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CONTENTS

* *Cover picture*
Fireworks

In our next Issue

- Cement floor and wall tile manufacture
- Industrial Development the Chinese way
- The Manager's role today
- Vegetable dyes

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'GINIKELI' AND 'CHEENA PATAS' FOR ALL OCCASIONS

By

C. S. Ranasinghe

IDB

No joyful event in Sri Lanka whether it be a wedding, or a birth or any other festive occasion is complete without the thunder of exploding crackers. No Lankan would consider heralding the dawn of new year or a momentous or auspicious event without the accompaniment of the exploding cracker. Thus especially at New Year which is full of auspicious moments, the number of crackers that are exploded are countless.

Not indigenous

However even though crackers, are such an integral part of Sri Lankan festivities, it is not indigenous nor is it linked with our traditions. Crackers are of comparatively recent origin and were only introduced to our shores during the period we were under foreign domination. Even the Sinhala word for crackers, is derived from the Portuguese. Therefore it is not surprising that originally crackers were used by Christians to celebrate religious festivals. Later, however, the Buddhist and Hindus too acquired the habit, and today, they have become indispensible during practically all celebrations.

It is both interesting and ironic to note that though we were introduced to these fascinating noise-makers by the Westerners, crackers originated in Asia. It is believed that the Chinese and the Indians had discovered the art of manufacturing tinder, by compounding salt petre with charcoal many centuries before crackers were known in Europe. In fact, history reveals that the Chinese, to whom the honour of inventing gun powder belonged, were skilled in the manufacture of crackers, rockets and other fireworks which were used for their celebrations.

By the Arabs

The techniques and secrets of the manufacture were introduced to Europe by the Arabs and the Greeks who from ancient times were trading with China. The Europeans however continued the practice and they developed the industry to the extent to which it has advanced today.

Composition of powder

Potassium nitrate, potassium chlorade or potassium perchlorade which act as oxidents, pigments to add colour, sulphur, coal etc. are the main ingredients contained in fireworks. In the early days of the industry, salt petre or potassium nitrate were used as the oxidents. However the heat produced from these ingredients was insufficient to produce colourful fireworks. However in 1833, the discovery of potassium chlorade proved to be a great boom to the industry and that year marks the dawn of a new era as far as the pyrotechnic industry is concerned.

From this time onwards, experiment upon experiment, that had been made from time to time has resulted in the present highly developed industry. In 1853, for example sugar and steric were used instead of sulphur. In 1865, magnesium powder was used to give a brighter lustre, and in 1885, potassium cholorate was being used in order to make the crackers safer. While in more recent times, hexochloro benzine and ethylene have come to be used.

Raw materials for the 'cases' are 'farmed' out to nearby houses. Here these cases are being turned out on a cottage basis.

However when talking of the modern fireworks industry, F. M. Chetier is a name that cannot be forgotten because the modern compounds comprising amonia, potassium chlorate, and copper sulphate were his inventions.

Fireworks in Sri Lanka

The fireworks industry in Sri Lanka is of comparatively recent origin. From the time that the Portuguese introduced them, even as late as the 20th century, our requirements of this product were imported from various countries, especially from China. Even today there are people who recall how our crackers and fireworks were imported from China and refer to them as "*Cheena Patas*".

In very recent times, especially after imports were banned, a fairly well developed industry which provides the entirety of our requirements has developed. However, strangely enough, this industry is located or concentrated very largely in the Kimbulapitiya and Minuwangoda areas and the region in and around Kandy. This it is believed, is perhaps, due to the religious environment that prevails in these areas. In the environs of Negombo there is a predominantly Catholic population while in the Kandyan areas, the estate population was mainly Hindu. It is believed that since fireworks and crackers are part and parcel of the religious festivities of these people, this industry too developed in close proximity.

Regulations regarding manufacture

The fact that crackers could be dangerous cannot be over stressed. Judging by the number of casualties and the number of accidents that are reported especially during festival times, it is evident that great care should be taken to ensure good quality. Therefore it is not surprising that very stringent regulations have been enacted to control production and to maintain a high quality.

Since the production of crackers comes under the Explosives Act, fireworks cannot be manufactured at random and without special care. Not only the manufacture, but the import of raw materials, storage and even the supply are all governed by regulations. Only those who have obtained licenses are permitted to manufacture those products.

Crackers are manufactured in long 'vines' to facilitate production. Here the long 'clusters' are being cut into smaller bunches just prior to being packeted.

Furthermore, apart from these restrictions, even the factory and the place of manufacture of these explosives have to comform to certain specifications, for example, the use of naked bulbs, metal tools or equipment capable of producing sparks or flame are prohibited. The gun powder has to be stored under conditions laid down by the Act. The quantity of gun powder released for daily use has to be limited to only the day's use (Details of these regulations could be gathered from the Explosives Act).

The finished crackers are bound by thread into clusters and packeted. Here these girls are giving the final touches to them before they are packeted and labelled.

Seasonal

An interesting facet of this industry is that the type of fireworks manufactured varies with the seasons for example, during the Sinhala and Tamil New Year season, the demand is for crackers only, whereas during Christmas time, the demand is for crackers, sparklers and fireworks as well.

Crackers

The type of crackers produced in Sri Lanka vary according to size, shape and sound. The main chemicals used in the manufacture are potassium nitrate, sulphur powder and aluminium powder. Normally the mixture comprises 75% potassium nitrate and 10% sulphur.

Process

The manufacture of the paper case is the primary stage of the production of crackers. The thickness of the paper used depends on the 'strength' of the cracker. The 'case' is made by wrapping glue-coated pieces of paper which are of uniform size and length round a spike. After the case has been formed, the clay base is filled in. Generally these cases as well as the clay filling is done, on a cottage basis—that is these are given out to be produced by people living around the factory.

The next stage of the production is one where great care should be exercised because now the crackers have to be filled with finely-ground gun powder. This could be done in two different ways: one is by introducing the powder into the case by using a long stemmed graded funnel, the other is by using a narrow spoon.

The 'wick' is a twine coated with potassium nitrate, coal and sulphur that is later rolled in tissue paper or some other easily flamable paper. The twine is then cut into required lengths. Once the 'wick' has been inserted, the mouth of the cracker is tightly bound with thread. Thread is also used to bind the crackers into clusters of required size. Sometimes, in order to facilitate manufacture, the crackers are bound together into long clusters and then they are later cut into bunches or clusters of required number into which they are to be 'packeted'. But if they are to be marketed in boxes, then, they are individually packed in batches of 50, 75 and 100 in round cardboard boxes.

Sky rockets

The mixture generally used in the manufacture of sky rockets comprises Potassium nitrate, sulphur and coal dust. However, though the production process is similar to that of a cracker, a steric mixture too is introduced into the case and the case itself is attached 'wick' facing down to an ekel or a long spike. Various effects are produced by additives and mixtures of various proportions.

Fireworks

The manufacture of fireworks is the work of an artist. They vary according to the experience, skill and artistry of the manufacturer and as in the case of good whisky, the secret is in the blending.

Thus, this industry which provides not only the atmosphere to practically every joyous occasion but also helps to bring joy too both the young and the old, also provides employment to hundreds of people. However though the industries that have already been set up are adequately supplying the country's requirements of this product, the market is still not saturated. Therefore an enterprising enterpreneur could always set up a good quality industry in this field.

RICE MILLING INDUSTRY

By K. J. Wanasinghe,
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Rice is the staple food of Sri Lankans. A considerable percentage of the country's requirements of rice, was being imported until recently. The massive agricultural and irrigation schemes implemented have resulted in a progressive increase in paddy production and a considerable decrease in imports. Today, Sri Lanka has now almost reached self-sufficiency in paddy production so much so that, the country has even taken the encouraging step of exporting its excess production.

As a result of the development programme that has been mounted by the government, and the green revolution that is underway at present, there is a heavy demand for milling facilities

Not surprising

Therefore hand in hand with increased production paddy milling and storage capacities too have to be increased. Therefore it is not surprising that with the present emphasis on paddy cultivation that a very lucrative industry could be established in this field.

Today in Sri Lanka rice mills are classified as 'Custom and Quota' mills depending on whether they undertake milling for private customers or for the Paddy Marketing Board (PMB) which issues quotas of 2,000 bushels per week per private miller. Paddy is milled either in the raw form or par boiled. The PMB however advocates only par boiled milling because it has been found that a larger volume of cooked rice could be obtained from par boiled rice and also because it has better keeping qualities and it is also said to have a higher nutritional value.

Guidelines

This article, gives the guidelines for setting up a rice mill for milling paddy for the PMB. The type of mill envisaged here, has a milling capacity of one ton per hour or 2,000 bushels per week, working on a single shift. We have however assumed that about 48 quotas of paddy would be milled per year when allowances are made for machinery breakdowns etc. and that the project would employ 17 persons. We have also taken into consideration facilities for par boiling and drying paddy in our estimates.

Working on the above assumptions, the total investment for an unit of the nature envisaged would be around Rs. 690,000/- comprising Rs. 587,000/- as fixedcapital and Rs. 103,000/- as working capital. The annual operational costs would be around Rs. 261,840/-. The annual revenue would be Rs. 444,840/- and the annual profit Rs. 183,000/-. The return on investment in the first year of operation is 26.5%, and the break even point is 37.9% and pay back period is 2.6 years.

We have published this article giving the guidelines for setting up a rice milling unit in response to the numerous requests that have been received at our office.

