopted can be obtained from the IDB.

Since industrialists may find it difficult to obtain good quality raw materials such as rubber chemicals, amonia preserved centrifuged rubber latex and dry rubber compounds, the Rubber Unit has made arrangements to make the following available to the public:

Centrifuged Rubber Latex

Amonia preserved, centrifuged, 60% concentrated, rubber latex prepared according to the British Standard Specification at an estate of the Janatha Estate Development Board, is available in 45 gallon drums or on a retail basis at a reasonable price at the IDB.

Compounded Rubber Latex and Pre-vulcanised Rubber Latex:

Rubber latex—pre-vulcanized or otherwise—required for the manufacture of rubberised coir matresses, rubber dipped goods such as balloons, gloves, bands, toys, and ebonite products etc. prepared according to the specified standard could be obtained by small industrialists at nominal prices.

Dry Rubber (coloured and black) Compounds:

Coloured and black rubber compounds required for manufacturing all products made of dry natural rubber prepared according accepted specifications are also available at the Rubber Unit.

Milling facilities on two roller mills, are also provided by the Unit to industrialists who wish to have compounds prepared with their own raw materials and according to their own specifications.

Rubber Chemicals

Limited quantities of rubber chemicals too are available to actual users.

Quality Control

Industrialists who wish to have their raw materials and finished products quality tested and reported on by the Rubber Research Institute and the CISIR, could also get them done through the **IDB** on easy payment terms.

Training Facilities

Industrialists wishing to acquire a wide knowledge of the latest production methods, quality control aspects, industrial management, costing, accounts and marketing etc. could participate in the various training courses, seminars etc. that are held from time to time.

Furthermore training for supervisors, mill-operators and for other specialised staff required for the rubber industry could be arranged at the IDB.

A technical services centre would also be set up shortly where advice on production, processes, market information etc. and training would also be provided to rubber goods manufacturers throughout the island.

For further details please contact the Rubber Industries Unit of the Extension Services Division of the IDB or our regional offices.

POWER FROM WATER MAINS

The concern in the US over dwindling energy resources is reflected in two moves to establish hydro power systems along "small is beautiful" lines. A document put out recently by the US Department of Energy urges the development of small hydro schemes, with outputs no bigger than 15 MW, at existing dams and sustaining heads of less than 20 m.

Suitable projects would receive financial support from the department.

The Department of Energy feels that the schemes could demonstrate that existing technology can be profitable in such applications and establish the costs involved. Pilot projects would also determine who would be the most likely beneficiaries.

Meanwhile the Metropolitan Water District of Southern California has already embarked on the first stage of a programme that reflects the spirit of the *DoE's* suggestion. The project is to recover energy from the district's water distribution system. Mini hydro generator units with capacities be installed at various points in the system in place of energy dissipation devices. The latter are used to reduce the excessive pressure in the mains to a level suitable for users.

Eventually it is expected that a total capacity of 100 MW will be extracted from the water mains, to yield about 500 GWh a year. The plants will pay for themselves in 10 to 20 years, depending on the type and place of installation.

Because the capacity of the units is very small compared with the power system to which they will be connected, they will not require speed governors but will depend on the system frequency to keep their speed constant. This reduces the capital cost and maintenance problems.

In addition most of the existing energy dissipating units are close to load centres. Hence when the hydro generators are installed, connection to the gird will not pose the kind of transmission difficulties experienced when remote hydro sites are commissioned.

(NEW SCIENTIST)

BOOM TIME FOR LEATHER

By P. L. Ramenaden

"The manufacturing activities of the public sector are not being expanded purely for the sake of ideology but the mian efforts of state-manufacturing institutions are being directed towards the establishment of an efficient non-corrupt and commercially viable public industrial sector capable of maximising productivity and useful employment opportunities..... the private sector is being permitted to compete on equal non-discriminatory terms with the public sector. It should also be noted that with the implementation of the import liberalisation policy of the Government, state industrial concerns have also to face the full force of foreign competition.

"Within the framework of this policy, it has been my task since assumption of office in July 1977, to raise the level of production, general efficiency and financial viability of State manufacturing institutions falling within my purview. In my view the success of these undertakings is largely dependent on the administrative ability uncompromising intergrity, commercial acumen, devotion to duty, practical vision of the Chairmen who function as 'Chief Executive Officers' and are responsible for their overall management and progress....." said the Minister of Industries and Scientific Affairs in his report on the activities of the institutions under his purview.

