PRODUCTIVITY

Special Section on

# inter-firm comparison

Monsoon Issue, Vol. V No. 3, July-Sept. 1964

TRUE YOGA IS EFFICIENCY IN ACTION

योगः कर्मसु कौशलम्

# NATIONAL PRODUCTIVITY COUNCIL

The National Productivity Council is an autonomous organisation registered as a Society. Representatives of Government, employers, workers and various other interests participate in its working. Established in 1958, the Council conducts its activities in collaboration with institutions and organisations interested in the Productivity Drive. Forty-six Local Productivity Councils have been established all over the country and they work as the spearhead of the productivity movement.

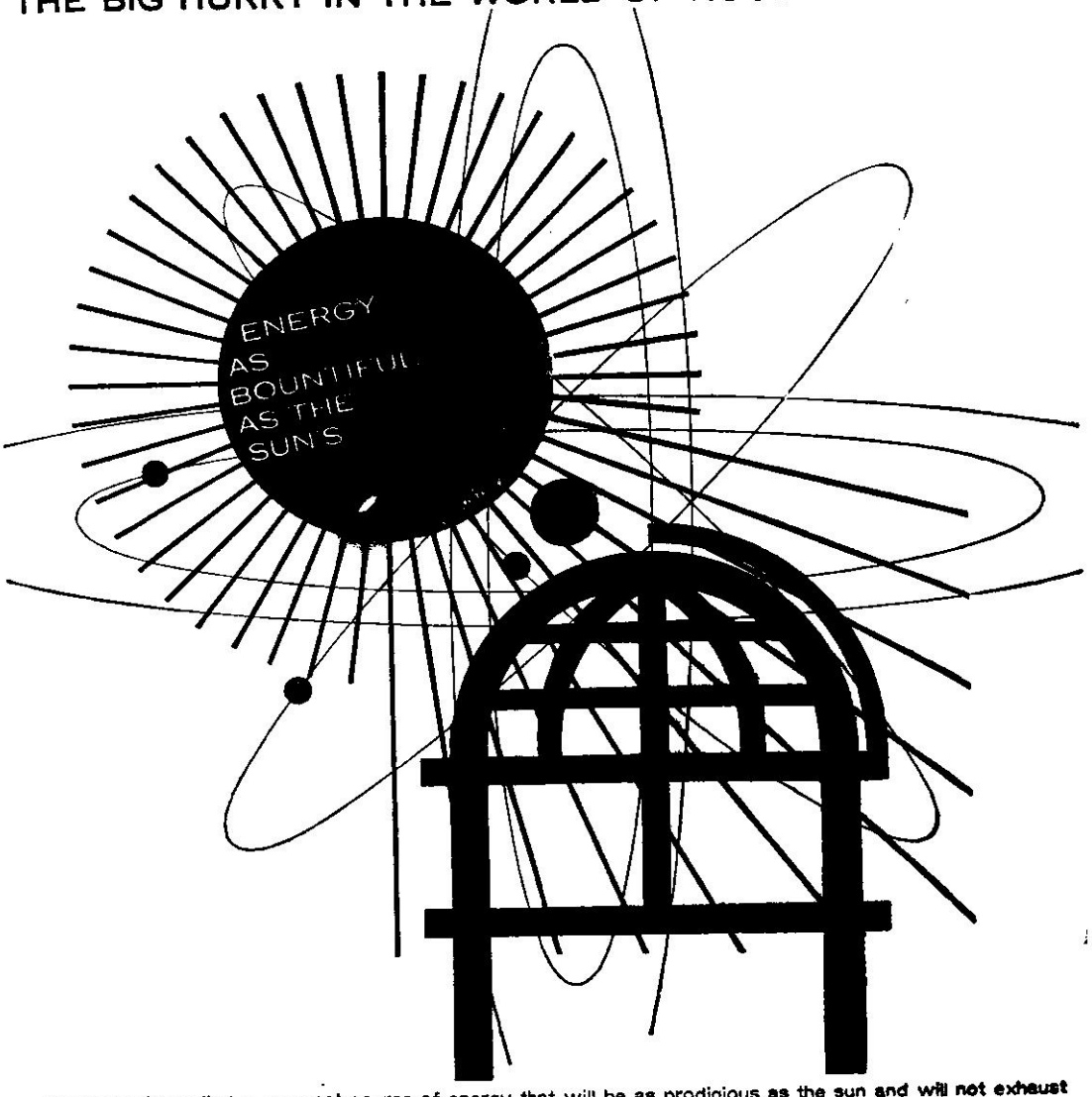
The purpose of NPC is to stimulate productivity consciousness in the country and to provide services with a view to maximising the utilisation of available resources of men, machines, materials and power; to wage war against waste; to help secure for the people of the country a better and higher standard of living. To this end, NPC collects and disseminates information about techniques and procedures of productivity. In collaboration with Local Productivity Councils and various institutions and organisations it organises and conducts training programmes for various levels of management in the subjects of productivity. It has also organised an Advisory Service for industries to facilitate the introduction of productivity techniques.

