FACT

The Magazine of Fertilisers And Chemicals, Travancore Ltd.
Vol. 5. No. 9. March 1951.

Editor & Publisher: P. Sreedharan Pillai B. A.

A single Ear of the new variety of Paddy tried in our Experimental farm.

The United Nations General Assembly, meeting in a special session at Flushing Meadow, New York City, recently commemorated the fifth anniversary of the world organization.

FACT

Vol. 5 No. 9
March 1951

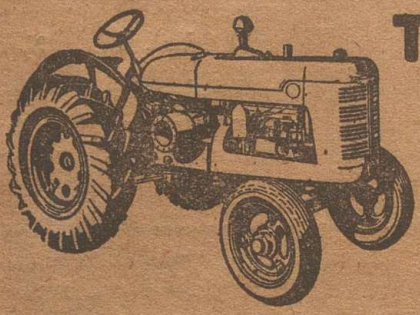
The Editorial Board do not hold themselves responsible for the views expressed by contributors.

Books and Pamphlets on scientific, industrial and allied themes are accepted or review in this Journal.

Editor.

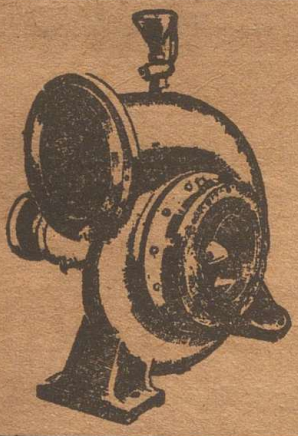
In this Issue .....

Advertisements A-18—20.



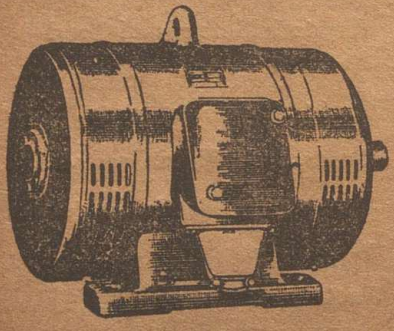
TRACTORS

and implements for all agricultural operations, even for small farms. Tractors with belt pulley are a source of stationary power for pumping, chaff-cutting, threshing.



PUMPS

for irrigation and other purposes.



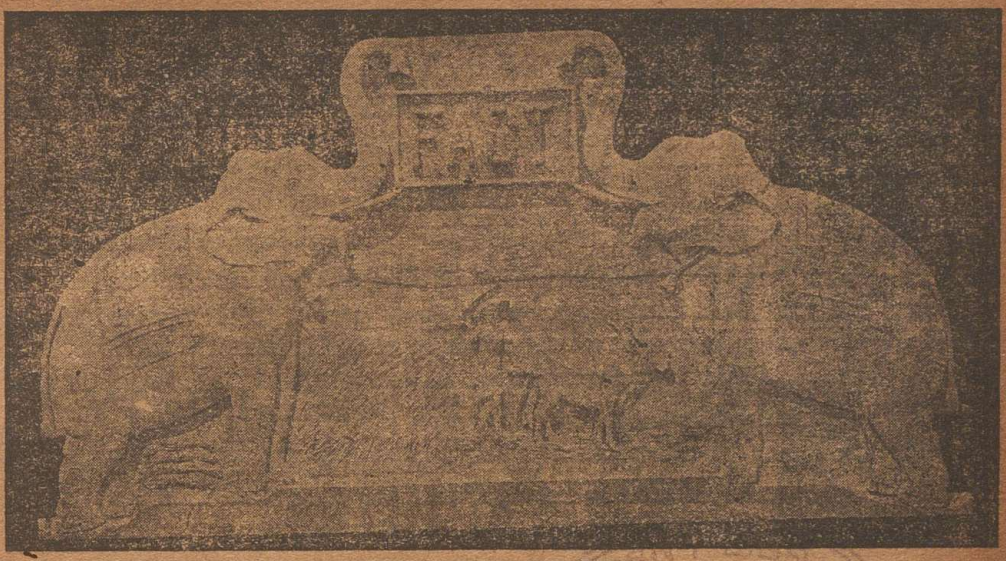
MOTORS

for all purposes in a wide range of horse-power.

VOLKART

VOLKART BROTHERS

P. O. Box 3, Calvetty Road, COCHIN.



VOL. 5 | MARCH 1951 | NO. 9

EDITORIAL.

COTTAGE INDUSTRIES.

THE Interim Report of the Cottage Industries Committee appointed by the Government of Travancore-Cochin in March 1950, is just out and forms interesting reading. The committee under the Chairmanship of the veteran economist Dr. P. J. Thomas, have carefully gone into the question of developing the cottage Industries of this state with a view to putting them on all fours, and modelling them effectively to become the chief plank in our economic rehabilitation programme.

Under the auspices of the committee, a large-scale survey of cottage and other small-scale industries was made last year. With the help of non-official committees set up locally, investigations were carried on in all the 36 taluks of the state for a period of two months. These investigations were principally based on geographical features, natural and human resources, the present condition of existing industries, possibilities for new industries, and the gathering of dependable economic statistics. The results of the survey and the committee's findings thereon have not yet taken final shape but it is hoped that when ready they will be of considerable help to stimulate small-scale industries in the state.

After discussing the different problems connected with the question in brief outline, and assessing the resources, economic trends and scopes for improvement in the case of a few of the main cottage industries, the committee have placed before the Government the following conclusions, consisting of six-point programme to be adopted at an early date. Here is the programme in its bare outline:—

a) a complete system of technological education to be established with a central polytechnic near Ernakulam, as the apex;

b) research in production methods of interest to cottage industries to be started at an experimental centre in Trivandrum;

c) a marketting organisation, to be in charge also of capital supply and quality control;

d) a production drive in selected areas, to be carried out by a Cottage Industries Board, assisted by local committees;

e) planned industrial villages, with clean houses, in those areas; and

f) a moral drive for tightening up business laxities.

They go on to observe that if the above programme could be implemented early, the scope for employment and income will increase, the common man's standard of living will be raised, discontent in the agrarian sphere will be minimised, and that as a direct consequence of these several factors operating in unison, our material prosperity will improve remarkably.

It would be interesting to note in this connection as to what the Government of India have been able to achieve in this direction. They had also appointed a Cottage Industries Board consisting of representatives of states and a few cottage industries organisations. Separate regional Cottage Industries Committees were set up in the states also to go into the problem fully and in detail. These have carried out their investigations and made their recommendations. The Government, accepting most of the recommendations, have lately placed executive powers in this matter in the hands of an All India Cottage Industries Board which has been reconstituted with 48 members and the Minister of Industry and Supply as its chairman. They have also made a provision in the current year's budget, of Rs. 16 lakhs for the development of Cottage Industries, other than the handloom industry.

This no doubt is a good beginning, and a lead given in the right direction for the states to follow. We trust that the Travancore-Cochin Government will lose no time in adopting the recommendations of our Cottage Industries Committee and implement them by prompt and effective executive measures at a very early date.

PRODUCTION AND NATIONALIZATION

By
A. V. MATTHEW

PRODUCTION has proved one of the most powerful agencies in altering the economic and moral tone of men's lives. A better study of the usefulness of production offers a fresh application of the great unalterable values in the light of to-day's thinking. It is interesting as well as instructive to consider the effect of environments on production and of the effect of production on environments. The condition of the material forces of production determines the nature of all ideas and tendencies, without exception. The need all the world over is for increased production. The creation of financial stability is a fre-requisite for the production programmes to be successful. Production is the keynote of industry. The problem of bringing down prices cannot be solved unless the level of agricultural and industrial production be raised.

The problems of agricultural production makes the interpretation of the relation of man to land obviously relevant. Land provides the best solution to the unemployment problem and gives to the people a great sense of economic security. So long as land helps to increase the productive capacity of the world and to release increased wealth, so long will man demand greater opportunity to share that wealth and use it for enriching his life. Land has maintained its historic existence in close connection with production enterprises. But as the result of the process of industrialization we are witnessing not only in India, but in all parts of the world an exodus of uprooted peasants from the country-sides to the towns, as also the growing up of great industrial cities in several agricultural regions where there existed formerly only small industries chiefly engaged in the manufacture of agricultural necessities. It is indeed a great economic problem of the present day whether it is conducive to the economic progress of any country, especially India, that a large part of the population should be entirely dependent on the ebb and flow of industrial demand. Production is sure to be retarded if there occurs the shifting about of labourers and mechanics from country-sides to towns to obtain higher wages. Restricted production is the root cause of rising prices which cannot be checked by adopting policies of controls or deflations, but only by a substantially rising productfon.