Therefore in keeping with this policy, The Ceylon Leather Products Corporation has taken steps to, not only step up production but also to streamline its management and improve the quality of its products. Today this institution has not only established markets in Europe and the U.K. but also supplies goods on a regular basis to the Soviet Union and Denmark as well.

The Corporation, which was established in January 1959, initially took over the management and operation of the State Leather Goods Factory and Tannery established in 1942, primarily for engaging in the tanning of hides and skins and the manufacture of leather goods, has therefore, expanded its activities progressively today. This Corporation today has under its authority not only a leather Tannery and shoe factory at Mattakkuliya but also a Leather Goods Factory at the Ekala Industrial Estate.

Except for several items such as chemical adhesives, shoe casts and fittings, which cannot be procurred locally and are purchased from abroad, the main raw materials required for manufacture are obtained locally.

Thus, largely, this Corporation utilizes local raw materials. The Corporation principally uses cow hides for the production of chrome upper leather and baffulo hides for manufacturing bark leather.

When compared with the production in the past, the production of sophisticated foot wear and assorted leather goods have recorded increases. The output of bark leather is 424,213 pounds as compared to 267,728 pounds in the previous years (1977 figures).

The output therefore amounted to 84% utilisation of plant capacities in 1977, while at the same time in the recent past this amount has shown a marked improvement with the utilization of the idle capacities.

With the impact of liberalisation of imports being felt and with the free flow of currency that is now being experienced and the increase in local sales that have been registered, a significant improvement in the manufacturing operations too have been recorded. During the first 6 months of 1978, the total value of assorted goods manufactured amounted to Rs. 2.2 million while, at the shoe factory, during the first 8 months of 1978 alone, the output excelled 170,000 pairs whereas the total production for 1977 was 177,319 pairs.

The foot wear, and miscellaneous leather goods manufactured are marketed in Sri Lanka through the Corporations sales outlets agent and wholesale dealers.

Apart from manufacturing, the Corporation also engages in the purchase and sale of chrome leather manufactured by another chrome leather tannery. The institution had earned Rs. 1.1 million from this.

(Continued from page 16)

"Of course, the IDB will have to help us once again with the technical know-how and the processes. I don't know what you gentlemen will think of us, but we want to apply for a loan also. But we know that the IDB will not let us down" Dingiri Banda laughingly said.

Thus it is really a dawn of a new era for "Udaya" industries, their casual contact with "Karmantha" had really been the turning point for them.

STATISTICAL DATA

LEATHER CORPORATION

1. Production

	Chrome Leather	*Bark Leather*	*Footwear*	*Assorted Leather Goods*
	Sq. ft.	*Lbs.*	*Pairs*	*Rs.*
1966/67	648,788	301,739	245,472	—
1967/68	637,789	343,238	265,701	—
1968/69	667,162	363,741	274,718	—
1969/70	697,887	356,722	281,200	—
1970/71	1,108,537	242,533	241,196	—
1971 (9 months)	854,370	249,677	215,552	—
1972	1,208,731	320,148	232,501	—
1973	1,312,525	266,402	208,961	—
1974	1,245,513	285,603	248,256	3,191,600
1975	1,004,363	214,616	198,681	3,324,600
1976	1,232,572	267,728	167,329	3,777,510
1977	1,046,084	324,213	177,319	4,129,830

2. Value of Production (at sales prices)

	Rs.
1966/67	Rs. 6,638,940
1967/68	Rs. 7,698,050
1968/69	Rs. 8,808,700
1969/70	Rs. 9,808,126
1970/71	Rs. 9,195,902
1971 (9 months) ...	Rs. 11,507,450
1972	Rs. 14,475,150
1973	Rs. 15,500,000
1974	Rs. 16,702,340
1975	Rs. 15,308,818
1976	Rs. 19,423,000
1977	Rs. 17,066,180

3. Value of Sales

	Rs.
1966/67	Rs. 5,291,238
1967/68	Rs. 5,883,076
1968/69	Rs. 7,004,891
1969/70	Rs. 6,279,681
1970/71	Rs. 6,783,200
1971 (9 months) ...	Rs. 7,193,379
1972	Rs. 10,345,635
1973	Rs. 14,091,813
1974	Rs. 13,919,398
1975	Rs. 15,740,671
1976	Rs. 18,601,629
1977	Rs. 21,885,000