Recognising that for a more intensive productivity effort, the training and other activities of NPC designed to acquaint management with productivity techniques, should be supported by demonstration of their validity and value in application, NPC has decided to offer a PRODUCTIVITY SURVEY & IMPLEMENTATION SERVICE (PSIS) to industry. This Service is intended to assist industry adopt techniques of higher management and operational efficiency consistent with the economic and social aspirations of the community. PSIS is concerned with the investigation of management and operational practices and problems, measures of improvement and their implementation. NPC has also estabished at Bombay a special Fuel Efficiency Service.

NPC publications include pamphlets, leaflets and Reports of Productivity Teams. NPC utilises audio-visual media of films, radio and exhibitions for propagating the concept and techniques of productivity. Through these media NPC seeks to carry the message of productivity and to create the appropriate climate for increasing national productivity. This Journal is an effort in the same direction.

The Journal bears a nominal price of Rs. 3.00 per issue and is available at all NPC offices. Annual subscription (Rs. 12.00 to be sent by cheque in favour of National Productivity Council, New Delhi 3) is inclusive of postage. Subscription for three years, however, can be paid at the concessional rate of Rs. 32.00.

# THE BIG HURRY IN THE WORLD OF NUCLEAR PHYSICS




The hurry is to find a compact source of energy that will be as prodigious as the sun and will not exhaust though the world live a million years. ■ Closest to the ideal is Uranium 235, a scant one milligram of which, when fissioned or 'exploded', releases more energy than that obtained by burning millions of tons of coal. This great world of power will keep all of us going, and going well, when the present natural sources such as coal give out. Already atomic power stations are an actuality in many countries including India. ■ Shaping the giant pressure vessels enclosing the reactor cores demands a very specialised knowledge of welding. ■ It is this specialised knowledge and application of industrial gases that Indian Oxygen affords Indian industry.