A great problem which is now confronting administrators is almost all countries is to find a way for relating national activities in industries to the purposes and interests of private enterprise. The problem of constructive nationalisation of industries appears in some countries to be passing out of the arena of democratic discussion into that of open Conflict, and forms the subject of considerable discussion in news-

papers and economic journals of many complexions all over the world. It is very necessary that a proper synthesis be discovered wherein the creative initiative, that has originated from private enterprise be conserved, and that the benefits accuring from nationalization may be utilized for driving out hunger, poverty and unemployment from society. All governments should undertake industries requiring large capital which lies beyond the capacity of private resources, while at the same time encourage a simultaneous development of government and private industries, and give to private industries encouragement and protection of the law. It cannot be denied the promulgation by great labour unions of a programme of nationalizing all the means of production and equal distribution of wealth, has produced in many countries, including India, violent reactions towards the excesses and tyrannies of the capitalists. But what substantial majority of the peoples of the world want is neither Communism nor Socialism, but a new order which will reasonably combine individual initiative with broad social planning. State ownership or control with private enterprise—which can be achieved only if people have faith in social discipline upon which to build a bridge leading to a better balanced social and economic system of regulated individualism, as also the capacity to understand the co-operative nature of mutuality and to accept the discipline of organized and creative struggle.

One of the most urgent problems of the present day is that of combining the necessary economic control with respect to the liberty of individuals. In a book of Social Principles, prepared by the International Union of Social Studies, it is stated thus: "By nationalization is meant that an undertaking belongs to the national community represented by the political power. It may be limited to ownership, or extend to management of profits. Where undertakings already worked by private persons are concerned their taking over is subject to just compensation. Nationalization, taken in its widest sense and applied to all industries or the majority of them, amounts by force of circumstances to collectivism, which was condemned by the Encyclical, Qerum Novarum, Nationalization, if applied generally, still runs the risk of arriving at the same result even when limited to mere ownership or management. Not even a system of more or less self-governing public undertakings would seem to be acceptacle, if it includes the majority of undertakings. Private initiative of individuals or groups can only be limited to the extent that the common good manifestly requires. It is very needful to preserve the two great stimulants to production, namely: the prospect of acquiring property and lawful competition. Considerations of public interest may in particular cases demand or suggest public management, either national, provincial or municipal. In that case the setting up of autonomous bodies, carrying on industrially under the control of public authorities and for the benefit of the community, can be recommended in preference to wholly official administration".

Though India has now won freedom in the political sphere, several serious industrial problems still remain in this country awaiting solution. At present there is perhaps no sphere of national life in this country where the confusion of ideas and purposes is greater than in the sphere of economics. We are assiduously treating symptoms before making any effort to diagnose our economic retrogression. Due to the difficulties in our financial position caused by the introduction of prohibition and the abolition of zemindaris, we are now compelled, in the interests of our country to revise our economic policy, instead of facing each new industrial crisis with uncertainty as to the outcome. If our economic future is pregnant with difficulties, it is no less full of promise. Our success in creating an ideal economic order in the country will be measured by what we achieve in helping society and state to develop more united planning and co-operative service.

Labour Saving in the Kitchen.

An engineer who also understands the difficulties facing the housewife in the kitchen is Mr. H. T. Lamb, managing director of a Newcastle-on-Tyne, England, firm. Mixing cakes by beating up the mixture with a spoon in a bowl seemed to him unnecessary and unpleasant labour. So he invented the "Lammix" mixer, a machine which does many of the strenuous jobs that a cook, whether commercial or domestic, must tackle every day.

The "heart" of the "Lammix" is its motor. This is a powerful electric unit of the universal type, suitable for alternating and direct current. The metal used for such parts as the revolving bowl, graters, dough hooks, and the blades of the wisk is stainless steel, which makes for easy cleaning and, consequently, for good hygiene.

One of the main features of the "Lammix" is the method of mixing. This depends on three main parts which work in combination: a revolving bowl with a geared rim; a geared dolly with adjustable arm; and a scraper. The dolly is set according to the kind of mixing to be done. In creaming and mashing, the dolly is turned by the geared rim of the bowl, the food being mixed by the action of the dolly against the sides of the bowl. In folding operations the dolly is not gear-driven but turns by the action of the mixture itself.

Sometimes it may be necessary, in preparing a particular dish, to change from the initial creaming to folding, and then to gentler folding. The "Lammix" saves the trouble of changing attachments; different kinds of mixing can be done just by varying the position of the dolly. The closer the dolly to the centre of the bowl, the gentler the action.

But mixing is only one of the many processes of which this machine is capable. For example, it also peels potatoes, shreds vegetables, makes sausages, grinds, mashes. It can make milk-shakes, egg nog, and the like, and fruit juices.

The "Lammix" has been chosen for exhibition in the Festival of Britain, 1951—and will also be on show at the British Industries Fair (Earls Court and Olympia, London, and Castle Brom-wich, Birmingham, April 30 to May 11). Though production runs now at about 200 a week, current negotiations abroad may lead to such large orders that new manufacturing capacity will be necessary; this is already arranged for and soon in other premises a thousand a week will be manufactured.

FERTILISERS IN 1950

By
D. P. HOPKINS, B. Sc., F. R. I. C.

IN the FAO Commodity Report on Fertilisers dated 10th Aug. 1950, it was said that the present "is an important period of transition in the world production and consumption of commercial fertilisers. For the first time since the war, world supplies of most fertiliser materials are now sufficient to meet effective world demand..... While, however, shortage of supply is no longer a major factor in limiting the expansion of fertiliser consumption, other factors are exerting an adverse influence in some countries." There can be no doubt that the phrase "other factors" virtually covers what might be called the economic factor. Certainly for the British fertiliser industry this factor has dominated the trading year of 1950 and to a greater extent than some members of the industry may have expected. It was known before the year began than the first stage of a two-stage plan to remove subsidies would be introduced. Those who looked upon this with pessimism have so far been proved to be realistic prophets.

On 1st July 1950, as a result of of this first stage of subsidy removal, the prices of most fertilisers rose by about a third and the prices of a few fertilisers by considerably larger proportions. For ten years of war and post-war farming expansion, fertiliser prices had been controlled to their pre-war levels, such upward movements as took place occasionally in the maximum price orders being minute. Rising costs of production and of import purchase had been steadily added to the subsidies. In May and June, which are normally months of low demand, the industry experienced an unprecedented "boom," farmers and merchants buying for store before the anticipated price rises. Nothing contributes to the profitability of fertiliser manufacture more than "out of season" business activity; consequently, those companies whose financial years ended on 30th June have shown record sales and abnormally high profits. Nothing could be more misleading than the assumption, already unhappily made in some quarters, that this shows that the industry is enjoying exceptionally prosperous conditions and opportunities.

A Much Darker Period.

Since 1st July, the industry has passed through a much darker period. With agricultural storage space well filled with the pre-July purchases and with one of the wettest harvest and autumn seasons known for many years, demand has been abnormally low. It is certain that the profitability of the May-June boom has now been offset by the July-December drop in sales. Unhappily, the industry also had to face a further complication in the sulphur and sulphuric acid shortage that arrived with some abruptness in the early sutumn. The almost complete

cessation of our sulphur imports from the United States was immediately felt, for the official view was taken that the superphosphate industry, as the largest single user of acid, could shoulder the whole, or almost the whole, of the first effects. British superphosphate production was reduced drastically; and much of the normal trade for superphosphate-direct application and compound mixing is now based upon imported Continental superphosphate.

Too Early to Comment.

As yet it is too early to comment upon the full effects of this emergency policy, but they are obviously adverse rather than beneficial. Previous production costs on the usual "perton" basis have been favourably influenced by the substantial tonnage figure by which many of the otherwise heavy and rising charges could be divided; for example, rising wages rates have been partially off-set in their proportionate effects upon costs by rising output. With such severe reductions in the supply of a vital raw material, productivity effects upon costs per ton are lost.

So far no shortage of fertilisers has been felt by farmers, the change in the raw material position being temporarily balanced by the abnormal lowness of demand; in any case, imports of superphosphate have been adequately secured. Nevertheless, it is not impossible for there to be a scarcity situation in the spring of 1951; any delays in the arrivals of imports could rapidly transform the market situation. For the de-subsidised prices are presented by many farmers and this has intensified their tendency to insist upon delivery at short notice as and when they want to use fertilisers, a buying policy that can avoid distribution chaos only *if* raw materials are all plentiful, *if* the industry itself possesses storage space for more than half of its annual output, and if there is a reservoir of unemployment from which seasonal labour forces can be obtained. Should an accentuated return to seasonal demand and deliveries be one result of de-subsidisation, it will prove costly to both farmers and fertiliser manufacturers.

Another useful report of 1950 was that of the Commonwealth Economic Committee (A Survey of the Trade in Fertilisers). Graphically presented statistics for this country, Denmark, Canada and the United States, in each case for the period 1925-50, show that fertiliser consumption is directly related to farm produce prices (or farm income) and not to fertiliser prices. The graphs for consumption are broadly parallel with those for farm produce prices; those for fertiliser prices are isolated. This might suggest that the rises in the price here through desubsidisation will nor lead to a fall in fertiliser use, but it should be noted that *sharp* changes in fertiliser prices did not occur in the period of 1925–50. This evidence from the recent past cannot, therefore, be a complete guide to the immediate future. Moreover, the controlled or guaranteed prices for farm produce are not rising as steadily as farmers' production costs; such, at any rate, is the view of many farmers.