We have not given any details about Marketing in this article. For details about Marketing, please contact the Director, Marketing Division IDB.

For further details about the milling project itself, please contact Director, Planning Division, IDB.

However, before one decides to set up this venture, it is essential, that the PMB be consulted to ensure that a quota of paddy could be obtained from them. Once, this step has been taken, and there is no question of not getting a quota, milling could be undertaken on a viable basis.

The paddy that is obtained from the PMB, should be par boiled and then it should be handed over to the Food Commissioner's Department at the rate of 68 lbs. of rice for every 100 lbs. of paddy obtained. At present the milling hire paid by the PMB is Rs. 6/- per 100 lbs. of par boiled paddy milled. It is however important to note that the quality of rice conforms to the speci-

fications laid down by the PMB. Apart from this, the PMB also pays a transport hire at a varying rate depending on the distance the rice or paddy has to be transported.

Earn extra Income

It is also possible for the miller to earn an extra income by selling the rice bran and also by the sale of any rice in excess of the specified 68% as is the normal practice. For purposes of this report the out turn of rice bran and excess rice have been taken at nominal values of 4% and 2% respectively. If processing and milling are done properly, the quantity of broken rice when par boiled paddy is milled, is negligible, hence, in our evaluation, we have not taken this into consideration. It has been assumed that rice bran is sold at Rs. 350/- per ton in the open market as animal feed and the excess rice is sold at Rs. 1.40 per lb., wholesale to a retail dealer.

Technical Process

'Cold soaking' and 'hot soaking' are the two methods that are commonly used in par boiling rice. Of these, the former is the traditional method while the latter is one of recent origin.

The par boiled rice, when it is properly dried, is then sent through the paddy cleaner to remove all extraneous matter. The cleaned paddy is then sent through a sheller or huller to remove the husk. It is then transferred either manually or by using an elevator, to a separator where the unhusked paddy is sent back to the huller, and the husked, brown rice is fed into a polisher.

The polished rice and the rice bran that issue from two outlets in the polisher, are collected and bagged separately. Each bag of rice should contain 160 lbs. A label giving the mill's name, variety and grade of rice and the date of bagging should be tagged on to every bag.

Land and Buildings

A block of land of about 1½ acres is required to set up this unit. Furthermore a building with a floor area of about 4,000 sq. feet, three connected soaking tanks (12′×8′×6′) a cemented drying floor of about 8,000 sq. ft. in area, a well, a pump house and an overhead tank with a capacity of 2,500 gallons are required.

The building should comprise a paddy store of floor area of about 1,600 sq. feet, a mill room of about 1,200 sq. ft. a rice and bran store (800 sq. feet), office room and a toilet.

Utilities

A three phase power supply and a regular water supply of about 5,000 gallons per day are essential. Paddy husk could be used as fuel for boiling the paddy.

The cost of obtaining 3 phase power supply has been estimated at Rs. 15,000/- assuming that power could be tapped from an existing 3 phase low tension overhead power line (without using a transformer) from a distance of 100 yards. However it would be best if the prospective investor would consult the Ceylon Electricity Board to get further details about power supply.

Since it is not always possible to ensure a regular supply of water provision has been made in this report, for the project to have its own source of water.

Machinery and equipment

In selecting machinery and equipment the overall benefits of a particular machine such as input—out put ratio, operational and maintenance costs, quality of the rice produced, life span of the machinery, availablity of spares and repair services etc must be considered rather than the initial prices alone.

The principal items of machinery and equipment required in this project are:

(*a*) Paddy cleaner—capacity 1 ton (50 bushels per hour)

(*b*) Paddy sheller—capacity 1 ton (50 bushels per hour)

(*c*) Paddy/rice separator—capacity 1 ton (50 bushels per hour)

(*d*) Polisher-capacity about 0.8 tons per hour.

(*e*) Paddy husk blowers (2 nos)

(*f*) Steel tanks (2 nos) fitted with a perforated false bottom and having provision for burning paddy husk—capacity 75-80 bushels each.

(*g*) A platform weighing scale—weighing range about 5 cwts.

Motors

The machinery should be fitted with motors of suitable, power rating, starters, belts, pulleys etc and the sheller should be fitted with a winnower and a husk blower.

In addition to the machinery, office furniture, tools, wheel barrows, buckets and showels too are required.

In this report, the cost of machinery has been estimated at Rs. 270,000/-. This amount would be sufficient to purchase any popular make of machinery (including elevators and a platform weighing scale) capable of milling both raw and par boiled rice at the rate of 1 ton per hour.

Raw materials

The only raw material needed for this project is paddy and this could be obtained from the PMB. However the PMB issues paddy quotas only to private millers registered with them. Therefore the would be investor should first register with the PBM and then set up the mill. Once the PMB approves the mill, the miller has to arrange for a bank guarantee to cover the value of paddy. Usually about 15-25% of the value of the paddy has to be deposited with the Bank inorder to arrange this guarantee.

Employment

In the type of unit discussed here, the project would provide employment to about 17 persons—a manager, a night watcher, two machine operators and 13 unskilled labourers. One of these operators, will have to be in charge of the milling section while the other will be in charge of par boiling. The unskilled workers will be utilized to assist in the boiling, milling storage and transport etc.

(*Continued on page* 26)

Food Additives and Contaminants

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Whether man eats to live or lives to eat, still, with today's population explosion, food is a commodity that is ever in demand. However with today's improved standards of living it is but natural that food too should become more and more sophisticated. Thus today, not only has the food production to be stepped up, but also the methods of preservation and protection of food stuff too have to be improved with better processing techniques.

Progress

Man has been making great progress through the centuries to make his environment more habitable and today man has even encroached on the moon. Hand in hand with this progress, he has also been clamouring for more and more sophisticated and exotic food, until today, food is no longer merely a means of sustenance but a fine art.

Apart from this craving for exotic food, since the population too has been steadily increasing, food supply has unfortunately not kept apace with the population increase. Thus man has had to supplement his diet with various edibles, some natural, others synthetic.

Therefore while, some of these foods have become potential health hazards, man has been forced to make advances in food and agricultural technologies inorder to cope with this situation. He has also had to exercise greater vigilance to ensure that the various chemical and biological additives in food that are in vogue today are not harmful to him. Furthermore foods have to be transported long distances and preserved over longer periods, therefore various additives have to be introduced. Thus the need for controls and protection too have increased hundred fold. Recognition of the need for such control of these additives has given rise to food specifications, food laws, and other restrictions being developed.

Enormous

Food additives are very extensively used today and they also serve an enormous range of functions, therefore the Codex Alimentarius Commission of the joint Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO) had defined food additives as "any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value the intentional addition of which to food, for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly) in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods. The term does not include "contaminants" or substances added to food for maintaining or improving nutritional qualities".

Elastic

Some authorities, however hold a slightly more elastic view on what constitues food additives. In their opinion, a food additive, "is a substance or mixture of substances, other than a basic food stuff, which is present in food as a result of any aspect of production, processing, storage or packaging". This definition, however includes chance contaminants.

According to this, chemicals defined by Codex as food additives are considered intentional and contaminants are referred to as unintentional food additives. The definition of contaminants according to the Food, Drug and Cosmetic Act of the USA is as follows: 'Food additive means any substance, the intended use of which results or may reasonably be expected to result directly or indirectly, in its becoming a component or otherwise affecting the characteristics of any food, including any substance intended for use in producing, manufacturing, packaging, processing, preparing, treating, packing, transporting or holding food and including any source of radiation intended for any such use, if such substance is not recognised, among experts qualified by scientific training and experience to evaluate its safety, as having been adequa-

tely shown through scientific procedures to be safe under the conditions of its intended use, except that such term does not include:

(1) A pesticide chemical in or on a raw agricultural commodity; or

(2) A pesticide chemical to the extent that it is intended for use or is used in the production, storage, or transportation of any raw agricultural commodity; or

(3) A colour additive; or

(4) Any substance used in accordance with a sanction or approval granted prior to the enactment of this paragraph pursuant to this Act, the Poultry Products Inspection Act or the Meat Inspection Act as amended and extended; or

(5) A new animal drug.

Objectives

Food additives are added inorder to accomplish one or more of the following general objectives:

(1) Maintanance of freshness;

(2) Creation of some desirable sensory property;

(3) Aid in processing ; or

(4) Improvement of nutritive value.

At present, there are over, 2,000 to 3,000 chemicals that are added for these purposes. The fact that relatively large quantities of some of them are ingested regularly over a life time, emphasize the importance of establishing conditions that assure their safe use.

Unlike drugs, food additives are consumed by a non-targeted population including vulnerable groups. They are not administered under the supervision of a medical practioner in a specified dose for a specific period to specific individuals, but may be ingested throughout an individual's life. Further more, the consumer may not be consciously aware of any potential hazards of food additives. He presumes that the food that is bought is 'good', and that his health and well-being are being safe guarded by the 'authorities", therefore absolute safety should be the prime consideration as far as additives are concerned.

Responsibility

It also places a grave responsibility on the government, the scientists engaged in food technological work, industries using food additives and other regulatory authorities responsible for clearing food additives for general acceptance, to monitor the levels of addition, control the use and adhere to quality specifications.

This, however is no easy task because the whole problem of safety is a very complex one. But how can we find out exactly how safe these additives are?