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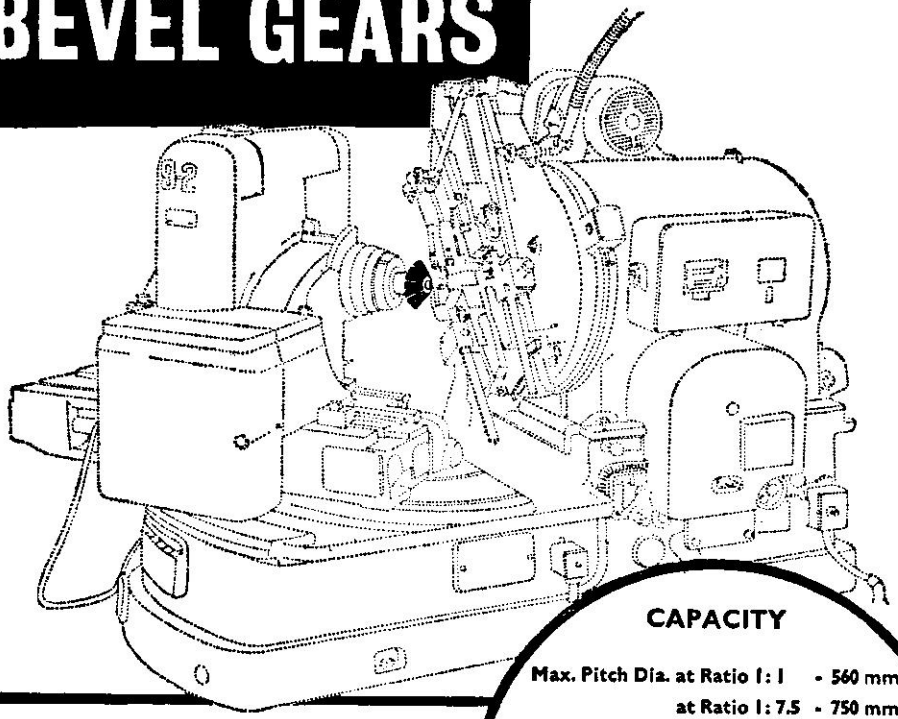

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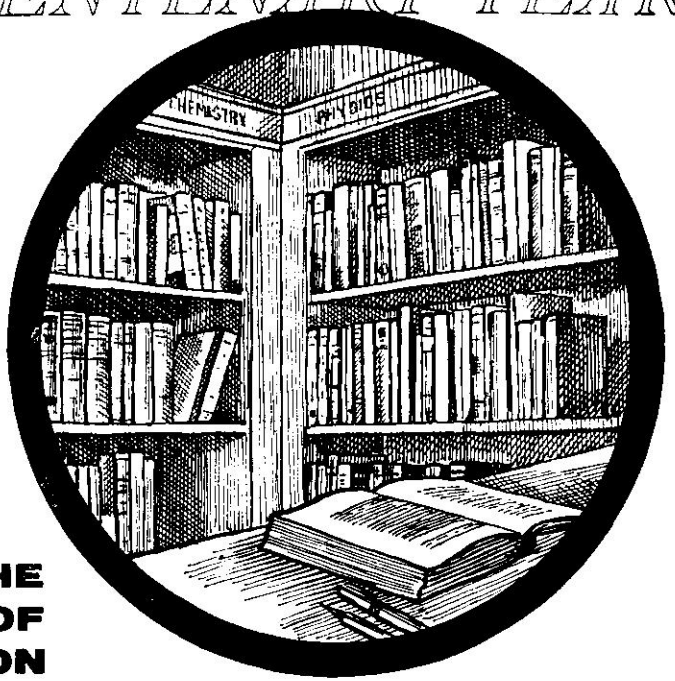