4. Foreign Exchange Savings

	Rs.
1966/67	Rs. 4,033,847
1967/68	Rs. 3,630,322
1968/69	Rs. 5,761,530
1969/70	Rs. 6,905,390
1970/71	Rs. 5,688,627
1971 (9 months) ...	Rs. 5,223,197
1972	n.a.
1973	n.a.
1974	Rs. 5,015,000
1975	Rs. 7,079,000
1976	Rs. 12,060,954
1977	Rs. 15,913,255

5. Employment—(as at 31st March '78)

1965	509 Persons
1966	534 „
1967	619 „
1968	687 „
1969	677 „
1970	748 „
1971 (9 months) ...	1,027 „
1972	1,053 „
1973	993 „
1974	976 „
1975	964 „
1976	980 „
1977	1,052 „

Lessons from the Chinese experience

by L. F. Yapa
Director Planning IDB

The first part of this article giving details of industrial development in China appeared in our May issue under the caption "Industrial Development - the Chinese way"

The basis of Chinese ideology is of course the ownership of the means of production, distribution and exchange by the people which ultimately means that all enterprises are owned by the State and are managed by the State on the guidelines issued by the Communist Party which is the medium through which the people communicate with the Government and vice versa.

The lessons

An agricultural economy could be enervated by a policy of integrated development which gives priority to agriculture. In China uneconomical small plots have been merged into large farms of regular rectangular shapes to make large scale mechanised operations possible. Thus a subsistance type of agriculture has been transformed into one of surplus—producing a commercial type which could support a greater degree of industrial production and allied services. The man-power released as a result is diverted to small and medium scale as well as large industries. It is noteworthy that Japan, Taiwan and Mexico too have adopted a similar policy.

Follow example

Sri Lanka too could follow this example and merge the small uneconomical units into large ones enabling them to obtain the maximum output possible.

Small and medium scale industries should take precedence over large ones while they should at the same time sustain each other as in China. This is necessary because of the unemployment rampant in Sri Lanka, and the wide gap between town and countryside, worker and peasant, mental and manual work.

Policy

Though we cannot copy the Chinese methods lock, stock and barrel, it is evident that Sri Lanka needs a clear cut policy of small and medium scale industry. In our country, the most predominant manufac turing sector is composed of the large scale public industrial ventures. They possess modern technologies, are able to produce and purchase large amounts of goods and services, it is in these ventures that a large amount of capital has been invested. Therefore they could be made an instrument to sustain small and medium scale industries by subcontracting arrangements and by transfer of technical know-how.

In addition, research, training and extension institutions may be advised to organise their programmes in such a manner as to provide a massive dose of technical inputs to small, medium scale industries to improve the quality of products and increase productivity.

Need to import

The need to import technologies especially those which are capital intensive, should be underplayed and technical innovation should be encouraged in scientific institutions, schools, universities and even in factories. Three-in-one combinations comprising representatives of management, technicians and workers with advice from scientific institutions, could be set up at public sector factories and other institutions to increase productivity. Such a programme could also help to dispel the myth that technical innovation is only for scientists working under perfect conditions.

It is increasingly clear that skilled workers are very important for the development of the economy.

Remedy

But in our country, educated youth still prefer management or supervisory posts to being masons, carpenters and fitters because the remuneration for such jobs is still low. Therefore the remedy is to reduce the gap between salaries of management personnel and the wages of skilled workers.

Apart from this, the present emphasis on academic training and qualifications should be shifted to an applied type of training. The British Colonial system of training young people for white collar jobs is still prevalant with the result that most of our educated youth are unfit for the technical positions that are required for industrial development.

It should be remembered that Sri Lanka being a country of only 25,000 sq. miles her natural resources would be exhausted in a decade or two with greater industrialisation. Her only major resource would be her people. Therefore their skills will have to be developed to establish knowledge based industries as in other island nations such as Japan, Hong Kong and Singapore.

Should be spurred

Workers should be spurred on to greater productivity not only by material incentives but also by giving social recognition and conversely those who lag behind should be deprived of material benefits and be black listed.

Greater attention too should be paid to relieve the problems of marketing faced by small and medium scale industries. The public sector corporations and public sector purchasing organisations could be requested to alter their purchasing patterns to enable them to buy the products of small scale industries. Furthermore, universities and business schools too could also help by modifying their training programmes to attract personnel from these industries to undergo formal training in marketing.