In assessing the safety, these aspects must be considered:

(1) Aspects of toxicity—that is, the capacity to produce injury;

(2) Aspects of hazard in use—the capacity to do harm at likely human intake levels;

(3) Aspects of carcinogenicity—capacity to cause cancer;

(4) Aspects of teratogenicity—capacity to produce embryotoxicity.

Concern

The question of carcinogenicity has caused deep concern so much so that in the Delaney clause in the Food Additives Amendment in the USA (1958) it is stated that no chemical may be added to food if it, in any amount produces cancer when ingested by man or beast.

This 'zero' tolerance is recommended mainly due to the fact that it is difficult to establish safe maximum level even if there can be some low levels at which carcinogens can be harmless. However the fact that there is no apparent uniformity or standard in the prohibition of additives for example certain additives are prohibited in one country while there is no restriction on its use in another, as in the case of Amaranth, a widely used colour additive which is prohibited in USA, is permitted in UK and Canada, has also created considerable confusion in the minds of consumers and legislators.

Apart from this, many substances which have been used widely without indication of any untoward reaction, have now been found not to meet all the safety criteria, and the list of such additives keeps on growing. Infact, it seems to be that substances that appear to be the safest at the moment, are the ones which have been least studied.

Justified

The use of food additives is justified only if it serves one or more of the following purposes:

(*a*) to maintain or improve the nutritional quality of a food,

(*b*) to improve the palatability, storage life or appearance of a food,

(*c*) to render a food more appetising,

(*d*) to provide aid in producing, manufacturing, packing, processing, treating, transporting, storing of a food,

(*e*) as a preservative—only when there is no alternative means of preserving a food.

However, it is not justified

(*a*) if the proposed level of use constitutes a health hazard,

(*b*) if it causes an appreciable reduction in the nutritive value of a food,

(*c*) if it disguises faulty or inferior quality of a product,

(*d*) if it disguises the use of processing and handling techniques that are prohibited.

(*e*) if it deceives the consumer,

(*f*) if the desired effect can be obtained by another method of processing.

The Codex Alimentarius Commission's recommendations can be of use to national bodies to assist them in the choice of permissable food additives. However in granting approval or temporary approval of an additive in a food standard or a regulation, the following should be taken into consideration:

(*a*) Additives should as far as possible be limited to specific foods for specific purposes and under specific conditions,

(*b*) Should be at the lowest level of use necessary to achieve the desired effect,

(*c*) Should take into account any acceptable daily intake established for the food additives and the anticipated daily intake of it,

(*d*) Special regard should be paid to the vulnerable groups with special diets such as infants and the elderly.

Functional

Food additives are classified mainly from a functional point of view, some of them are:

(*a*) Acids, bases and salts eg. acetic acid, phosphoric acid,
(*b*) Anti-caking agents—calcium silicate.
(*c*) Antioxidants—ascorbic acid, sulphite and metalisulphite,
(*d*) Bleaching agents—calcium peroxides,
(*e*) Clarifying agents—tannic acid,
(*f*) Colours—carmoisine, titanium dioxide,
(*g*) Emulsifiers and stabilisers—lecithin, stearyl, tartrate,
(*h*) Enzymes—papain,
(*i*) Flavours—vanillion, cinnamaldehyde,
(*j*) Leavening agents—sodium bic carbonate,
(*k*) Non-nutritive sweetners—saccharin,
(*l*) preservatives—benzoic acid, nisin,
(*m*) Thickening agents—dextrin, gelatine.

In Lanka

In Sri Lanka, the Food and Drugs Act regulations permit the use of a few additives. Particular importance is given to food colours and a recent regulation—Food and Drugs No. 9 (Colouring matter in Food) Regulations, 1978—under the Food and Drugs Act, which came into operation from 1st August 1978, permits only the following colouring matter for use in foods:—

COAL TAR COLOURS

Colour	Common Name	Colour Index 1956 Number
Red	Carmoisine	14,720
	Fast Red E	16,045
	Ponceau 4R	16,255
	Erythrosine BS	45,430
Yellow	Sunset Yellow FCF	15,985
	Tartrazine	19,140
Blue	Indigo Carmine (Indigotine)	73,015
	Brilliant Blue FCF	42,090
Green	Green S	44,090
	Green FCF	42,053

Other permitted colouring matter include:

1. Caramel and carmine (colour obtained from cochineal).

2. The following colouring matter of vegetable origin: (Any colouring matter natural to edible fruit and vegetables and alkanet, annatoo, carotene, chlorophyll, flavine, indigo, saffron, safflower, sandlewood, turmeric and the pure colouring principle of any of the above mentioned colouring matter, whether isolated from such colouring matter or produced synthetically.

Coal tar

The coal tar colours mentioned above should be pure food colours conforming to national standards specifications or if such specifications are not available, to the British Standards Specifications for that product. Sri Lanka Standards Specifications have been prepared for Carmoisine, Fast Red E, Ponceau 4R and the specification for Erythrosine is under preparation. Colouring matter other than coal tar colours, are expected to have a standard of purity consistent with good manufacturing practice.

Contaminants

Contaminants are generally regarded as undesirable substances which have been added inadvertently before, during or after processing of food. As already indicated these substances are considered "unitentional additives" by some authorities, Codex Alimentarius Commission defines contaminants as "any substance not intentionally added to food, which is present in such foods as a result of the production (including operation carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or as a result of environmental contamination. The term does not include insect fragments, rodent hair and other extraneous matter".

Contaminants are generally regarded to include:

1. Trace elements,

2. pesticide residues,

3. mineral oil,

Contamination of food by trace elements and pesticide residues is an inevitable result of the modern technology used for the increased production of world food supplies.

Fruits and vegetables may get contaminated by agricultural sprays and the trace elements may become incorporated into the food due to attack on the processing plant or container. Recognizing the health hazards involved in the intake of these contaminants, many countries have started active surveilance programmes and strict regulations for contaminants in foods and environments. In the international level, the joint FAO/WHO expert committee on food additives of the Codex Alimentarius Commission is responsible for work on contaminants. The maximum limits for contaminants recommended by the Code Commission are made in the light of information that these contaminants are likely to occur following their use in accordance with good agricultural practice or good manufacturing practice as well as in the light of the toxicological information and the anticipated daily or weekly intake by man of these contaminants from all food sources.

Trace elements

By trace elements we refer to inorganic elements which may be present in foods in very small quantities and have some toxicological or nutritive significance. These substances can be broadly grouped into three classes: (1) the essential nutritive elements. eg: Cu, CO, Fe, I, Mn, Zn, (2) the non-nutritive non-toxic elements eg: Al, B, Cr, Ni, Sn, which are known to have produced harmful effects when present in quantities not exceeding 100 p.p.m. and (3) the non-nutritive, toxic element eg: As, Sb, Cd, F, Pb, Hg, Se, which are known to have deleterious effects even when the diet contains less than 100 p.p.m.

The presence of the more undesirable trace elements in foods can be attributed to one of the following:

(1) Natural occurrence, eg. in fish due to ingestion of water contaminated by industrial effluents, deposition in the liver of animals.

(2) Sprays and dusts used as insecticides during cultivation, eg. lead arsenate.

(3) Use of impure chemicals for the manufacture of raw materials, eg. the use of arsenic contaminated sulphuric acid for the manufacture of glucose, tartaric acid, phosphates and food colours and the manufacture of acid phosphates from flurorine contaminated rock phosphate.

(4) Accidental contamination due to confusion of materials of similar appearance, eg. white arsenic for cornflour (for dusting sugar confectionery), tartar emetic for cream of tartar (in self-raising flour).

(5) Foods (especially acid foods and those containing salt or alcohol) may dissolve metals from the equipment eg. from tin plate, foils, solders, galvanised iron and cheap enamals and glasses.

The joint FAO/WHO Codex Alimentarius Commission has recommended limits for some contaminants in various foods. The limits included represent levels which are not higher than would result from good manufacturing practises, but are such as to ensure a free movement of food in international trade.

Separately

Although pesticides are covered in the definition of contaminants they are generally considered separately. Codex Committee defines pesticides as "any substance or mixture or substance intended for preventing or controlling any pest and includes any substance or mixture of substances intended for use as a plant-growth regulator, defoliant or dessicant. The term excludes fertilizers and antibiotics or other chemicals administered to animals for other purposes such as to stimulate their growth or to modify their reproductive behaviour". In foods, one is concerned with *pesticide residues* and a pesticide residue is defined as "any substance or substances in food for man or animals resulting from the use of a pesticide. It also includes any specified derivatives, such as degradation and conversion products, metabolites and reaction products which are considered to be of toxiclogical significance".

Hazardous

Persistent pesticides have been of great concern among scientists, technologists and legislators in recent years. These pesticides are not easily degraded and they remain in the ecosystem. There have been reports showing the hazardous efforts of these persistent pesticides in animals and birds. Through various food chains these pesticide residues reach man and accumulate in relatively large concentrations in human tissues. The long term effect of these pesticides in man is not yet known. Organochlorine insecticides are very significant among persistant pesticides. Some of the persistant organochlorine pesticides are: Aldrin, Chlordane Camphechlor, DDT Dieldrin, Endrin, Heptachlor, Isobenzan, Isodrin, Lindane and Methoxychlor. On the basis of toxicological evaluation a very widely used insecticide, DDT has been banned in many countries including the U.S.A. In the light of available information on pesticide residues, some authorities are of the opinion that man tends to adopt the amount of pesticides currently in the environment. However, on the basis of studies carried out on animals and on the basis of surveys conducted to monitor pesticide residues in food supply, many countries have established or are in the process of establishing limits for various pesticide residues. In the U.S.A. there are governmental tolerances set for the permissible amounts of residues for each crop and insecticide. Based on such tolerance limits and experimental evidence on accumulation in human beings, Codex Alimentarius Commission of the FAO/WHO has agreed on recommended acceptable daily intakes of pesticides with a very considerable safety factor.