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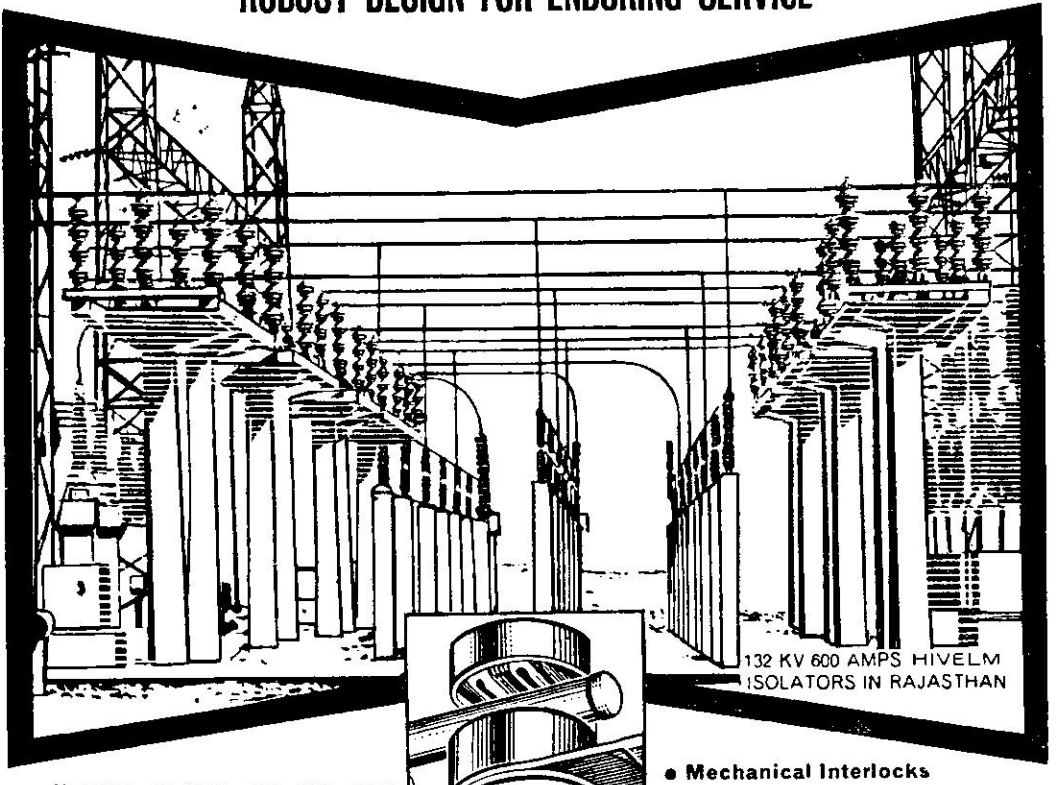

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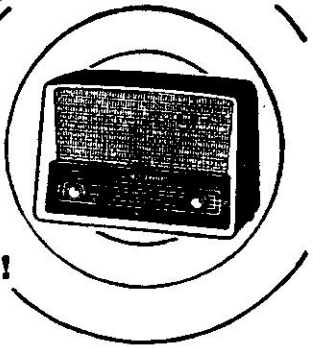

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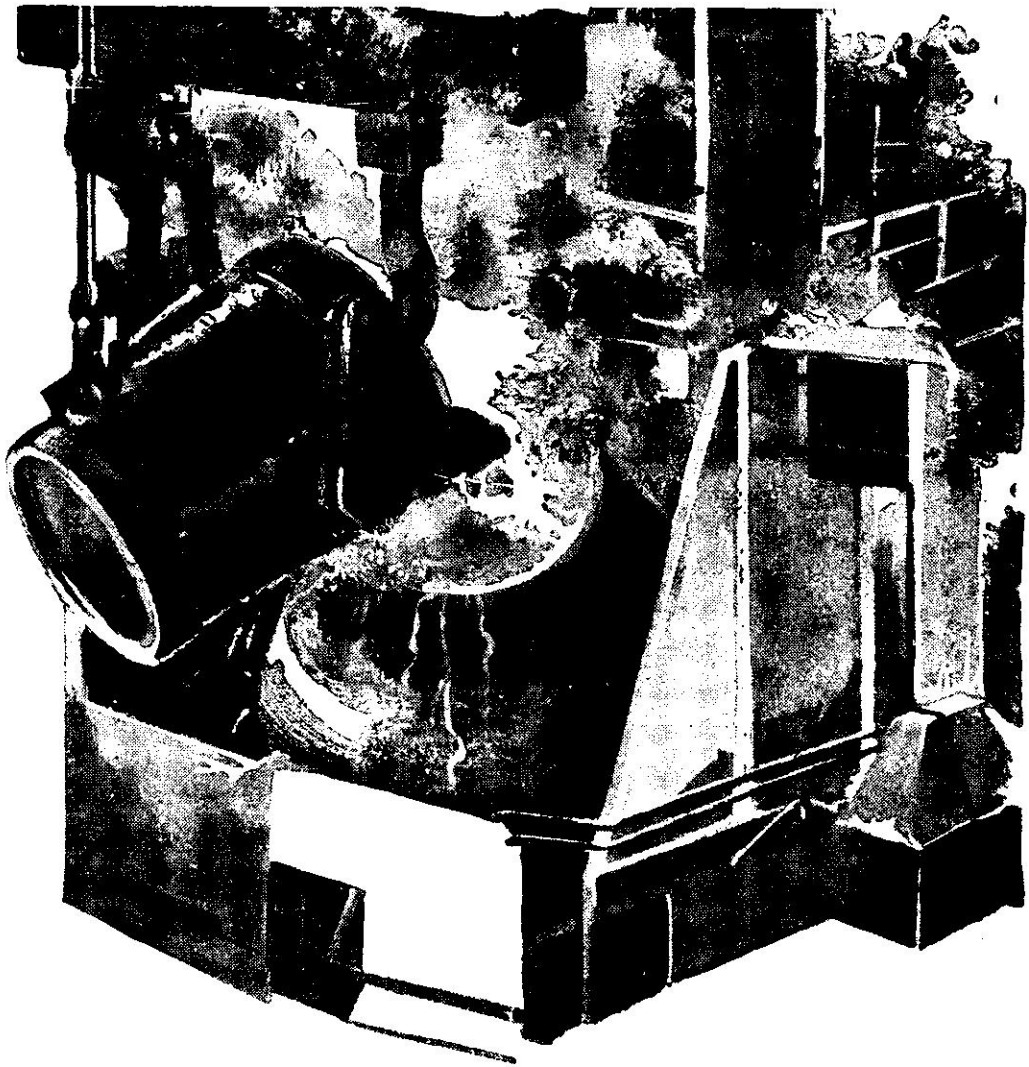