Planning

Planning could only be effective if planning from the top is supplemented by that from the bottom and when the necessary machinery had been set up. Sri Lanka has yet to see a system which reaches right down to the villages as in China though the setting up of District Ministries is a step in the right direction. If the District Ministry system could be carried a bit further by the formation of Development planning teams in electorates and villages comprising people's representatives and public officials, it would bring the people and the Government closer and help develop our economy.

ALTERNATIVE ENERGY

Biomass

Biomass, the product of natural photo-synthesis, has been predicted to be the source of fuel and fertiliser for the post-petroleum era.

According to Professor David Hall of the Kings College, London, the energy stocked in the world's vegetable matter roughly equals that in proven fossil fuel reserves and humanity may have to resort to vegetable fuels sooner than has been expected.

More and more international cooperation on biomass projects could be predicted for the coming years. The European Commission has already submitted a report to the Council of Ministers on the different aspects, the objectives and principles of a common forest policy.

Gasohol from cane

The high tax on gasoline in Brazil has made alcohol fuel competitive with gasoline, and many taxis in Rio de Janeiro, Brassila and Sao Paulo are already operating on alcohol based gasoline. The Government expects that gasohol from sugar cane will replace 20% of gasoline consumption by 1980.

With a view to increasing alcohol production, Brazilian scientists have already developed a new method of using enzymes to break down starch in Cassava into sugar (Courtesy Energy Update).

ICE CREAM: A FIRM FAVOURITE

—By—
Mrs. S. Kodagoda and N. Jeganathan

Ice-cream is ever popular with both the young and the young-at-heart from 3 to 90. It is very welcome especially in these sweltering days following the vernal equinox. It is a product that could be easily made in many variations. Ice-cream is easily digested and does not have many draw-backs to health, thus it could be given to infants, the feeble and the old.

This product, manufactured from milk, or cream and sugar may contain many ingredients but it contains less than 14% fat and it could be prepared with or without flavouring. A fruit and nut ice-cream contains a minimum of 12% fat. Thus it is consumed by all categories of people.

Therefore it is obvious that ice-cream has a good demand the year round and it would not be difficult to set up a viable small scale industry without a heavy initial outlay.

Technical Process

The ingredients to be mixed are placed in the mixing vessel with the most viscous liquids being added first and then the less viscous ones being added later with sugar and gelatine being added last. When all the ingredients have been added, the mixture is heated to a temperature of 150° to 160° F (73.9°C to 88.3°C) for about 25 to 30 minutes. Then it is taken off the fire and allowed to cool. However, if the temperature of the mixture is brought down immediately it is ideal because it gives a smoother product.

The pasturised mixture, is passed through a homogenizer inorder to homogenize it. When the fat particles have been completely broken up, the mixture is immediately cooled to a temperature of 40°F or less. If this temperature is maintained for about 24 hours, the viscosity of the finished product would increase giving it extra smoothness.

Flow diagram:

Preparation of mixture
|
Pasturization
|
Homogenization
|
Ageing
|
Deep freezing
|
Settling

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The batch or continuous freezer method is used in cooling. Flavouring and colouring are added during the manufacturing process. The cooled mixture is now placed in suitable containers and allowed to harden in a room with a temperature of 20°C or less.

The texture of the finished product depends on the rate of deep freezing and hardening. Quick deep-freezing will give a smoother ice-cream with smaller ice crystals.

ICE PALAM

This product like ice cream is popular with everyone especially children. It is manufactured almost in the same way as ice-cream. As in the case of ice-cream, this product too could be prepared with many variations.

Apart from this, this industry would yield a high profit because of the heavy demand and it does not require a heavy investment because the product requires only small quantities of milk and sugar.

Equipment

*It is similar to the requirements for the ice-cream manufacture. They are as follows:

(1) Mixing vessel,
(2) Vessel/vessels for pasturization
(3) Homogenizer
(4) Deep freezer (10 cubic feet) and
(5) Moulds*

*The moulds could either be plastic ones or those turned out of zinc. They could be purchased quite easily.

Process

Ice palam could be manufactured by mixing the required quantities of milk, sugar and flavouring with water.

It's manufacturing process is practically the same as that adopted for the manufacture of ice-cream except that finally it should be poured into the moulds and allowed to set. Then when it has settled, it should be stored in the deep freezer until required, of course after it has been removed from the moulds.

In order to prepare chocolate ice palam, 240 pints of the sugar solution, one and a half pounds of yellow colouring matter 32 ozs. of vanilla should be added to 2,000 pints of chocolate flavoured milk.