Selective Subsidy Introduced.

At the same time that subsidies were partially removed from all mineral fertilisers, a new and selective subsidy was introduced, directly payable to farmers in respect of fertilisers used for grassland. This concession is in line with the views of the Committee on Industrial Productivity, whose first Report in 1949 observed: "To-day, less than a quarter of the 18 million acres of grassland in the U. K. receives dressings of nitrogenous fertiliser.....in spite of the fact that experimental work has shown that the response to a given quantity of nitrogen is greater in the case of grass than for either cereals or root crops." The new subsidy cheme provides proportional payments towards farmers' actual fertiliser costs up to certain maxima per acre and for maximum proportions of the farm's total acreage. There has been some criticism that this scheme and its necessary form of application are too complicated, but this seems petty and superficial; no one can expect a subsidy payment without administrative documents, and the general principles of the scheme are in fact well conceived. Unhappily its birth has been attended by extremely bad weather and it still remains to be seen whether take farmers full advantage of its offerings. The payments are wisely made for phosphatic and potassic fertilisers as well as for nitrogen.

These are all large changes in the economic climate of the industry and most of their effects did not begin to be felt until the second half of 1950. Yet no time is to be allowed for adjustment and consolidation. Before realistic consequences can be assessed, the second and final stage of de-subsidisation is scheduled for 1st July 1951, when it is anticipated that similar additions will have to be made to prices.

It is at least refreshing to turn from economics to the technical picture. The most notable event of the year was beyond doubt the report by Dr. A. Fleck, of Imperial Chemical Industries, of progress so far made towards the establishment of a British potash-mining industry in Yorkshire. The strata of potash salts found shortly before the war during oil prospecting have now been amply confirmed by further bore-holes sunk in 1948-50; though the potash-bearing brines observed at the foot of the older borehole have not been found in these new investigations. Although the Yorkshire deposits are deeper placed then the deepest potash mines now being worked anywhere in theworld, the lower of the two beds has a thickness "only rarely exceeded in any known potash filed." In an area of some 12 sq. miles, it is estimated that there are 200 million tons of muriate of potash in the form of sylvinite, the easiest of the common potash ores from which commercial muriate may be obtained. If 35 per cent of this reserve can be extracted, this amount would meet all U.K. requirements for 140 years even when a higher annual rate of use than any past rate is assumed. Nor is there any evidence that this area so far prospected limits the Yorkshire deposits. No judgment can yet be made as to the technical and economic prospects of mining these newly-

formed resources; the great depth of the beds-some 4,000 ft. below the surface-must present a number of serious problems. However, if Dr. Fleck was non-commital on this aspect of the deposits, the stmosphere of his paper was confident rather than dubious. Another large Fertiliser Company, Fisons, is also interested in this development; a test bore sunk at Robin Hood's Bay has revealed a 7-foot thick seam of sylvinite which includes a 12-in. band of pure potassium chloride; the depth ot this rich deposit has been stated to be 3,455 ft.

Most Pressing Problem.

The most pressing problem of fertiliser technology is still that of producing an efficient phosphatic fertiliserfrom mineralrockphosphate. The superphosphate process, now almost 110 years old, has yet to be displaced. Indeed, evidence during 1950 has tended to strengthen the view that no other process can produce a fertiliser more efficient in its soil-action despite the high degree to which water-soluble phosphate may be fixed by other soil constituents. Nevertheless, the sulphur situation and its effect upon acid supplies brings this matter into a different perspective. Even if the sulphur shortage can eventually be overcome by increased production of acid from other sulphur-containing materials, these new sources of acid will inevitable mean dearer acid. The alternative processes of activating phosphate rock by high temperature fusion treatments have so far been regardedas more costlythan the superphosphate process a view whose general correctness was confirmed in a 1950 symposium of American papers on phosphate rock treatment. Rising costs for superphosphate production are likely, however, to stimulate interest in fusion methods. It is not irrelevant that Dr. A. B. Stewart, in a 1950 paper read to the Fertiliser Society (not yet published) on the soil fixation of phosphate suggested that progress in fixation repression lay with soil management, rather than with the development of new types of phosphatic fertilisers.

Important Role Stressed.

The part played by fertilisers in expanding grassland's food production was comprehensively surveyed by R. A. Hamilton in 1950. The intimate connection between grassland management and fertiliser use was emphatically stressed. Unlike arable crops, grass production is continuous. The increased output obtainable by fertiliser application must be utilised for grazing, for silage making, or for conversion into dried grass meals, at the optimum times, and the balance of these different utilisations must be determined so that theannualrequirements of cattle are secured. This valuable paper, based upon modern field and farm investigations, makes it clear that grassland fertilisation must be approached as an almost entirely new branch of fertiliser technology; advisory services, both within and outside the industry, must regard the campaign "to treat grass asa crop" asalong-termproject. The intensive use of fertilisers to increase arable crop yields is a much less complex subject.

ARTIFICIAL WOOD

By
Frank Rowsome, Jr.

A GOOD-SIZED New Hampshire factory is busy 24 hours a day at what seems, at first glance, like one of the world's silliest industrial operations: they grind up lumber into bits and remake it into lumber.

For from being a boondoggle, it's an operation that may of freshadow major changes in several U. S. industries. Experts say that the process could some day make a sawmill plank about as quaint as a hand-wrought nail. It may reduce the amount that a new home will cost you, and it may substantially enlarge U. S. timber resources.

Synthetic lumber-which is ground-up wood bonded with a resin under heat and pressure-holds this glittering promise because of basic defects in natural lumber.

The best conventional methods of changing logs to lumber are spectacularly wasteful. It's estimated that less than 30 per cent of the wood in the log reaches the consumer as lumber. Even at that, a big part of this scant third is inferior grade. Moreover, the characteristics of natural lumber are mainly fixed-applications have to be governed by what nature built into the tree.

With man-made lumber, none of these limitations apply. Practically all the wood can be used, including logs that the boss sawyer at a sawmill would call hopelessly inferior. The product, too, is of uniform quality, with no loss from downgrading. Special characteristics that are needed—hardness, shear strength, moisture, resistance, nail-holding power-*can be built in* at the mill. And because the process, compared to that of a sawmill, gives a far higher yield from cheaper raw material, synthetic lumber may even cost less.

The dream of turning wood fibres into a better board isn't in itself new: the immence waste between forest and consumer has long stirred men's imaginations. But until recently only the insulating and "hard" boards have made a place for themselves, and in both cases physical limitations and manufacturing costs have been restraints. (The principal difference between the older "felted" boards and the new ones lies in the use of thermo-setting resins for bonding.)

European mills, spurred by comparatively meager timber resources, produced a successful resin-bonded board in 1947. Last year the U. S. Plywood Corporation announced plans to build a plant that would make a board of this type. Meanwhile, other U. S. firms, notably the Souhegan Mills, at Wilton, N. H., jumped into the market and are now turning out millions of board feet a year.

Souhegan's main product at present is Plaswood, a 5/8-inch board

used as a base for linoleum or floor tile. It is about as hard as maple, almost as strong as plywood and much cheaper--and builders are using it at a rate that keeps the mill on three shifts. Raw material consists of the rough, irregular scraps that are trimmed off when saw-mill slabs are squared up. Chewed up by a chipper and a grinder, the wood particles that result are almost entirely usable. Depending on price, the mill could equally well use timber straight from the wood lot, or old sawmill dust.

The manufacturing process is essentially simple, though it requires careful control of variables. Besides the linoleum "underlayment," other products in the works include core stock for furniture veneers, special pressed and extruded forms, and a new sheathing board for construction purposes.

Future products may not be restricted to flat, plywood-like boards. It may even be possible to manufacture structural members that will replace familiar two-by-threes. and to-by-fours. Here the problem will be to get beam strength to match or excel natural wood, something that can't be done on conventional molding equipment. But with special presses to apply lateral as well as lengthwise pressure, structural beams almost as sturdy as metal ones may be a commonplace in coming years.

Meantime, it's the sheathing board now being made that has R. A. Caughey, Souhegan's research director, particularly excited. It makes a building far stronger, he points out, than conventional diagonal lumber sheathing. It resists nail-hole enlargement from wind stress far better than insulating or gypsum board. It allows siding or special nails. It makes a house more fire resistant, because the resin-bonded wood burns unwillingly. And all this, Caughey emphasizes, can be had from a waste-product board that cuts costs, saves labour, and lessens timber-lot depletion.

Pakistan Mica Find:

The operations of the Geological Survey of Pakistan for the quarter ending September, 1950, have resulted in the discovery of mica at three places in Chitral, N. W. F. P.