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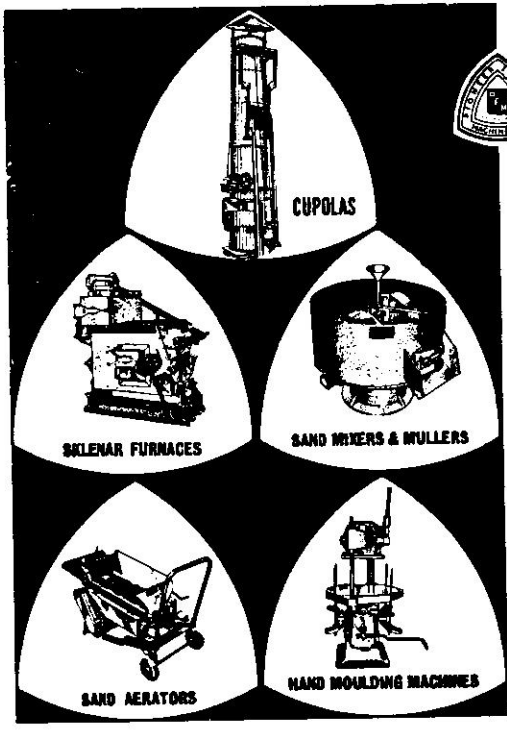