The limits for pesticide residues in various food commodities, recommended by Codex Committee take into consideration the important aspects such as (a) the toxicological evaluation of the pesticide residue. (b) agricultural or chemical data

(Continued on Page 26)

AGE OF MAN MADE POLYMERS

By Colin Reginald Jayawardene

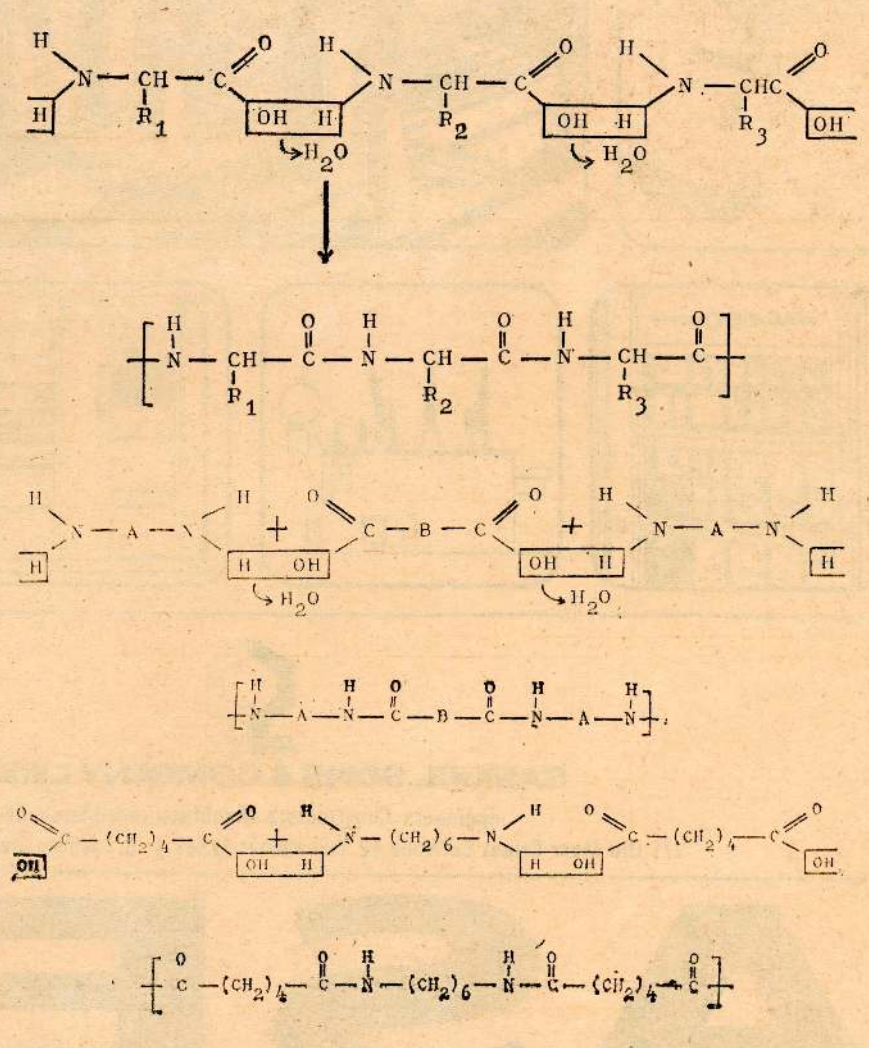
Wherever one looks today, one comes into contact with various types of nylons, polythenes and polyester—all man-made 'polymers'. Thus industry leans heavily on this synthetic product and perhaps, the present era may well be called the 'Age of Polymers' judging from the variety of uses to which this material has been put to. Its versatility has enabled it to wage a gallant war against metal for a place in industry. Today it has become one of man's most frequently used materials—from a minute button to a gigantic space craft.

In our day to day life we come across various items such as combs, bottles, boxes, plastic and polythene ware, textiles, brushes, socks and many more articles that are made of polymers. There are various types of polymers which are also known as 'Giant molecules'. Molecules are formed when atoms combine. Sometimes molecules too exist in groups and they are bound together by what is known as the 'Chemical bond'. Therefore there are large molecules that are formed by the bonding together of a large number of smaller molecules which are bound by chemical bonds. Diamonds, quartz, proteins, carbohydrates and rubber fall into this category. The giant molecules or polymers have a large molecular weight eg. natural rubber has a molecular weight of about 1,36,000.

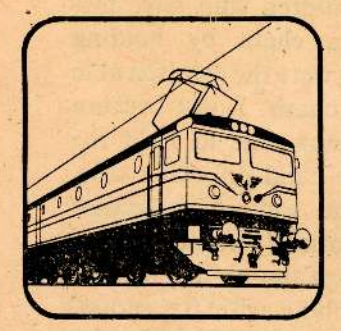
A polymer is formed by the linear combination of a large number of smaller components. These smaller components are molecules with a lower molecular weight consisting of several atoms and are known as 'monomers'. Thus Polymers are formed by the linear combination of monomers by a chemical reaction. This process is known as polymerization.

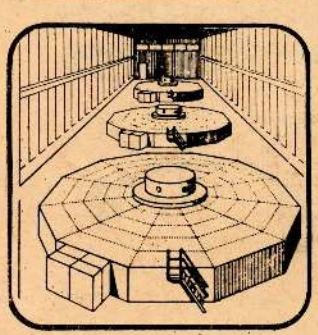
Formation

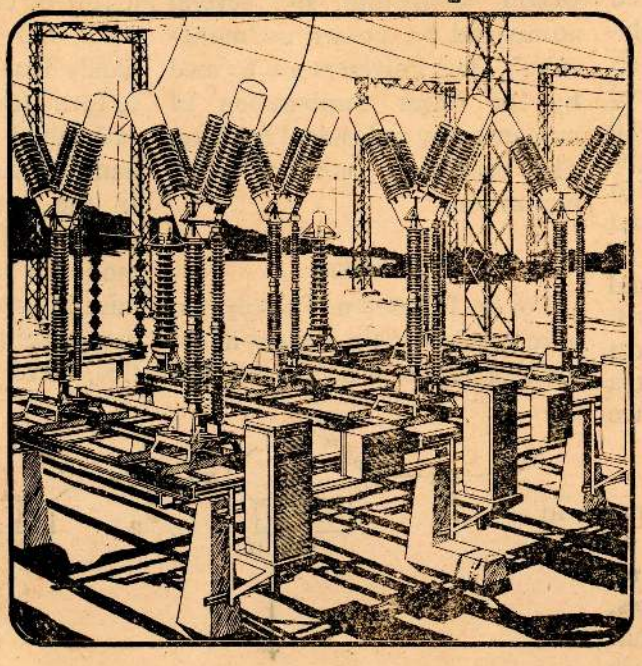
For the formation of a polymer, a molecular chain consisting of monomers has to be formed. For this, the monomers should have certain characteristics. Imagine a row of children who have formed into a chain by holding hands. How were the children able to form the chain? It was because each child was able to hold the hand of the child on either side. In the same way, a molecular chain is formed because each monomer has the ability to chemically combine with the monomers on either side—therefore, for this, there should be two chemi-



ASEA in power in industry in transportation





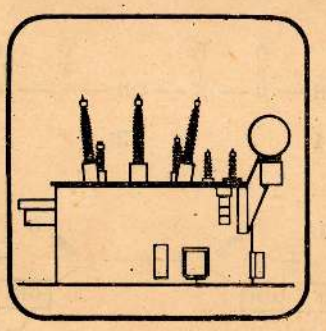


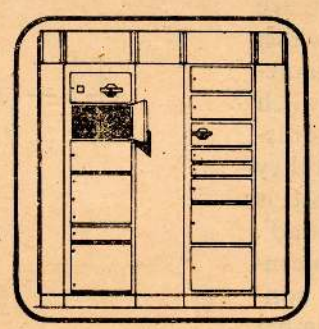
ASEA has a world-wide reputation as an international company with an extensive product range and considerable technical resources.

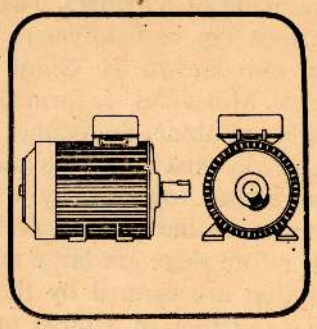
They have factories in ten countries and are represented in more than 80. In 1977 sales outside Sweden amounted to 52% of the total sales of US $2.085 million.