AGRICULTURAL RESEARCH AND FOOD PRODUCTION

SARDAR Datar Singh, who was inaugurating the 34th meeting of the Advisory Board of the Indian Council of Agricultural Research, said that the country was passing through a crisis and the expansion of agricultural production affected our very existence. The Council, therefore, he urged, must play its correct role in achieving the target of self-sufficiency in food by March, 1952.

Sardar Datar Singh disclosed that the rules of the Society had recently been amended in order to secure greater co-ordination between the activities of the Council and those of the Research Institutes, whether working under the Central or State Governments or the Central Commodity Committees, and with a view to widen the scope of the development and extension activities of the Council. As a consequence, the membership of the Advisory Board had been enlarged to include representatives of the various Research Institutes and important Boards.

Sardar Datar Singh said: "At the last meeting of the Board, I referred to our decision to introduce, as an experimental measure, the system of regionalisation in financing research work. The Regional Committees have been working for two years and it is now for the Board to consider whether they should be continued or not.

The 8th meeting of the Crops and Soils Wing of the Board of Agriculture and Animal Husbandry in India was held at Patiala in March 1950. The opportunity was availed for calling a conference of the Entomological and Mycological workers also. Two important recommendations made at these meetings are coming before you as separate items. The first relates to the setting up of an organisation for extension services according to a standard plan, and the second for setting up of an organisation for plant protection work in all States and placing research and plant protection work under one unified control and direction.

"I would also like to mention that the co-ordinated scheme for control of wheat rust on an all-India basis has started working at all the approved centres i.e. Simla, Agra, Delhi and Pusa.

Proposed Schemes.

"Other co-ordinated schemes proposed by the Council which will be considered by the Advisory Board are:—

i. Investigation on the cultivation of selected medicinal plants for which there is considerable demand both by the export trade and local markets;

ii. Research into the use of weedicides of the Hormone types for eradication of weeds in agricultural fields particularly of food crops;

iii. Soil fertility investigations on the lines recommended by Dr. Stewart; and

iv. Research into production of important vegetables and their seed.

"You will recall that the International Conference on cattle-breeding was held at Lucknow in February, 1950, under the auspices of the Food and Agriculture Organisation of the United Nations. This was the first conference on the subject attended by delegates from 13 countries and India was selected as its venue. As many as 32 recommendations of far-reaching importance to the development of livestock were passed by the conference and these are now receiving attention of the Government of India.

Pilot Village Schemes.

"The conference specially commended our Key Village Plan as suitable for general adoption. The Indian Council of Agricultural Research has already sanctioned six Pilot Key Village Schemes. Arrangements are in progress for the establishment of an artifical insemination centre under the Delhi Villages Development Scheme. This forms an important part of the Key Village Scheme.

Another important recommendation of the Conference was request to all countries to co-operate in supplying material for the World Catalogue of Cattle Stock which the F. A. O. proposes to publish. We have taken necessary action in this direction and the data collected from various States has been furnished to the F. A. O.

Co-ordination of Research Work.

"Recognising the importance of co-ordinating research work carried out at different research stations belonging to the Central Commodity Committees and Central and State Governments, so as to avoid duplication of work and effect economy, a meeting of all Directors of State Departments of Agriculture, Central Institutes and Directors of Central Commodity Research Stations was held under the auspices of the Council at Patiala on the 29th March, 1950. It was decided that, in future, the annual technical reports and programmes of work relating to agriculture and animal husbandry activities of the State Governments and all the Institutes should be sent to the I. C. A. R. for consideration by its scientific committees. Accordingly, 140 reports and programmes were obtained this year and considered by the scientific committees at their meetings held in November 1950.

Random Sampling.

"On the side of the statistical activities of the Council, the technique of random sampling is being employed in surveys for estimating the additional food production as a result of the adoption of different G. M. F. measures. Such surveys are now being extended to all principal food and non-food crops and to parts 'B' and 'C' States, through a five-year co-ordinated scheme of crop-cutting experiments. With the implementation of this scheme, the estimates of yield of the crops is expected to be placed on a sounder and more reliable footing.

Model Nursery.

"I now come to the Delhi Villages Development Scheme. I should mention for your information that about 35 bighas of land have been acquired on lease at Rs. 400/- per annum for setting up a nursery in village Bawana, the headquarters of the scheme, and the Chief Engineer Government of Punjab, has kindly agreed to give us a separate shoot from the canal running nearby for irrigating the nursery. In course of time we expect to have it as a model nursery for the guidance of the villagers and to supply the entire requirements of plants to the villagers at a rate cheaper than that charged at present by outside suppliers.

Milk for Delhi Citizens.

"Another important development in the scheme is the arrangement which is now being finalised for the transport of milk from the villages to Delhi. It has been decided to organise the collection and marketing of milk in the villages covered by the scheme on a co-operative basis in order to ensure the maximum benefit to the producers and also to ensure the supply of pure and good milk to the citizens of Delhi, as desired by an inter-Ministerial conference attended by the Hon'ble Ministers of Food and Agriculture, Health and Rehabilitation on the 14th September, 1950. The scheme is expected to start functioning by the middle of this month".

Pakistan Minerals.

Considerable development in Pakistan's Mining Industry is reported in a half-yearly survey ending 30th June 1950, by the Ministry of Industries. The most important minerals now being worked are coal, petroleum, chromite, gypsum, limestone, antimony, sulphur, silica sand and fire-clay. Production of crude oil in this half of 1950 was 5,39,493 barrels. The Burmah Oil Co. Ltd., who have formed a new company in Pakistan known as Pakistan Petroleum Ltd., have recently been granted oil-prospecting licences and two new oil mining leases.

PHYSICAL METHODS OF FOOD ANALYSIS

PHYSICAL, or physico-chemical, methods of analysis depend essentially on the use of instruments, since the methods are based primarily on the measurement of some physical quantity. The instrument is becoming more and more indispensable to the analytical chemist and, in particular, to the food analyst. Thus, the methods of absorptiometry, flame photometry, emission spectroscopy and spectrography, to mention only a few, are applied in most modern laboratories despite the high cost of equipment. The comparatively new science of chromatography, especially paper chromatography, has proved invaluable to the analyst.

There is no doubt that the value of physical methods must be assessed in relation to the particular problem under investigation. The errors obtained in a determination by means of instruments are sometimes considerable compared with chemical assay. Hence, it is necessary to maintain a sense of proportion for routine control, where a large number of analyses are required within a short time, physical methods are generally superior, but, where accuracy is wanted, probably chemical methods of analysis are more desirable.

Speed of Great Value.

The great value, then, of physical methods lies in their speed, particularly in routine control analysis. For example, a flame photometric method for the determination of the alkali metals in foodstuffs will give results of a high order of accuracy in a few minutes, compared with the one to two days required by normal macrochemical methods. Again, emission spectroscopical techniques, while not yielding accurate quantitative results, will give a complete qualitative analysis of the material and an approximate quantitative analysis; with this important preliminary knowledge, the analyst can decide which methods are the most suitabe for the elements sought.

It must not be forgotten, however, in this era of instrumentation, that behind these rapid, 'push-button' methods of analyses there is always a standardisation which depends on a knowledge of real chemical analysis. The instrument must be used as a tool as is the balance, but it is important to understand the chemistry of the process going on within the instrument.

Colorimetry Most Common.

Probably the most commonly used physical method in food analysis is colorimetry. Within recent years, many new organic reagents have been developed which give colours of high intensity with many metal ions. In fact, most metals have been determined by virtue of the colours they produce with certain organic reagents. At the present time, the wellknown Hilger Photo-electric Absorptiometer ("Spekker") has superseded the older types of colorimeter (Nessler tube,

Tintometer, Dubosq colorimeter, etc.) where the judgment and the colour vision of the analyst are the critical factors in the analysis. As these older methods are, in the main, comparison procedures, the advent of the photo-electric instrument has been a boon to the analyst from the point of view of both speed and accuracy. Further, the newer procedures eliminate eyestrain and contribute to the well-being of the analyst.

Even such an instrument as the "Spekker" can behave capriciously at times, and certain definite procedures have to be adhered to during an analysis. For example, the manner of placing the cells in the holder is of importance. It has occasionally been found that by the mere reversal of the cell in its holder a different drum reading is obtained. Again, cleanliness of the cells is essential, while variations in the lamp often cause trouble.

Some workers regard it as a decided danger to rely too much on previously determined calibration curves, and prefer to run standards along with the actual determination.

The precision of measuring colour intensity by the modern instruments is often greater than the precision of the chromogenicity of the reaction, and this must be taken into account when stating the accuracy of the results.