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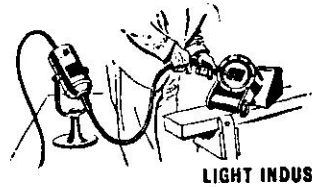
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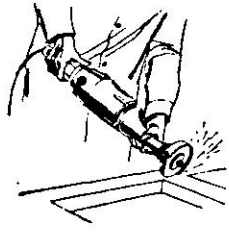
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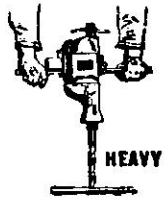
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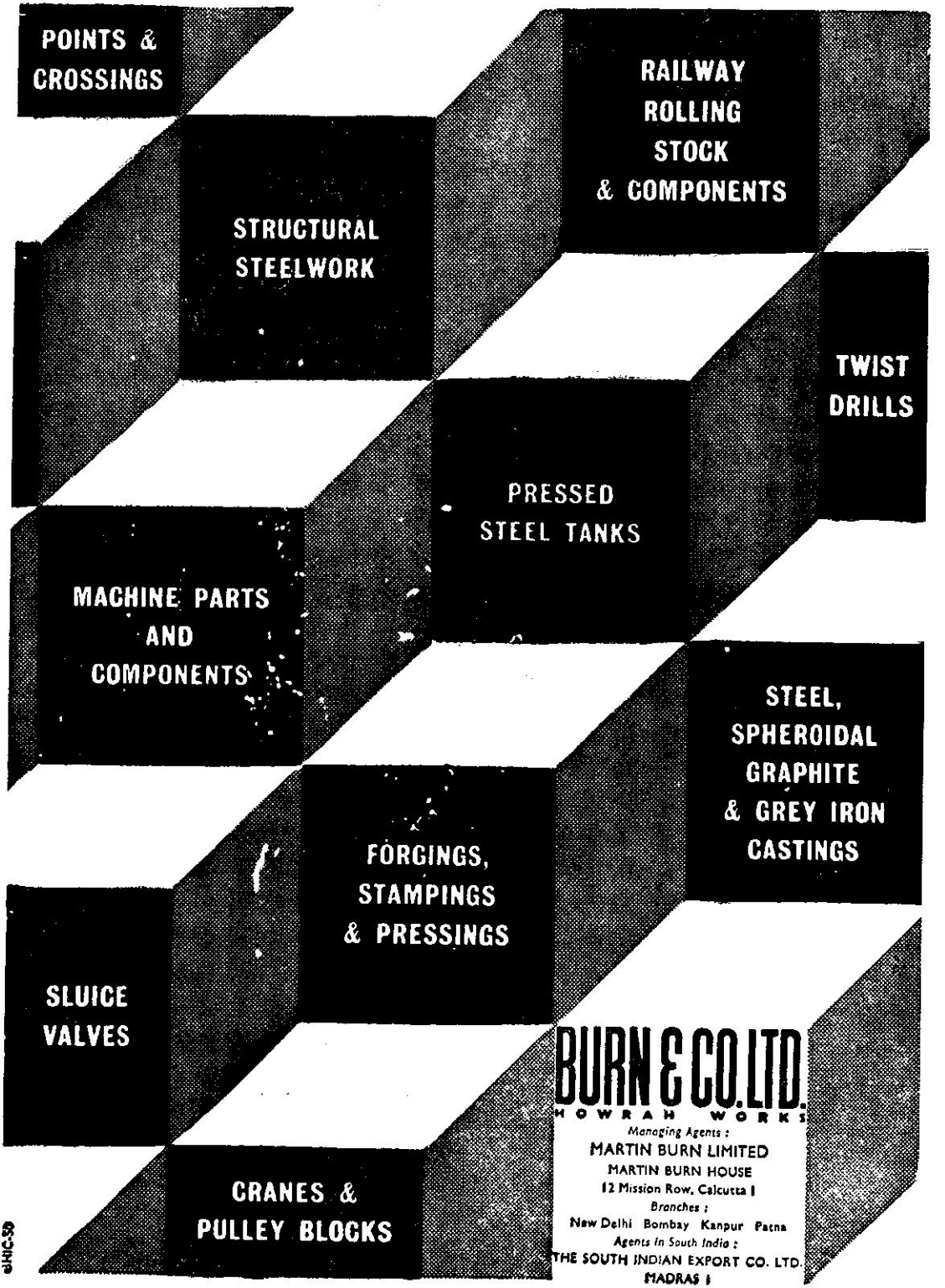
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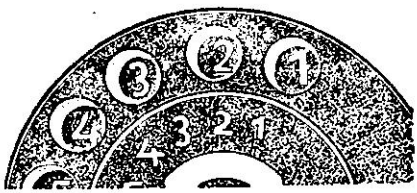
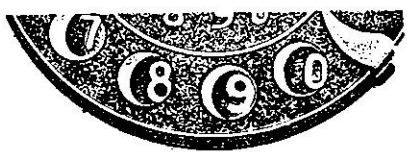


# short cut to long distance



Long distance trunks really shorten distances in business or otherwise, it is an important form of communication worth many times its cost in efficiency and profits.