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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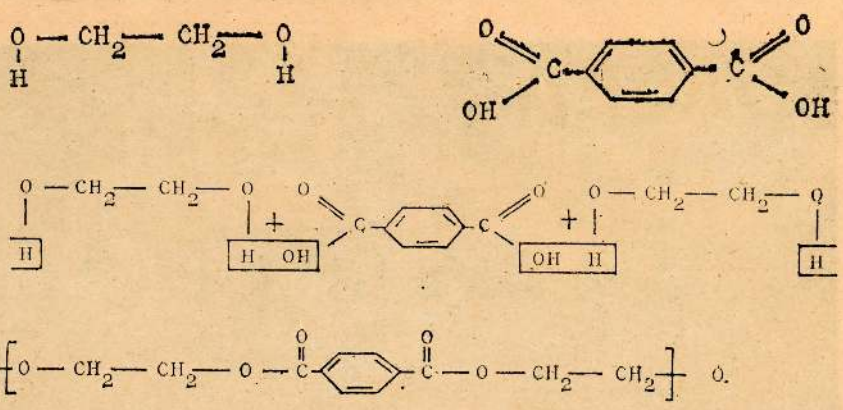
cally reactive groups on either side, of a monomer (NH_2—CH—COOH). Inorder to illustrate this, lets examine the structure of Amino Acid which is a monomer. As can be seen, on one side of the molecule there is the amino group NH_2 while on the other is the acid group COOH—these two groups react easily.



Poly Amide

The acid group of one amino acid reacts only with the amino group of another amino acid. During this reaction, one molecule of water is eliminated, and an amide bond takes place. With the formation of a large number of such bonds, a polymer called a Poly amide is formed. Natural proteins too are formed in this manner as a result of the combination of various amino acids.

Each molecule of amino acid which goes into the formation of the polyamide has two reactive groups and these two groups may be contained in two different molecules instead of being in the same one. Apart from this, each of these could, or have, the ability to join or combine with other molecules on either side.

This is the type of molecular reaction that is of use to industry. In the manufacture of various types of nylon, polymers are made by linking different molecules in this manner. Therefore it is not incorrect to call nylon a "synthetic protein". For example, to make Nylon-66 polymer, a diamine containing 6 carbon atoms (Hexa methylene diamine) and a dicarboxylic acid with 6 carbon atoms is used.

Polyester

The process by which monomers link together to form polymers by eliminating simple molecules like water molecules, is known as the condensation reaction.

The polymer known as Polyester is formed by the linear combination of two different monomers. For this to occur, there should be an OH group in one monomer and an acid group in another. An Ester bond—that is the bond that is formed between the OH or alcohol group and the acid by the elimination of a molecule of water—takes place. Since this polymer is formed of a large number of Ester bonds, it is known as the POLYESTER.

Thus polyester is formed when an ethelene glycol monomer has two groups of alcohol on either side and the acid reacts with only the atom group on either side.

Polythene

The Polythene polymer is formed by a method that is totally different from the polyester. In this process, Ethelene, a simple Hydro-carbon with a double bond, repeatedly joins together and forms a polymer. However to form the polymer, the double bonds in the ethelene bond have to be opened up.

In this process however, it would be noticed that no molecule is eliminated but that all are contained. Thus this type of polymer formation is due to the process called "an addition reaction". In this process of polymerization, it is necessary for the monomer involved to be activated. However if two activated molecules join together, the polymerization process would halt.

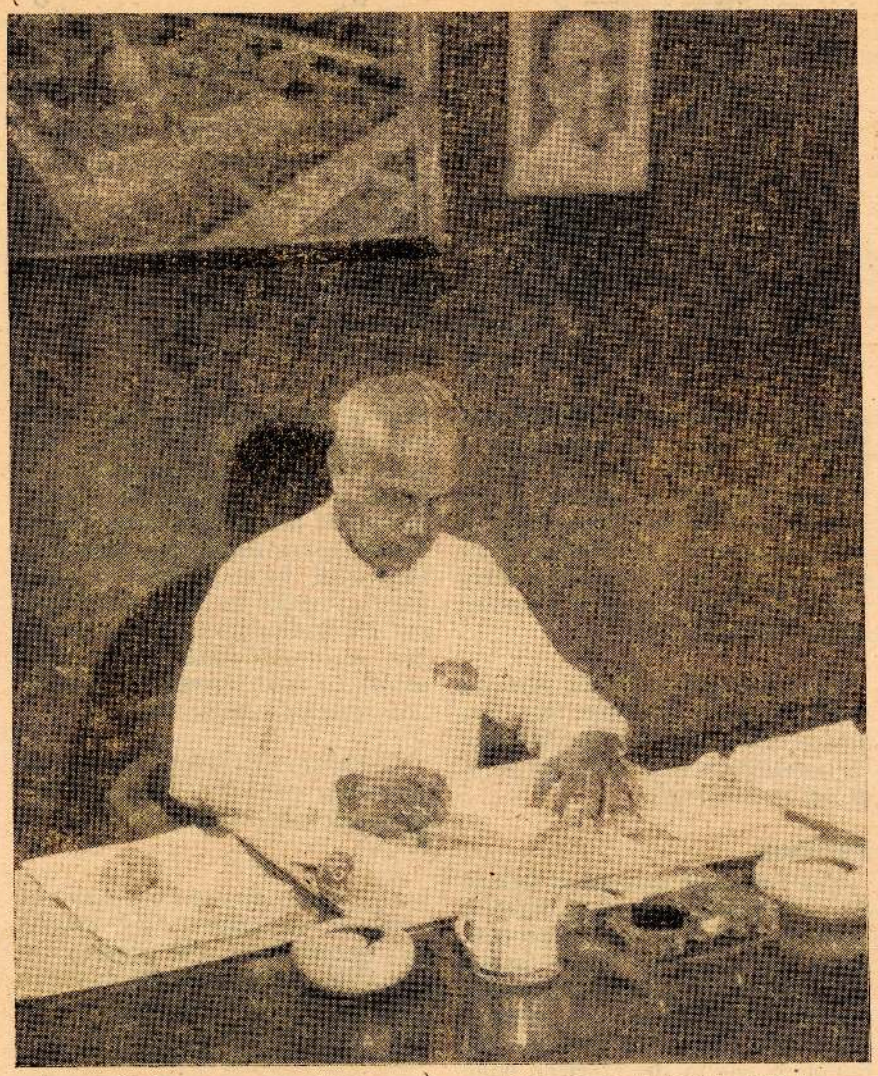
In order to activate the basic monomer, to start the process of polymerization through the addition reaction, another activated group or atom has to be utilized. These active groups could be obtained by splitting the molecules so that the pairs of electrones in a weak covalent bond are equally divided. The activated group in this manner is called the free Radical. The fission that could be achieved either by the use of heat or radiation is known as Homolytic fission. Thus, in other words, inorder to form polythene, the free Radical activates the monomer which participates in the polymerization and thereafter the addition reaction commences.

A similar method is adopted in the activation of Vinyl Chloride, the monomer used in the production of P.V.C.

Linear polymers or long chains of polyester are capable of making very strong fibres. The polymers in such fibres are aligned in one direction and this structure has the power to bind each molecule on one side. Their power arises from the Hydrogen bonds. Therefore the molecules in a piece of nylon are orientated in one direction. In the cold state, even if nylon is subjected to mechanical drawing, the hydrogen bonds between the molecules will not break. However, if they are subjected to heat, the bonds will break.

Analysis of the structure of polythene reveals that while the molecules of polythene form linear chains, crystaline units are formed between the rows of each polymer. In a molecule of polythene, the atoms vibrate along the various planes of the three dimentional space. However in equilibrium conditions, crystaline units are formed between the molecules and this accounts for the strength of polythenes.

Special incentive
in Rural
Minister's



The Minister of Industries and Scientific Affairs, Mr. Cyril Mathew at the Press Conference,

The Minister of Industries and Scientific Affairs said at a recent Press Conference that inorder to develop the Industrial infra structure in the rural areas, he proposed to give entrepreneurs who established industrial ventures in rural areas such benefits as 15 per cent of the capital as a grant and a further 10 per cent of the capital as a soft loan through the Industrial Development Board.

This, the Minister, said, was the method that had been adopted in India. He said that he would discourage the proliferation of industries in urban areas.

Assistance

The Minister said that he would give all possible assistance to disperse and distribute the industries widely throughout the country. He said that it was the intention of the Government to ensure that the rural areas were also developed. Therefore, he said, it was his intention to give special incentives to investors who setup industries in these areas.

Opportunity

The Minister said that he had visited Ind a recently at the invitation of the Indian Industries M nister and had had an opportunity of visiting the Indian Industrial exhibition. The Indian industries had the advantage of a massive market because of the huge population which was a fine attraction to investors, he sa'd. India had also had a cons stent post-independence policy of industrial development. Thus, the Indian industries developed fast, especially because of the large-scale collaboration it had from other developed countries.

Now, Sri Lanka could get this collaboration from India and we could also develop our industries rapidly, the Minister explained. He said that some of the Indian processes could be used in Sri Lanka's industries without our having to go for western technology. Indian technological collaboration had been forthcoming in the cement industry where under Indian consultancy and designing, pre calcinators were being constructed at the three cement works at a cost of Rs. 1.6 million.

ives to investors
l areas
proposals

By

P. L. Ramenaden

This would increase the total production of cement in the country from 710,000 tons per year to over 1 million tons, without installing any new kilns for the purpose, he said.

Longer time

The installation of new kilns would have taken a longer time to complete. As a result of this process being carried out with Indian help, Sri Lanka would have enough cement to meet her development requirements upto 1984, he added.

Would help

The Minister said that the Indian Government would help Sri Lanka in a big way in the machine tool industry as well. Since extremely skilled workers were needed in this sector, a modern Machine. Tools training centre estimated to cost about Rs. 18 million, would be established in Sri Lanka with Indian help to train machine-tool skills.