The sugar solution needed for this quantity of milk, could be prepared by boiling 1,000 pounds of sugar in 2,000 pints of water.

As in the case of ice-cream, it is important that the mixture once it has been poured into the moulds, be placed in the deep freezer immediately so that it cools fast. Once it is frozen, the ice palams could be removed from the moulds and again placed in the deep freezer or it could be packed in containers made of rigifoam or some other material which would prevent the ice-cream from melting while being stored or transported.

Research Unit to be set up

A mineral research department is to be set up in Sri Lanka for the first time.

This unit would be of immense help to the various government Departments and Corporations dealing with mineral resources. This unit would be a great boon to both the Mineral Sands Corporation and the Petroleum Corporation.

The unit would be carrying out extensive research of the sea bed and continental shelf with special emphasis be paid to the prospect of finding oil and other resources.

It would also be helping the Geological Depatrment with various projects and research.

KARMANTHA

Editorial Note

The journal is a means whereby information on innovations, inventions etc. are communicated to the industrial sector. Besides highlighting the latest technological developments through articles, the journal carries information on processes, utilisation of raw materials etc.

Contributions are invited on industrial development and related aspects. Articles based on factual data, research work and surveys are welcome.

Contributions could be from research workers, entrepreneurs, educationists or any others interested in the industrial field.

Published contributions would be paid for. The amount payable would be decided by the Editorial Board.

The following abstracts are brief samplings of some of the articles occurring in the journals that are available in our library. These articles are provided through our Industrial Information Service (IIS) The public could visit the library and read the articles. This would not incur any cost. The Library is open between 8.30 a.m. and 4.30 p.m. on week days.

* * * *

Indian Turpentine Oil as a Source of perfumery chemicals by Vincent Paul. (Indian Perfumer, Vol. XXII, No. 1, 1978) p. 1-4.

Outlines the problems and possibilities in the utilisation of careno, which is the major constituent of Indian Turpentine oil.

* * *

Insulating lacquers by M. L. Ellinger. Reprint Paint Manufacture; 1974. Reprint 219.

* * *

Use of Rubber derivatives and Rubber seed Oil in paints by A. Coomarasamy (RRISI Bulletin, Vol. 12:2: 1977) p. 75'.

The possibilities of using natural rubber and rubber seed oil in the paint industry by suitable modifications for local consumption and also for export.

* * *

Maintenance in the foundry by Tony Suschi. (Modern Casting, August 1978) p 51-59.

Includes two articles namely maintenance and election Corporation and Modular Maintenance, a foundry Supplier's concept for controlling moulding line down time.

* * *

* Concentrated orange flavouring powder based on methanol-treated starch by Erc D. Lund and others. (*International Flavours and Food Additives;* Sep./Oct. 1977) p. 193-195.

A powdered orange flavouring containing 27 fold orange oil absorbed on rice starch was prepared by Methanol treatment process. The powder contained the equivalent flavouring potency of 18% of whole orange oil which was the maximum obtainable. Other rice starch samples contained lesser amounts. and had lower folds.

FOUNDRY

* Divided blast cupola. (*Modern Casting*, Oct. 1977) p. 91.

INDUSTRIAL INFORMATION SERVICE

The divided blast cupola has shown great promise in those foundries which have converted the single row tuyers cupolas to two rows of tuyers. This change has resulted in higher tapping temperatures and carbon pickup, plus a reduction in coke consumption.

* * *

* Pollution effects of tannery waste—two case studies by N. Basheer and others. (*Leather Science*, Vol. 24, No. 12, Dec. 1977) p. 416-422.

Tanning is one of the most polulting industries in the states. The studies carried out by different workers on the effect of water supply and agriculture due to the discharge of this waste have been reviewed.

* * *

* Utilisation of slaughter house by-products—Part 1, by Gopal R. Mallavarapy & others. (*Leather Science*, Vol. 24, No. 12, Dec. 1977) p. 409-411.

A process for the preparation of cholesterol from cattle brain is developed on a semi-pilot plant scale. The process is economically feasible and is suitable for a small scale industry.

* * *

• Selecting Plastic and Wood Materials in toy making. Edited by John A. Vaccan. *Materials Engineering* (USA), May 1977, p. 18

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Long Eggs

• Farm eggs processed into 8" long cylinderical food eggs, by George Neison, *Du Pont Magazine* (USA) July-August 1976, p. 2.

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