In India, long distance calling has been further improved by the introduction of Single Link Operator Dialling (S.L.O.D.) and Multi Link Operator Dialling (M.L.O.D). In these new systems only one operator is involved who dials through to a distant subscriber directly. This Automation in trunk calling is a real short cut to long distance.

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# *In the Next Issue...*

**Henry Ford once observed that if he acquired a business, his first effort would be to put the plant in a clean and orderly condition, and see that it was maintained that way. Though this thinking is reflected in the policies of some progressive modern companies, it is true, by and large, that the rules of preventive maintenance are more honoured in the breach than in their observance, and something has to be done to safeguard the too rapid depreciation of capital. In fact, this problem of preventive maintenance has now acquired a special significance in view of the enormous investments we have been making in road and rail transport, electricity, steel, cement and a number of new industries. The national interest requires that we take care of this precious capital equipment, for we have hardly the resources to renew it and we need all the capital that we can possibly muster for new investments in the people's health, education, roads, food, etc. Preventive maintenance is, therefore, the productivity technique par excellence for Indian Economy.**

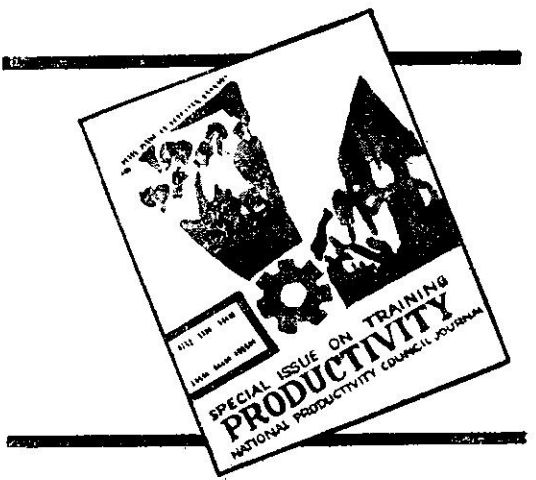
*We have, therefore, planned for release, early December, a special issue on* **Preventive Maintenance.** *The articles on this subject will focus attention on how good plant housekeeping practices will increase output, maintain capital equipment in good condition, reduce accident costs through safe work methods, etc. etc.*

*Among the distinguished contributors are Prabhu Mehta, LT Madnani, Chief Mechanical Engineer of the North-East Frontier Railway, GS Sanders of Urwick, Orr & Partners Ltd., London, MN Unni Nayar of the NPC, V Gopalan, B Mukherjee, BO Parikkh and N Sen.*

*The same issue will have a General Section with a number of original articles, including one by Prof. RF Bruckart on PERT, and another, a report on efforts to raise the productivity at the Naval Dockyard, Bombay, besides other interesting features.*

# *You Are Invited to Write...*

**The Spring 1965 issue of *Productivity* will be a special one on *Fuel Efficiency*, followed in the Summer by a special issue on *Productivity in Agriculture*. Articles, which should be original, and preferably illustrated by photographs and sketches, should reach the Editor, *Productivity*, 156 Golf Links, New Delhi 3, by mid-December 1964 for the Spring issue, and mid-January 1965 for the Summer issue.**

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# Authoritative . . .

## TRAINING IN INDUSTRY—

Special Issue of *Productivity* (Vol. V, No. 2) introduces the reader to all aspects of training. Contains useful papers by Indian and foreign experts

*RUPEES THREE*

Here is a partial list of contributors

Russell M Currie
John Wellens
Lt. Col. LD Gates
Nitish R De
P Corbishley
Brig. K Pennathur
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Maj. Gen. Habibullah
LN Ghirnikar
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# acclaimed . . .