Although the cost of apparatus should be a secondary consideration, the necessarily high cost of the "Spekker" has meant that some of the smaller laboratories have had to make do with less expensive and less versatile instruments. A wide variety of cheaper instruments, costing in the neighbourhood of 20 is available commercially. Only one type of cell, however, is used with these instruments which generally suffer from a lack of sensitivity. The filters supplied have too wide transmission bands. However, instruments of this type are quite useful.

A direct reading photo-electric absorptiometer, as versatile and accurate as the "Spekker" has been constructed in the laboratory for less than L40. It can be used with the Ilford range of narrow band pass filters, and standard cuvettes up to 4 c. m. can be employed. It is direct reading in either Percentage Transmission or Optical Density, mains operated and is very simple to use. The light supply is a motor car headlamp built of about 24 watts at 6 volts. This is supplied from the mains through a constant voltage transformer. Parallel or slightly converging light is obtained by means of a cheap lens of about 2 in. focal length, and this light is passed through a mask to obtain a beam of about 3/4 in. square, cross section. On the mask, is fixed a heat absorbing filter and a sprung shutter which remains closed when not being operated.

Mounted in Perspex Holder.

The cuvettes containing the solution and blank are mounted in a perspex holder on a simple slide so that they can be interchanged easily and quickly.

The filters, which are situated between the cuvettes and the photocell, are mounted on a rotating disc which projects through the side of the case for turning. A positive positioning device consists of a small

sprung ball-bearing, which catches into a depression cut into the disc near the outside edge. By this means, the filters are very easily and quickly interchanged, an added advantage being that they are never handled, it being merely necessary to turn the disc to the appropriate filter number.

The photocell is a 45 mm. diameter circular "Eel" cell the output of which is fed into a galvanometer through an Ayrton Shunt consisting of a 10,000 ohm helical potentiometer.

The whole instrument, not including constant voltage transformer or galvanometer, is contained in a box 8 in. x 9 in. x 9 in. The light source is separated from the rest by a partition, so that no light can reach the photocell unless the shutter is operated.

The galvanometer gives full scale deflection with about 2 amps. input and has a scale graduated 0 to 100 which can be used directly as per cent transmission. Current models have an additional optical density scale.

In operation, the filter is selected and, with the *Blank* cuvette in position, the shutter is operated and the helipot adjusted to give a reading 100 per cent T (or Zero density) on the galvanometer. The cuvettes are interchanged and the shutter opened again when per cent T or D is read off directly.

It has been shown recently the certain metals in combination with the well-known compound B. A. L. (British Anti-Lewisite) can be estimated absorptiometrically. The colourless complexes may be determined on an ordinary "Spekker" using the shortest wavelength filter to measure the maximum absorption, that it, using U. V. wavelengths.

Balance Developments.

The chemical balance is, of course, still one of the main tools of the analytical chemist, and there have been many striking developments in balance manufacture within recent years. Several laboratories have now installed completely automatic balances which more than pay for themselves in the matter of a year or two by means of time saved in weighing. The intergrating type of fully automatic balance is as yet unknown in the country, but there is undoubtedly a case to be made out for its introduction.

Chromatographic methods are proving invaluable to the analytical chemist, and are of special importance to the food chemist. Some workers have questioned the methods for the selection of solvents for these techniques and feel there is too much empiricism involved. However, it has been shown in numerous publications that solvents are not always selected at random and that, in many cases, the best solvent or solvents for a particular separation can be logically selected.

A Common Fallacy.

It is a common fallacy that column chromatography is the absorption type, while paper chromatography is the partition type. Certain types of column chromatography, however, are of the partition type; for example, the separation of amino acids on a silica gel column.

The preparation of samples prior to the estimation of trace metals, etc., in food-stuffs, generally involves an ashing process. The need for extreme care during this process must be emphasised, as losses of metal both by volatilisation and fusion to the dish are common. If ashing is carried out in the presence of phosphate, alkalisation is essential, since losses of chloride and sulphate may be incurred in the presence of acid phosphate.

PROFIT-SHARING IN INDIA

IN a number of concerns in India profit-sharing schemes have been introduced during recent years either voluntarily by the employers or compulsorily by the awards of industrial tribunals. Among the undertakings which are known to have voluntarily introduced profit-sharing are the Tata Iron and Steel Company Limited, the Tinplate Company of India Limited, the Indian Iron and Steel Company Limited, the Steel Corporation of Bengal Limited and the Buckingham and Carnatic Mills Limited. The agreement between the Tata Iron and Steel Company and the Tata Workers' Union, for instance stipulates that 27.5 per cent of the net profits of the company, after meeting such charges as depreciation, taxes and interest, shall be distributed each year among its employees in proportion to the basic salaries and wages earned by each.

The greater proportion of the profit-sharing schemes in India, however, have resulted from the awards of industrial tribunals, which have compulsory jurisdiction in certain industries and whose awards are binding on both the employers and the employees. In a number of industrial disputes during recent years the tribunals have in general upheld the claim of the workers to a share in the profits earned by the enterprises in which they work, though in determining this share and its distribution among the different workers the tribunals have not always followed the same guiding principles. Most of them have turned down the employers' contention that the bonus is an *ex gratia* payment. Thus, according to the industrial tribunal appointed by the Government of West Bengal in the dispute between the managements of 36 cotton mills and their employees.

> Bonus may be an *ex gratia* payment, but when it is demanded for work done out of which the employers make high profits, the demand is not for any payment gratis but price of labour..... the demand of bonus, though not based on legal right arising out of a contract, expressed or implied, has to be decided on broad principles of equity and justice.

The tribunals have also generally emphasised the view that profits are the result of the joint effort of the workers and the management which should be shared by both, and have further justified the award of a share in the net profits to the workers on the twofold grounds that the worker's wages in the industry concerned fell short of a living wage and that the industry was earning much more than a fair return on the capital employed.

As regards the quantum of the profit bonus, different tribunals have adopted different criteria, though all of them have in general tried to link it to the net profits earned by the concern or industry during the year, its financial condi-

tion and its capacity to bear the burden. Also, in deciding the share of the profit to be paid to each individual worker, the various tribunals have not followed any uniform practice, some relating it to the monthly basic wages of workers and others to the rate of dividend paid to the shareholders. During last year, the possible inflationary efforts of the distribution among the wage earners of substantial amounts in cash as a profit bonus has caused increasing concern, and new legislation enacted by the Government of India in June 1949 empowers industrial tribunals, when making an award in an industrial dispute concerning bonus, to direct that a part of the bonus not exceeding 50 per cent shall be paid in the form of Post Office national savings certificates.

It is to be noted, however, that in most of these profit-sharing schemes introduced as a result of the awards of industrial tribunals, the share of the profits to be distributed among the workers is not decided in advance, but on an *ad hoc* basis each year *after* the profits have been earned. It may reasonably be presumed that they have helped to give the workers some assurance of participating in the profits earned by the concern in which they work, particularly when these reach abnormal proportions, and that they have thus contributed indirectly to minimising industrial strife. The likelihood that each year an industrial tribunal will scrutinise the earnings of undertakings and will grant a part of these to their workers as a profit bonus should also have a favourable influence on the pricing policy of the managements and contribute in some measure to moderating price increases during periods of inflationary pressure. It is difficult to see, however, how much schemes enforced by the awards of industrial tribunals could either create between capital and labour that sense of partnership in a common venture or provide that direct incentive to increased efficiency which are amoug the most important advantages claimed on behalf of profit-sharing.

The possibility of introducing by legislation a general scheme of profit-sharing applicable over a wide range of industry, as a means of improving employer-labour relations and of interesting labour in increasing the volume of production, has been engaging the attention of the Government of India since 1947. A tripartite Industries Conference held at Delhi in December 1947 adopted a resolution recommending, among other things, that—

The system of remuneration to capital as well as labour should be so devised that, while in the interests of the consumers and the primary producers excessive profits should be prevented by suitable measures of taxation and otherwise, both should share the product of their common effort after making provision for payment of fair wages to labour, a fair return on capital employed in the industry and reasonable reserves for the maintenance and expansion of the undertaking.

Accepting this principle, the Government of India suggested in a resolution on industrial policy, approved by the Constituent Assembly of India on 7th April 1948, that labourer's share should be fixed varying with production.

A committee on profit-sharing, set up by the Government in May 1948 to work out the details of the proposed scheme, found, however, that it was not possible, owing to a number of practical difficulties, to devise a system in which labourer's share of the profits would be determined on a sliding scale varying with production. Instead, it recommended that an experimental profit sharing scheme should be tried out, in the first instance for a period of five years, in the following well-established industries: cotton textiles, jute, steel (main producers), cement, manufacture of tyres and manufacture of cigarettes. Under the scheme outlined by the committee, the employees' share of the profits in these industries would amount to 50 per cent of the surplus profits of the undertakings after 10 per cent of the net profits had been carried over to the reserves and provision had been made for a rate of return equal to 6 per cent on the capital employed, i. e. the paidup capital plus all reserves held for the purpose of the business. Each individual worker's share of the profits would be in proportion to his total earnings during the preceding twelve months, minus dearness allowance and any other bonuses received by him. If this share exceeded 25 per cent of the total basic wage, the excess over 25 per cent would not be given to him in cash but would be held on his account, either in his provident fund or otherwise. The Central Advisory Council of Labour (a tripartite body consisting of Government, employers' and workers' representatives) considered these recommendations in July 1949 but could not arrive at any agreed decision, and no action on them has as yet been taken by the Government. An inter-ministerial study of the implications of the scheme was recently reported to have raised doubts about its relative importance, some of the Ministries feeling strongly that under present economic conditions the sharing of profits with labour would result in the irrational distribution of capital, so hindering the Government's industrial programme, and would discourage the investment of fresh indigenous and foreign capital in Indian industries.