Benefits

Apart from these benefits, the Minister said he had been able to secure other important advantages for Sri Lanka from his Indian visit. He said that Sri Lanka would be able to get Indian technical aid and collaboration in such industries as paper, hardware, rubber and steel.

There were also possibilities of Sri Lanka making use of the non-fuel consuming battery-operated motor bicycles that India had developed.

Apart from this, the Minister said that there was a possibility of the Indian method of using rubber-tyred wheels working on ball bearings for bullock carts being introduced here. These carts or carts based on the Indian models would be introduced by the Industrial Development Board, the Minister said.

More tax benefits for Small Industrialists

By P. L. Ramenaden

Cabinet approval has been granted to a programme of the Ministry of Industries and Scientific Affairs to develop small and medium-scale industries l ocated in less developed areas of the country by granting a series of special tax incentives in addition to the ones that had already been granted with the current budget proposals.

Co-ordinate

While the Industrial Development Board will be the principal organisation that would co-ordinate this programme of developing industries in the less developed regions, a three-member team has been appointed by the Cabinet to draw up these special incentives.

According to the measures that have been approved, it is proposed to give most favoured treatment to industries in under-developed and developing areas in the island while those in developed and 'congested' areas would be denied these new incentives. In so demarcating areas, the present distribution of industries in the area, the area's state of development, population density and unemployment figures would be considered.

Grouped

Thus the administrative districts and local authorities would be grouped into four categories viz.-under developed areas, developing areas, intermediate areas and developed or congested areas. The proposed tax incentives would differ according to these categories.

According to the proposed measures, industries located in these demarcated areas would get among other incentives, the following concessions:

- **An exemption of profits from income for five to ten years,**
- **A 100% depreciation on fixed assets,**
- **An exemption from payment of BTT,**
- **Exemption of skilled personnel from paying income tax to compensate them for the disadvantages and additional expenditure incurred in working in the provinces.**

Survey on manufacturing industries

by P. L. Ramenaden

The Department of Census and Statistics is conducting a survey on the manufacturing industry in both private and public sectors using the method of postal inquiry in the first instance.

The Department has already despatched a carefully designed single page questionnaire to approximately 3,515 manufacturing establishments in the private sector who, according to existing records, are known to be in regular production. Public sector corporations engaged in manufacturing activities will also be covered in the subsequent phase of this survey.

Objective

The main objective of this survey is to gather statistical information that will throw light on the prevailing production pattern and employment structure etc. of the manufacturing industry. With this end in view, a relatively simple questionnaire form covering a minimum number of items such as output, raw material, sales and employment for the calendar year 1978 has been served on the manufacturing industries.

The survey information is being canvassed under the authority of the Statistical Ordinance Chapter 144, which ensures confidentiality in the data furnished by individual establishments.

It has been constantly pointed out that the inadequacy of reliable and adequate statistical data on industries has been a major obstacle to planners and policy makers in the task of effective planning in the crucial field of industrial development. The Department has undertaken this survey (which it is hoped will be continued in future on an annual basis) to fulfill this long-felt need for systematic and timely statistical data on industry.

Informed

Several associations of manufacturers have already been informed of the scope and purpose of the survey and requested to obtain the co-operation of their membership in perfecting and furnishing the survey questionnaire to the Department of Census and Statistics by the target date specified.

Confidentially

While information furnished by individual establishments will be treated confidentially, the summary analysis of output, sales etc. of the manufacturing industry that will emerge as a result of this survey will be of considerable benefit to industrialists themselves in assessing future production and sales trends. This will depend however, on the extent to which the manufacturing establishments co-operate in providing the neces sary information and thus ensuring the success of the survey.

India offers technical know-how

The Commonwealth Industry Minister's conference provided an opportunity for India to have bilateral discussions with various countries on Industrial projects which India could assist.

It is understood that many countries evinced interest in cement plants, textiles and starting of basic industries.

India's offer to share its skills and manpower has been warmly welcomed by the Commonwealth Ministers. The communique, issued at the end of the conference, said the offer of practical assistance included technologies developed within India for small or cottage industries, and for more sophisticated plants, at nominal or no costs, seats at various levels in Indian universities, technical institutions and other training establishments and the facilities of Indian research and development institutions on imparting new and appropriate technologies.

The communique said some Ministers made similar offers of practical assistance. The consensus was that the Commonwealth Secretariat should collect and analyse information on technologies expertise training facilities and member-countries for communication to others.

Mr. S. S. Ramphal, Secretary General of the Commonwealth Secretariat, said delegates were impressed by what India was doing, and what it had offered. He was confident that developing countries in the Commonwealth would take full advantage of the technology, training and skills available in India. (Courtesy Hindu)

INDUSTRIAL ESTATES: 'Developed plots' scheme

In keeping with the Government's policy of establishing small and medium scale industries that are labour intensive and local raw material based, the IDB has launched several schemes to encourage would-be industrialists. Since it is the Government's policy to set up industries on a district basis, the Industrial Development Board has decided to encourage the setting up of industrial units in the districts by not only providing straight forward fiscal assistance and other incentives but also by helping the industrialists by providing them with suitable locations to set up their enterprises.

Location

The problem of finding a suitable location, securing land for constructing the factory and setting up the required service facilities are some of the major problems that face any would-be entrepreneur. These can be costly and time consuming, therefore the IDB has initiated a scheme where by it would be able to ease these problems by providing selected locations. In order to assist the small and medium scale industrialists, the Board would bear the cost of providing basic infrastructure such as power, water, sewerage and industrial waste disposal and internal roadways etc. These 'locations' in the form of Developed plots and the service facilities would be leased out to the industrialists.

Therefore, in addition to maintaining the facilities and services at the three existing industrial estates at Ekala, Pallekelle and Atchuveli, these will be developed and further expanded to accommodate additional industries. The vacant land at the Industrial estates at Boosa, Pallekelle and Atchuveli have already been allocated to industrialists and their facilities are being improved.

Mini-estates

Apart from this in consultation with the District Ministers, the IDB will set up mini Industrial Estates as well. Already one such estate has been set up at Horana and another is being established at Pannala.

Since this scheme has been launched primarily to help those who are interested in setting up industries, but are handicapped due to lack of initial outlay to set up the basic infra-structure, and also are finding it difficult to find a good location, these plots would be leased out to industrialists at a nominal rate.

Salient features

The other salient features of this scheme are:

Allocations will normally be made to industries approved by the Government, but the IDB will, however, examine the viability of non-approved projects and consider allocation pending approval.

Not only manufacturing, but also servicing industries will be eligible for allocation of land.

Furthermore, industries of varying sizes and types will be considered. The complementary role of small industries in relation to larger ones, catering to specialised requirements, mutual advantage to both the small and large industries would also be taken into consideration when allocations are made.

Minimum

A minimum of quarter acre of land will be offered for the commencement of new industries, or re-location or expansion of existing ones.

Individual requirements of space and facilities will be taken into account and extents over the minimum, will be allocated to enable the industrialists to construct buildings to suit their own requirements.

Terms

The land will be initially allocated on a fifty year lease and thereafter, it is renewable at the option of the Board for a period to be decided by it.

* * *

While the cost of buildings will have to be borne by the leasee, approval of plans, designs for the buildings, electrical installations, water services, sewerage, other additions, improvements etc. should be obtained in writing from the Board prior to commencement of work.

* * *

The Board will examine the plans and specify the time permitted within which the buildings should be completed.

* * *

The leasee will have to keep the buildings in good repair at his cost during the entire period of the lease. Furthermore all buil-

dings, machinery, raw materials, finished products and all other goods within the premises have to be comprehensively insured by the leasee. The Board will not be liable for any loss or damage suffered by the leasee from whatever cause.

* * *

The leasee cannot sub-let, or part with any part of the buildings or appurtances without written consent of the Board.

* * *

The building or the premises cannot be used for any other purpose whatsoever other than the purpose it had been obtained.

* * *

The annual ground rent will be determined in consultation with the Chief Valuer.

* * *

Annual rent will have to be paid immediately on notification for the 12 month period commencing from the date of taking over of the land by the leasee.

* * *

A service charge will be levied on the basis of the services consumed by the tenants. An additional recovery will be made to cover extra consumption of any of the services above the minimum provided.

* * *

The service charge is subject to revision and change in the event of any increase in the cost of maintenance and/or cost of the services provided.

* * *

All existing and future rates and taxes have to be paid by the tenant leasee.

* * *

All electricity and telephone charges too have to be met by the leasee.

* * *

At the expiry or sooner, of the lease, the leasee should hand over the demised premises with the buildings without compensation to the Board.

* * *

These are some of the terms and conditions under which land at the Industrial estate will be alocated to industrialists. For further details please contact– Director, Industrial Estates at our Head Office or our Regional Offices.

The Saga of a Colourful Personality

By C. S. Ranasinghe,
I.D.B.

Who is the child who is not fascinated by the colours around him? Young R. M. Premawardene was no exception. However, he, unlike other children was not satisfied with merely daubbing paints, he was interested in making his own colours. In this he was fortunate, unlike other children especially those of the cities, he did not have to depend on readymade crayons and pastels to indulge in his youthful pleasures of translating his varied thoughts and feelings into brilliantly colourful graphics and graffiti. His habitat in the Kotmale area was abounding in various materials such as leaves, bark of trees, flowers, fruits and figs etc. which readily yielded colour pigments that he needed.

"It was mainly due to my wife that during our leisure hours we tried our hand at making colours."

His greatest joy was to experiment with various leaves, and fruits etc. to obtain diverse dyes and colours and many were the occasions on which parental wrath descended on his person for trying out these dyes on the invitingly available walls of his house. However, the numerous contacts with the business end of sticks, palms and whatever other implements used on his posterior to chastise him were no deterents—instead of dampening his interest in paints, they merely whetted his keeness to experiment. His yearning to translate his fascination for colours into something positive became almost an obsession with him.

"We had a very hard time at first. It was my wife who bore the brunt during the period we were struggling to make our mark". Pictured here is a stage in production - the colours are being poured into moulds.

But painters and artists, especially in Sri Lanka of 40 years ago, were notorious for their emaciated purses and empty larders, therefore when he parted from his school books at the age of 17, it was not to the palette that he turned to provide him with a plateful but to the more substantial career of masonry.

But bricks and mortar alone could not satisfy his creative impulses and being the practical being he was, he drew the line between keeping Socrates happy and the pig satisfied, by turning to carpentry. Since there is always room at the top for the determined, he not only acquired laurels in this craft but he gradually planed his way to the highly satisfactory position of a building contractor.

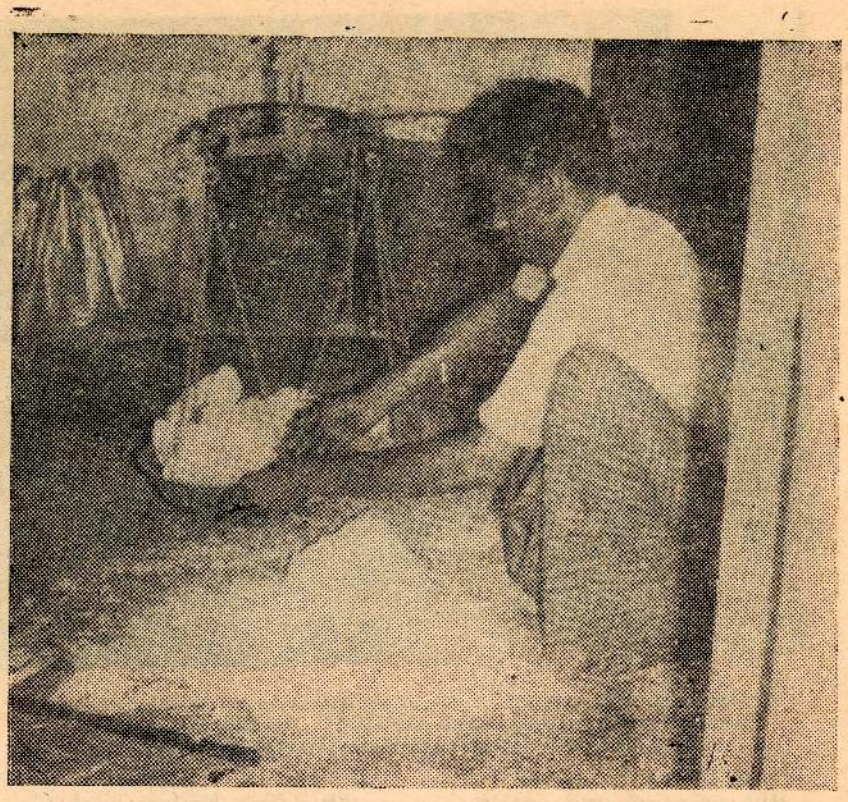
Building houses and his fortune weren't his only recreation by now; he had acquired a comelylass who like him was creatively bent and kept alive not only his lineage but also his artistic flame. His wife was not only beautiful but also had a love of beauty and it was she who constantly fanned the embers of his love for colours and paints.

"It was mainly due to my wife that during our leisure hours, we tried our hand at making colours from turpentine leaves, long bean leaves, Rata kaha and Wathu paalu as a pastime" he said.

"We gave the colours obtained from these and other raw materials available, free of charge to the Thovil gurus and the painters. I remember those early days very clearly, no Thovil was complete without paintings made from the colours obtained by us. Cha, those colours, Sir, they were exquisitely attractive and bright. In fact, before long our colours were in great demand not only in the village but also in the villages round about" he said.

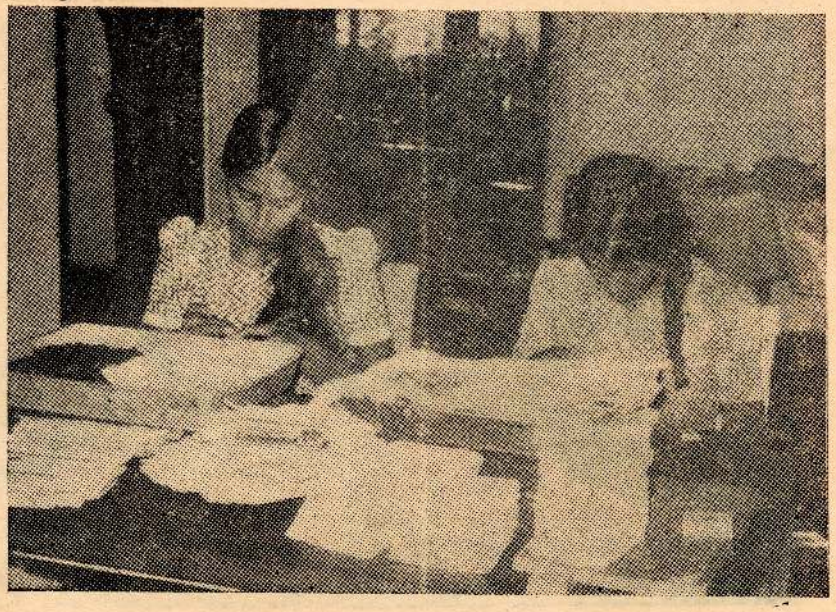
"I felt that our children should be taught from a very young age to use local products. They also helped us to packet and label our products".

"It was at this time that it occurred to us that we could manufacture these colours on an industrial scale. I realised that there was a great potential for this industry. This was also the period when there were no imports whatsoever. My children were clamouring for good quality pastels and crayons and everyone was lamenting that the good imported varieties were not available. What rubbish—the mere fact that they were imported ones did not mean that they were good". He mentioned the name of an imported brand of pastel colours. "Do you think that is good, Sir, aah? tell me? and at that price? Do you think it is good?" I made a non-commital sound.



"The IDB helped us to streamline production and cut down wastage".

"There you are, you gentlemen from Colombo should know. Not by a long chalk. These imported pastel colours are worthless. I knew I could produce really good colours" he said.



"Ruwan pas colours" are now being marketed in an improved quality pack thanks to the help given by the IDB. Here two girls from a nearby house are engaged in giving the final touches to the packs.

"Apart from this, I felt that our children should be taught from their very young age to use local products. I felt that too much homage was being paid to foreign goods. I felt that I should be a party to the development of a truly national industry and show the scep tics that our National goods were as good or even supe rior to the imported ones" he added swelling his chest with pride.

It was at this time while he was contemplating on setting up a pastel colour industry that Fortune clutched him to her bosom. He won the first prize in the National Lottery in 1966. "I still remember the day I

won that sweep prize. You see money is the root of all evil. With this easy money coming in, out went all ideas of earning an honest coin. I wanted to have an easy time, I bought some property with the prize money", he said ruefully. "Now I know how much land a man really needs as that ancient story relates. You believe me Sir, from the day I purchased that property, there was a jinx to it. I was embroiled in various legal suits and what with the land, with dispute after dispute, I had to sell, mortgage and sell them all. You know what law suits are—all gone down the drain. And my money, my hard earned money too followed suit—all down the drain".

But Premawardene wasn't the type to wallow in self pity. He was made of sterner stuff and it was to chalk and the colours he always loved that he finally turned to.

"Sir, they say that the higher one climbed, the harder one fell. That's quite true. Mine was a rocket-like rise—and so was my fall. I fell with a bone shuddering thud".

Thus it was that by the end of 1966 he came to set up the pastel colour industry—an industry that he had always wanted to set up but never quite got round to.

"I had no money whatsoever. I had only this piece of land left. I started the industry on a very small scale. The members of my family, that is my wife and children and myself began to manufacture the pastel colours in a temporary shed. This is how 'Lalani industries' came to be registered in 1967. My first products presented to the market under the trade mark 'Lalani' were well received".

"After this initial success I improved the quality of the product. Not only was I able to improve the quality of the pastels, but I improved on the pack as well. This improved, better quality product was marketed under the Trade name 'Ruwan'. Today Sir, Ruwan pas colours have become a byword among the students. You see, Sir, my products are good, even though I myself say so; but you can see for yourself.

"It was through trial and error that we managed to perfect the formula but the IDB helped us with the latest processes".

Take any of the pastel colours available in the market today and compare them with my colours. Then you will realise what I am saying. Don't take my word for it. Mr. Premawardene said quite confidently.

"With the help that I am getting from the IDB, I am sure I can give (he mentioned the name of a very popular brand of imported pastels) a good run for its money. I can market my pastels at quite a reasonable price'.

"It was while I was in this desperate state that I came to hear about the IDB through the Co-operative Development Society of the Kegalle Kachcheri. I met the Regional Manager of the IDB in Kandy and made representations to him on this matter". he said.