Seed-germination Tests.

U. S. Dept. of Agriculture scientists are experimenting on effect of high-frequency sound radiation on germination, flowering, growth, and yield of hybrid corn. Faster germination is expected, but also possible is failure of some seeds to take root.

Controlling Wind Erosion.

FROM THE BALTIMORE SUNDAY SUN

FROM 1936 to 1942 more than 2,20,00,000 seedlings were planted on 33,000 farms in the American Midwest. In the spring of 1950 the winds sweeping across the prairie states of America were again picking up dust. Farmers had been doing spring plowing and planting oats. Least worried among them were the men whose fields were protected by the little trees that were now grown up to become farm shelter belts.

A shelter belt is a belt of five to ten rows of trees standing across farms perpendicular to the prevailing wind direction which is north and south in the American midwestern states. The belt protects adjacent fields from the hot winds of summer and the eroding winds of spring and winter when the crop cover is light. On the dry open field, where the wind strikes in its full fury, dust will rise like smoke from fire. But where shelter belts rise 25 to 40 feet in the air, the wind is slowed and little of the land blows away.

In the 14 years since planting of the tree belts began in the United States, soil experts and farmers have learned much about protecting belts of trees. They are no cure-all, but they are an important part of the total conservation program on any American farm. Gardens and crops protected by belts do better. So do orchards. Cattle feed better if a windbreaks protects them.

Shelter belts include shrubs, conifers (evergreens), big, hardy slower-growing trees and big fast-growing species. In belts they lie east to west, unually, and form a hill-like shape with more slope on the south side. They break winds that average more than 10 miles an hour the day and year around.

Belts are effective five times their height to windward and 20 times their height to leeward, say American soil conservation and forestry men who have studied the results of the plantings. In 1948, after about winds blew across the prairio states day after day, a county agent of the U. S. Department of Agriculture Extension Service in the state of Nebraska reported.

"Soil blowing on land protected by a good shelter belt was practically negligible following three days of high winds." Another county agent reported: "Shelter belts reduced or prevented soil blowing."

In 1946 a report of the State Board of Agriculture, in the state of Kansas, on "Soil Conservation", stated: "Tree planting has an important place in the conservation program...and in control of wind erosion." The report pointed out that soil and forestry scientists have measured the marked decrease of winds on both sides of the shelter belts. Where the belt adjoins the farm home on the north, fuel bills

go down 25 percent. The report set the total farm forest land in the state of Kansas at 11,22,626 acres; 18 percent of Kansas farms then had tree-shrub windbreaks.

There is one thing which will convince most people of the success of the farm shelter belt. Visiting a farm on a cold, windy day, they feel quite comfortable, as soon as they move into the protection of the cedar row in the shelter belts; the wind is a light breeze there and the sunshine warming. It feels as if it were spring.

"It is worth having just for living comfort," one farmer said, "The belt keeps drifting snow out of the farmyard or along roads it borders on the north. The soil of the north field used to blow. I have had no trouble with it since the trees grow up."

Every soil conservationist keeps a close eye on projects in every area that he travels through. It is hoped that some day there may be enough shelter belts to help lower the high winds all the way across the prairie states. When that day comes it will be the dawn of a new era for American the farmers in the midwest. Big "blows" like those in 1934 will have little terror for the farmer. In that year his topsoil was spread far and wide, some of it landing in the streets of large cities—only to be swept up and tossed away by the street-cleaning departments.

The aftermath of that tragedy was that yields of wheat on eroded land fell from a normal 45 bushels an acre to as low as 17. Shelter belts will prevent a similar tragedy in America and elsewhere.

Japanese Chromium Compounds.

Production of chromium compounds in Japan has recently been increasing. Output in July 1950, was as follows, in metric tons (July 1949, figures in parentheses): Sodium bichromate, 300; anhydrous chromic acid, 59; chromic oxide, 11; and potassium bichromate, 24. Chrome ore has been imported to supplement domestic supplies.

Austrian Fertiliser for U. S. A.

The Austrian Nitrate Works, Linz, are, by the end of Jan., to deliver 30,000 tons of nitrate fertilisers to Poland, within the framework of the Austro-Polish trade agreement. Poland is increasing her coal deliveries to Austrian in return. The Austrian concern has also succeeded in obtaining an order for a total of 20,000 tons of nitrate to be shipped to the U. S. This is the firm's first order from the U. S. Palment is to be made in free U. S. dollars. Some 9,500 tons of nitrates will also be shipped to Greece in the next few weeks.

NOTE ON AN EXOTIC STRAIN OF PADDY

Trial Cultivation Conducted in F. A. C. T. experimental farm.

By

T. S. RAMAKRISHNAN B. Sc. (Ag.)

NURSERY.

The seed was sown in a small nursery plot that had been prepared well. This plot was at first given two turnings with spade and then superphosphate (dose: 2 cwts. per acre) was broadcast uniformly. After one more turning water was let in and the top soil was well puddled. During the puddling process a fairly good dose of green leaf was applied and allowed to rot in the puddled field. Wood ash (dose: 1000 lbs. per acre) was applied two days prior to actual sowing. Germinated seed was sown on 4-8-'50. The germination was quite good and there was a fairly thick stand of the seedlings in the plot. Periodic irrigations were carried to keep always 1" of water in the nursery. A small quantity of screened wood ash was dusted over the young seedlings 15 days after sowing. This was just to increase the disease resistance of the young plants. Ammonium Sulphate (dose: 150 lbs. per acre) was applied uniformly over the seedlings 25 days after sowing. There was nearly 2" of water in the nursery when the sulphate was applied. The seedlings responded well to the sulphate and came up well.

TRANSPLANTING.

Transplanting was carried out on 20-9-'50 and subsequent days. The fields had been prepared well. Altogether 8 ploughings were given and it received superphosphate (dose: 2 cwts. per acre) and wood ash (dose: 1200 lbs. per acre). No green leaf was applied as there seems to be no need for it. The land was well puddled and was given sufficient time so that the stubbles of the previous crop could decompose completely. The seedlings were quite study and they were transplanted 9" apart each way. This extra spacing was given because the variety was reported to have the capacity to tiller profusely.

TOP DRESSING.

15 days after transplanting special mixture manure, containing 50% groundnut cake, was uniformly broadcast over the crop. The dose adopted was nearly 2 cwts. per acre. Ammonium Sulphate at the rate of 1½ cwts. per acre was top-dressed 35 days after transplanting.

GROWTH OF THE CROP.

The crop came up well according to our expectations and one could notice profuse tillering in all the clumps. The average number of tillers per clump was easily 12, while the maximum number counted went up to 25 per clump. The tillering capacity of this new strain confirmed the fact that it could be given even greater spacing, up to 1 foot each way. The average height of the

crop was 4½ to 5 feet. The leaf blade was broader and of longer than ordinary varieties of paddy. The flowering was uniform and there was a large number of earheads per plant–the maximum number counted being as many as 12. The average number of grains per earhead ranged between 175 to 200, while the maximum number counted exceeded 300. One very important feature of this crop was its erect nature. Inspite of the top heavy earheads filled with well developed grains, the crop did not exhibit any sign of lodging. This particular characteristic will be of very great value, especially in those regions where much loss occurs due to premature lodging. It must be remembered that most of our local varieties are liable to lodge and in waterlogged areas this susceptibility will lead to much loss.

YIELD.

The actual harvest was carried out on 1st Feb. 1951. The area put under this strain was just 52 cents and the total gross yield obtained from this plot was 91 parahs of paddy. This works out to 175 parahs per acre, which again corresponds to a gross yield of 3150 lbs. of paddy per acre. This is indeed a good yield when compared to the yields that our other varieties are able to give.

It has to be emphasized here that this new strain is quite capable of yielding much more, for instance, 4000 lbs. per acre. To give the maximum yield, the crop must have always water standing in the fields throughout its growing period. This we could not accomplish owing to water shortage and the partial failure of the North East Monsoon rains. The crop had to suffer partial drought for nearly a month and this had a telling effect on the subsequent development of the crop.

The rice seems to be of superior quality and is milk white in colour. The paddy grain has a kendency to stick to the stalks and does not easily fall off during threshing, unlike other local varieties. Hence it will be advisable to postpone actual threshing for 2 or even 3 days after harvest, in which case the grains will easily fall off.