The IDB after carefully considering the problem of the industrialist agreed to assist him and he was able to obtain a loan of Rs. 31,500 for the development of his industry in November 1978.

He purchased more stocks of raw material, copper moulds and other such equipment with this money thereby expanding his industry and providing employment opportunities to a larger number of people.

He is confident that he could meet 30-35% of the demand for pastel colours by utilizing his total production capacity. Calculated on this basis the value of his monthly production appears to be around Rs. 8,000/-.

"The IDB provided extremely valuable advice on the management of my industry and marketing techniques. Even when difficulties arose in relation to the manufacturing process, the IDB was always able to provide a solution. We should be happy to have such an institution to look into the difficulties of small industrialists and to give them encouragement" he mentioned with gratitude.

Employment

A noteworthy feature of this industry is that all the functions in the manufacturing process are carried out manually. Therefore it has helped considerably in providing a solution to the rural unemployment problem.

This industry which involved only the members of the industrialist's family at the out-set, now has a work-force of about 20 young women.

Water Colours

On examining some of the boxes of water colours manufactured by this industrialist, we realised he could also successfully manufacture water colours in addition to pastels. He also owns a hand-presss for turning out boxes for water colours out of tin sheets. The brush he has made, using a locally available fibre is also a handy item. He is now planning to manufacture the water colours required by students.

"We started this industry with a capital as small as Rs. 2,500/-. But within about 4 years the value of our monthly production increased to over Rs. 2,500/- he stated with modest pride.

The import of pastels was banned and a favourable period dawned for the local manufacturers. The pastels

"Lalani industries" now provide employment to several women of the area because every stage of manufacture is manually done

required by school children were being manufactured locally. "It is true that some of the pastels first manufactured by the local industrialists were not of a very high quality. They did not have the proper drawing quality, tended to smudge and were apt to break, being extra fragile. But a look at the products available in the market at present will show that our manufacturers have gradually been able to overcome these short comings and manufacture quality products.

Mr. Premawardene stated that local industrialists were able to improve the quality and develop their industries due to the entire market being opened up to the local industrialist leaving room for healthy competition.

As far as sales were concerned, the industrialist considered 1973-78 as a remarkable period. His Ruwan Pas colours became so popular among school children that sales orders began to flow in from all corners of the island. To prove this he produced a large number of telegrams and letters, where orders were made for this packs of pastel colours. He said that he was faced with the problem of having to supply all these orders.

The large number of orders made it essential to expand the industry and also the volume of production. As he had already invested a considerable portion of the income earned in buildings, machinery and stocks of raw materials, he was unable to spend any more money on expansion of the industry.

Evidently there was scope for developing the industry and he was struggling to find a way out of the money problem which accompanied the plans for expansion.

One Lament

This industrialist who has competed with local industrialists and managed to forge ahead of others, voiced one inevitable grievance. This was regarding the difficulty faced by him as well as other local manufacturers due to the flow of imported brands of pastels into the market. His opinion was that the unrestricted import of foreign products in spite of the local industrialists being able to meet the demand, was an obstacle to the progress of the local industry as well as a wastage of foreign exchange.

"The misconception that whatever that is imported is superior to the local product has taken root in the minds of the people and therefore when our products are placed besides the imported items invariably 90% of the buyers choose the imported ones even if they are inferior in quality. But I am prepared to prove that my products are of a better quality, are non-smudging and less fragile than the imported product" he said.

Thus the 'Lalani' pastel industry which was started with an initial capital of about Rs. 2,500/- not only provides employment to a considerable number of people but is also an industry with an islandwide distribution today.

INDUSTRIAL INFORMATION SERVICE

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.

Materials for toy making

* Selecting Plastic and Wood Materials in toy making. Edited by John A. Vaccan. *Materials Engineering* (USA), May 1977, p. 18 **E 771805**

Reference to Fisher-Price toys

Maintaining high quality standards takes an engineering approach to materials' selection, even when it comes to toys. Durability, "intrinsic play value", ingenuity and value for money are the key factors governing materials' selection.

Wood still represents around 15% of the material consumption. It is used for toys which need enhancing of sound quality like teaching clocks, chime phones etc.

Plastics now account for 80% of total material used, polystyrene, polyethylene, PVC, ABS, CAB, EEA, EVA are some of the plastics used. Strength and damage tolerance in thick selections, flexibility and softness and greater lubricity are some of the factors which are advantageous in using plastics.

Carbon steel is about the only metal used to achieve strength, magnetic properties, spring characteristics and low costs. Common applications include in xylophone keys, spring motors, coil springs for wagging tails, etc.

Wood and paper too are used. Masonite and cardboard treated for moisture resistance are also materials that are used.

* * *

Long Eggs

* Farm eggs processed into 8" long cylinderical food eggs, by George Neison, *Du Pont Magazine* (USA) July-August 1976, P, 2. **B 62069**

This processing method ensures that each slice of egg contains proper proportions of egg and yolk. The usual egg when hard-boiled and sliced has no yolk on the end portions.

Fresh eggs are broken by machine which separates whites from yolks. The components are pumped to forming machines and into long egg moulds. They are then hard-boiled, cooled and skin-packaged. Catering services find the long egg is a more economical way of serving hard boiled egg slices.

* * *

Film-coated paper

* Nylon Plastic film-coated paper for liquid packaging containers, *Technocrat* (Japan) April 1976, p. 52. **B 62252**

An affiliated company of Teij Seiki Co., Ltd., have jointly developed a special paper vessel lined with nylon film for liquids. This can be used for packing cleansers, edible oils, engine oils etc. It has low production costs than conventional glass vessels. It's production does not involve excess technological difficulties. The company rates it as having extremely bright prospects.

* * *

Rust remover

* Canadian chemical removes rust, prevents corrosion, cleans and finishes *Canadian Machinery and Metalworking* (Canada) March 1976, p. 13. B 61396

Canadian patent No. 978839 of December 1975 granted to Corosex Inc., Bedford, Quebec, is for chemical composition which removes oxides from metallic surfaces without attacking the metal. The Chemical is a mixture of phosphoric acid, urea and a surface active agent, properly mixed having a boiling point of 70 f°, and can be stored indefinitely. The process can be used for chrome, stainless steel, aluminium and copper.

FOR FURTHER DETAILS Contact Director Documentation and Publications

Rice milling . . .

(*Continued from Page* 6)

Location

The location of the mill is very important and four important aspects have to be considered before setting up a rice mill. Primarily, it must be remembered that though there is an over all shortage of milling facilities in Sri Lanka it has been found that there is an excess in certain areas. At the same time, the demand for milling services, keep changing in different regions from time to time due to opening of new ones, and the closures of other. Therefore prospective millers are advised to consult the PMB before deciding on the location.

In selecting a location, the availability of 3 phase power supply must be considered because 3 phase power supply is vital for the project, or in the alternative a generator or an engine will have to be used and this would entail an increase in the initial capital investment as well as operational costs.

Another important aspect that has to be considered is the availability of ample water supplies since boiling cannot be done without sufficient water.

Apart from these factors, proximity to the PMB paddy stores is another factor that has to be considered when deciding on a location because the PMB pays transport charges on a sliding scale and enhanced payment is only up to a limit of less than five miles per trip. Thus the profit margin would be higher, if the mill is located within a five mile radius of the stores.

Financing

The Industrial Development Board arranges credit facilities for rice mills through Bank of Ceylon, People's Bank and the Development Finance Corporation of Ceylon. The upper limit of the loan is Rs. 300,000 or 60% of the total capital cost whichever is less. The repayment of the loan is expected to commence either 6 months from the date of the loan being granted or one month from the date of commencement of production—whichever is earlier. The loan is repayable in 6 years.

Export Opportunities

The undermentioned enquiries from abroad have been received. Exporters who could ensure supply of quality products in adequate quantities only are advised to contact the Trade Information Service Flat 29, Galle Face, Court 2, Colombo 3 (Tel: 35277) for further details:

Commodity	Country
Tea	Pakistan & USSR
Spices	Pakistan & USSR
Readymade garments	Bahrain, France, Canada
Aquarium Fish & Tropical plants	Egypt
Fresh Cut flowers—Orchids	Japan
Frog legs	France
Food stuffs	Sweden
Handicrafts	USA
Jewellery	USA & Kenya
Precious & Semi—precious Stores	Lebanon
Wood Carvings	West Germany
Rubber bands	Egypt
Souvenirs	Kenya
Musical Instruments	Sweden
Bicycle Tyres & Tubes	Canada

Food additives. . .

(*Continued from Page* 10)

(c) data relating to the daily *per caput* in take of the pesticide residue by man. When deficiencies exist in such available data the maximum limits are recommended on a temporary basis with the understanding that it is subject to review by the relevant expret committees, in the light of the additional information required.

The recommended limits published by the Codex Alimentarius Commission, for the pesticide residues are given as either *Codex tolerance* or *Codex minimum residue limit* or practical residue limit. In general, a Codex tolerance refers to the residue resulting from the use of a pesticide under circumstances designed to protect the food or food commodity against pest attack, according to good agricultural practice. A practical residue limit refers to the residue resulting from circumstances not designed to protect the food against pest attack. The residue may be acquired at any stage in the growing, harvesting, distribution, marketing or processing of the food. Therefore, such pesticides are not being recommended for direct application to food to which these limits apply.

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