As it is felt that the cultivation of this particular strain of paddy will directly help in augmenting food production, it is our intention to utilise the limited quantity of this paddy as seed and distribute it to bonafide agriculturists and to the agricultural departments of Madras and Travancore–Cochin States for multiplication. This paddy will be ideally suited for all Mundakan lands.

The total duration of this strain of paddy is nearly 6 months (180 days). Of this period nearly 1½ months are spent in the nursery and the rest in the fields. Thus, it will be seen that this paddy is an ideal Mundakan crop. Though we sowed this paddy in nursery in the month of Chingom and harvested in Makaram, it will be advisable to prepare the nursery if possible in Karkadagom. Then we will be able to harvest in Dhanu. The preparation of the nursery of course depends upon water supply, but it will be preferable to start it early.

As the area of nursery is only a minute fraction of the field area it will be possible to raise the seedlings with a minimum of water. It is always preferable to raise this crop by transplantation, instead of sowing it directly into the fields. By doing so we will be saving a lot of seed. 1 parah (of 18 lbs.) will be quite adequate for 1 acre. Ordinarily farmers use 7 parahs (126 lbs.) of seed for sowing an acre. Thus by this method of transplantation alone there will be a saving of nearly 108 lbs. per acre.

In Travancore-Cochin State most of the Mundakan lands are sown with long duration crops, which this new paddy can easily replace to our advantage. Even in lands where three crops are being raised, this paddy can be grown as the 2nd crop, provided we make adequate arrangements to prepare the nursery in time so as to have the seedlings ready for transplanting as soon as the first crop is harvested. A short duration variety like "Cheema" "Navara" etc. can follow as the third (Summer) crop.

Another point that has to be emphasized is that, being a heavy yielder, it demands liberal manuring. If we don't adopt a generous scheme of manuring, then the new variety will very soon lose all its vigour. In this connection we would like to make a suggestion which may be followed whereever conditions permits. The sowing and transplanting must be so tuned as to make the crop flower a bit later than the local varieties that are grown nearby. If we do so the purity of the strain will be kept up easily.

Apprentice Training is Easy.

Apprentice training does not have to be limited to the large organizations. Small plants can make use of it if they follow the specialities, Inc., plan.

A basic course in engineering drafting is taught right in their plant. The chief draftsman gives a basic engineering education, putting theory and practice together.

The rest of the apprentice training is done by correspondence courses. Specialties, Inc., determines exactly what each man needs and sees that he gets it. Grades are recorded by the company.

Initial care in planning plus a simple record system make administration of the programme an easy job. Assignments are planned a year at a time, with the foreman involved, so everybody knows exactly where the apprentices will be.

FACTS THAT INTEREST

Heat-Resistant Alloy Data.

Data now available on Thermaalloy 30, a heat-resistant 21% chromium and 9% nickel alloy, indicate exceptional ductility with good creep strength. The alloy, made by American Brake Shoe Co., can be given a tensil strength of 1,10,000 psi. at 35% elongation in 2 in. and a Brinell hardness of 210,

Applications include furnace parts, kiln alloy parts, and oil-refinery catalytic-unit castings. Foundry handling characteristics are comparable to those of the 25% chromium, 12% nickel alloy. Machinability, except for tapping, is satisfactory. Weldability is excellent.

Writing with Light.

The use of specially prepared coloured crayons for writing on a transparent pannel of acrylic resin or glass illuminated with U. V. light forms the basis of the display signs marketed by Glow-Ray Developments Ltd., of Horton Mills, Colnbrook, Bucks. As the message can be erased as easily as it was originally written, and stands out vividly in a number of contrasting colours, there should be many additional applications in the industrial and scientific fields, especially as the materials are reasonably priced.

Nuclear Reactor for Research and Tuition.

The first nuclear reactor in the United States not owned and operated by the Atomic Energy Commission is to be built by the Consolidated University of North Carbolina, using nuclear fuel loaned by A. E. C. The reactor will provide facilities for nuclear engineering research and education, will have a maximum power level of 10 kilowatts, and will use a fuel enriched in uranium 235. The reactor willl be housed in a special building to be erected with a fund of $2,00,000 provided by the Burlington Mills Foundation.

Salt Production in Forced-circulation Pans.

The value of forced circulation vacuum pans for the production of high grade salt from brine has been confirmed after two months operation of a full-scale plant by the Michigan Chemical Corporation. It has been found that production capacity has been materially increased with an appreciable reduction in the amount of steam required per ton of salt made. Much of the very fine grain salt ('flour') has been eliminated. It is expected that as operating experience with the new plant is gained it may be possible to exercise a very high degree of control over the grain size of the salt produced. This development is briefly recorded by L. D. Simmons, of the Michigan Chemical Corporation, in "Chemical Engineering," N. Y., of Nov. 1950.

Cellulose Compounds in Synthetic Detergents.

According to a statement in "Chemical Industries," N. Y., of Oct., over 90 p. c. of all the synthetic detergents now produced in the U. S. A. contain sodium carboxymethylcellulose owing to the property possessed by this compound of preventing the redeposition of soil on textile surfaces. As has already been briefly reported in this Journal, the Tennessee Eastman Corporation is now entering the field of water-soluble cellulose compounds by the production of sodium cellulose sulphate so far made only on the limited scale for evaluation purposes. The new product is expected to be cheaper than CMC and can be made in a range of viscosities. It is not yet suggested for foodstuffs and allied uses as toxicology trials on the material have not been completed.

U. S. Soaps and Synthetic Detergents.

Total sale of soaps and synthetic detergents in the U. S. A. reported for the nine months ended Sept. 30, were, says the Association of American Soap and Glycerine Producers, Inc., 2,637m. lb., as compared with 2,470m. lb. for the same period in 1949. Of the first total synthetic detergents amounted to 818m. lb.

Continuous Wood Pulp Process.

The Fengersfors Paper Mill in Dalsland, Central Sweden, claims to be the first in the world to introduce the continuous boiling of cellulose for pulp production by a patented process which was first tried out in the State Forestry Industries plant at Kalix. At Fengersfors, reports the "Anglo-Swedish Review," a single boiler 19 meters long and with a capacity of 65 cubic meters is used. The boiler is operated by only two men and gives an output increase of 25 p. c. over the usual process.

Mercury Prices in the U.S.A.

American importers reports "Reuter" from New York, have sold spot mercury at $137½ flask following the increase in Spain's offering level by $15 to $118 f.o.b. Spanish ports. Importers are now confining offerings to the $139–$140 range. Resale offerings are meagre and trade reports indicate that recent estimated holdings of about 3,000 flasks by re-sellers have been practically all sold. The firmness in the present market is accompanied by trade rumours that Spain is contemplating a further price rise in January.

Cold-Extrudes Steel Shells.

Concentrating pressures as high as 100 tons per sq. in. on a steel billet in special dies causes the steel to flow in a cold state around a mandrel. In this operation in a Lake Erie press at Mullins Mfg. Co., the steel assumes first the shape of a shallow cup and finally that of a finished artillery shell.

Initial work with this cold-extrusion process will include a pilot lot of projectiles for 105-mm. howitzers and for air-craft. These are believed to be considerably larger than the pieces cold-extruded in Germany where the process originated.

Engineers hope that the pilot work will show only 40,000 tons of scrap for production of 100-million shells. Comparable scrap for the method employed during World War II was 1-million tons.

Balances Car Wheels.

Maintenance costs were reduced 5% when armatures, other generator parts, and air-conditioning equipment were dynamically balanced regularly at the Illiohis Central Railroad. Now the railroad balances car wheels. The average unbalance was found to be 2½—3 lb. per wheel. A considerable reduction in vibration is achieved.

How to Cut Machining Costs with the Right Coolant.

Coolant selection can affect machining costs as much as can cutting-tool selection. Dramatic evidence of this was furnished by a study made at Salisbury Axle Works on a Gleason Revacycle gear-cutting machine. Change of coolant alone cut the cost per piece by 48% because of increased tool life.

Tests were made by using two machines and alternating waste-soluble and oil coolants. Results were judged by grinding needed to resharpen the cutters. Sixteen different coolants were tested.

Recommendations made as a result of the tests were (I) to use a coolant of 5% lard oil and 95% paraffin oil, (2) to run 3000 pieces per grind, and (3) not to try to clean up one bad tooth when grinding if only one in any one segment is peeled more than the others.

Performance observations made since the investigation showed these tool costs: For sulphurized cutting oils and water-soluble coolants, tool cost per gear was $0.0212 with 13,760 gears cut per cutter. For the mineral-lard oil, cost was $0.0110 with 27,329 per cutter.

NEWS & NOTES

Solving Home Dyeing Problems.

Housewives often fight shy of using home dyes because they fear the result may be patchy or streaky. But a London firm of dye manufacturers believes, with reason, that perfect results can be obtained if the dye is fresh and dry when used and is concentrated enough to give an even spread of colour. They have, therefore, produced a series of highly concentrated dyes for home use which are marketed in small light aluminium packs. These shining airtight packs (in themselves works of art) keep the powder fresh and unaffected by moisture or sunlight in all climatic and storage conditions until the metal is pierced and the powder pours out ready for use.

The dyes, in 36 colours — including four special stocking shades — can even be used to colour such synthetic fabrics as nylon and acetate rayon in addition to cotton, silk, wool, linen and viscose rayon.

The same firm has also just produced a series of six carpet dyes. Packed in screw-top containers, these powder dyes are simply dissolved in a bucket of boiling water and brushed into the pile.

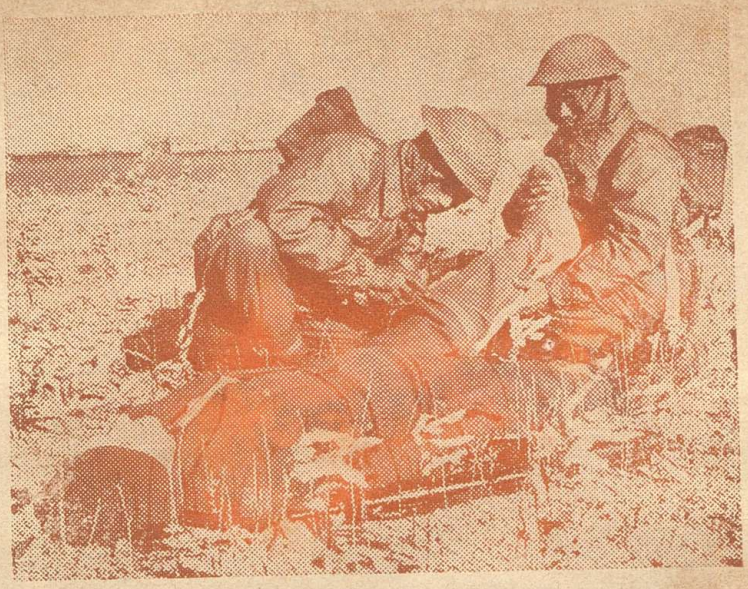
Other interesting products are the basic dyes which the company exports to West Africa for staining coarse fibres and grasses (when dissolved in water) and wood and leather (when dissolved in spirit). Interested visitors will be able to see these dyes exhibited at the 1951 British Industries Fair (Earls Court and Olympia, London, and Castle Bromwich, Birmingham April 30 to May 11).

Degreasing Metal at Room Temperature.

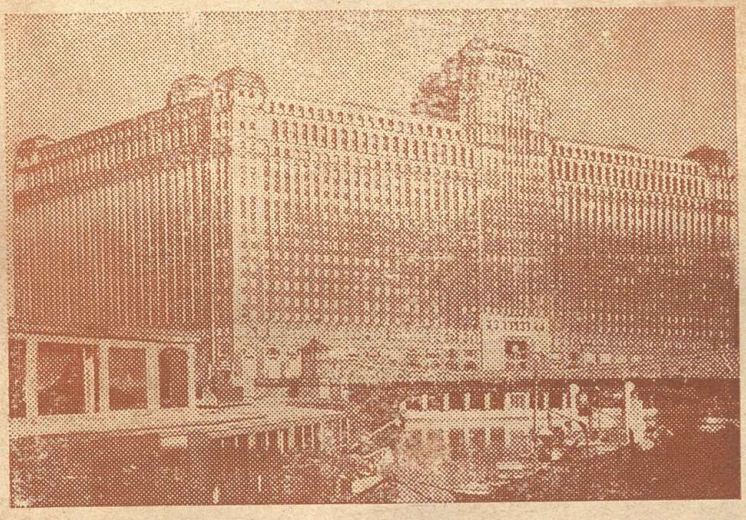
A London chemical firm has recently produced a new type emulsion cleaner which degreases metals at room temperature. In operation this new cleaner is simplicity itself. Metal parts, for instance, are immersed in the liquid for a few minutes until the cleaner, with the powerful emulsifying agents, has thoroughly penetrated the grease. The parts are then taken out and rinsed with water; and the water, forming an emulsion with the grease, quickly removes it. "Solvenol", as the new cleaner is called, is neither inflammable nor toxic, nor does it chemically attack any metal with which it comes in contact.

It is, in addition, economical in use. For since the grease on components, for example, remains in position when these are put in a "Solvenol" bath, the cleaner does not become contaminated by dirt and need never be thrown away. All that is necessary is to make good the quantity of cleaner carried off with the components being degreased. Dry metal parts should be immersed from 5 to 15 minutes; large machinery may be treated by swabbing or spraying, and then hosed.

"Solvenol" is ideal for pre-cleaning all metals, from steel to aluminium, before electro-plating, painting or enamelling. And the fact that no heat is used means that precision components do not become distorted by heat. Visitors to the 1951 British Industries Fair (Earls Court and Olympia, London, and Castle Bromwich, Birmingham, April 30 to May 11) will have an opportunity of inspecting this new emulsion cleaner in operation.

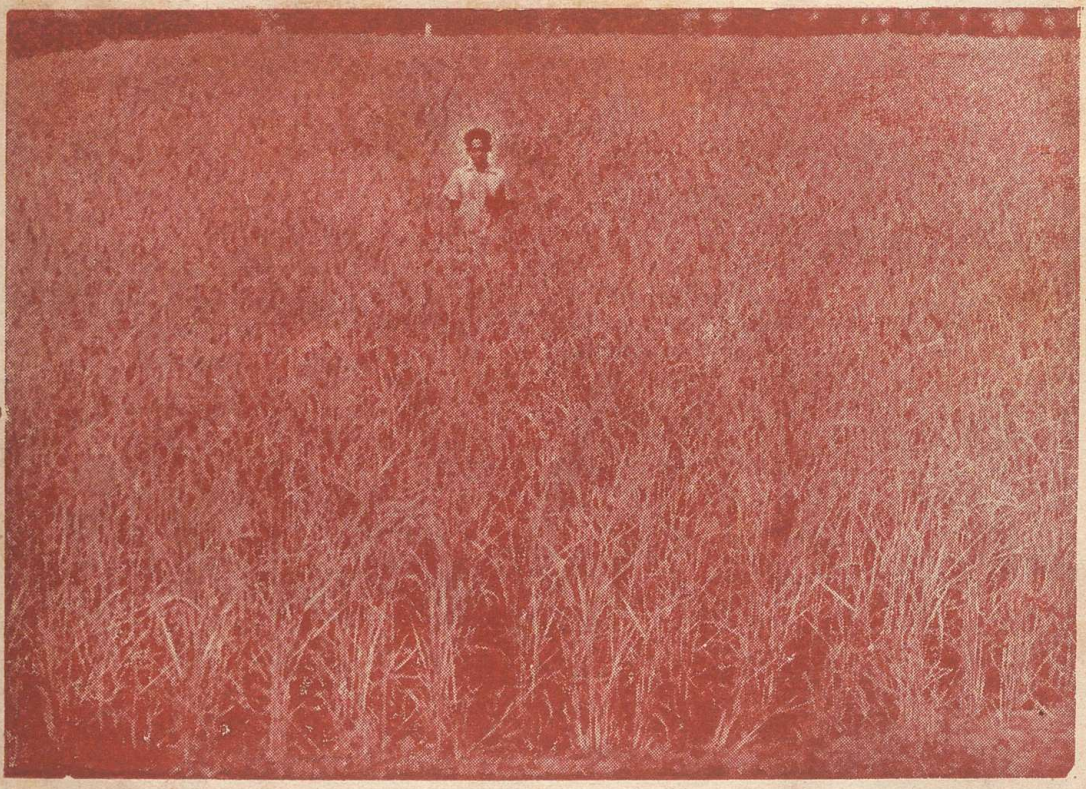


The 60th Ambulance Unit of the Indian Army is one of the components of the United Nations forces resisting Communist aggression in Korea. The photograph, made in Korea, shows two members of the field unit giving aid to a casualty during combat training exercises. Many men in the unit are veterans of World War II.



The Merchandise Mart in Chicago, Illinois, largest commercial building in the United States. The building, which has 93 acres of floor space and 6½ miles of store frontage, houses a working population of 25,000 and has its own bank, post office, telegraph and railroad ticket offices, restaurants, and retail shops for the convenience of employees and buyers. In the foreground of the photograph are boats used to carry products to the marketing centre.

Licence No. 663 Dated 21st July 1949.
Monthly: Annual Subscription Rs. 3/- Single Copy As. 4/-



The New Strain of Paddy in cultivation.

Printed by P. Sreedharan Pillai at the S. G. Press, Parur and Published by him for
The Fertilisers And Chemicals, Travancore Ltd., Alwaye.