**...an excellent publication highlighting the importance of trained manpower for economic growth...**—*Economic Times, Bombay.*

**...highly interesting...a masterpiece...—GC BERI,** *Institute of Applied Manpower Research, New Delhi.*

**...really first class...—JN BOSE,** *President, Institute of Cost and Works Accountants of India, Calcutta.*

**...lot of relevant material...—NS PARADASANI,** *Administrative Staff College, Maharashtra.*

**...an outstanding work, and should find a permanent place in the literatures of management...—SUBHAYU DASGUPTA,** *Director, Calcutta Productivity Council, Calcutta.*

**...an excellent compilation on training...—HD SHOURIE,** *Director-General, Indian Institute of Foreign Trade, New Delhi.*

*Copies can be had from:*

## NATIONAL PRODUCTIVITY COUNCIL

**38 GOLF LINKS, NEW DELHI 3**

national productivity council journal Vol. V, No. 3 July-Sept. 1964

# PRODUCTIVITY

SECTION ON INTER-FIRM COMPARISON

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7. **NPC Crash Induction Programme**:

   (a) Andhra Governor with US-AID expert and others
   (b) US-AID expert explaining a technical intricacy } 538

*Also, a number of cartoons and sketches*

—✦✦—

## PRIZES FOR IDEAS

*In our Special Issues on Operations Research and Inventory Control we had announced the opening of an idea-page in the NPC* **PRODUCTIVITY** *Journal. Readers were invited to send us new ideas (outlines of new gadgets, devices, etc.) of productive possibilities. We have now decided to offer prizes of Rs. 50, Rs. 25 and consolation prizes for new ideas approved for publication in this journal. The ideas must be practical in the sense of being actually operable on the shopfloor under Indian industrial conditions. We will welcome ideas that would save time, reduce fatigue, increase fuel efficiency, to give only a few examples of what we in NPC understand by productive ideas. Those who send us their ideas for publication must also work out in a practical way their economics, showing how much cost reduction can be brought about, if the new ideas were actually to be practised on the shopfloor. It would be desirable that the write-up of the ideas is accompanied by suitable sketches, diagrams, or photographs.*

# *1966 . . .*

# *NATIONAL PRODUCTIVITY YEAR*

*The National Productivity Council of India has decided to celebrate 1966 as the NATIONAL PRODUCTIVITY YEAR.*

**Productivity** *readers will be interested to know that the British Productivity Council organised a National Productivity Year (NPY) in Britain from November 1962 to November 1963—and they can get an idea of the magnitude of the national involvement in this productivity business in the article published on pages 575-577.*

# PRESENTATION OF WORK STUDY FILMS

**Dr PS Lokanathan, Chairman of the National Productivity Council, receiving two films on work study, produced with the help of US-AID, from Mr C Tyler Wood, Director of the US-AID Mission in India. The presentation was made at the All-India Conference of Local Productivity Councils and Productivity Personnel held at Vigyan Bhavan, New Delhi, on July 28.**

*more pictures of LPCs' conference, turn to pages 499-502*

*Also, turn to pages 571-574 for report of conference proceedings, and to pages 503-507 for welcome speech of Dr Lokanathan, and pages 496-498 for Sri Asoka Mehta's inaugural address*

on Inter-firm Comparison—the 14th[1] in the line of special issues .PC—is due to the circumstances of the case, a preliminary adventure, neither the organisation, nor have we worked out the methodology of sophisticated technique in micro-economic analysis.

y, inter-firm comparison is extremely *naive* in its simplicity, for in its it means nothing more than Learning by Example. It is true that the research organisations at the disposal of industry in developed coun- e IFC to an imposing matrix of capital-output ratios, with all manner l combinations involving inventories, sales turnover, wages, materials, rheads and any other relevant detail that Management considers as the its own productivity. *What we require is an indigenous, simplified* ndustrial managements in India can understand in the context of their ll click in their minds and for which the data are readily available.

ble way and within its own resources, the National Productivity Council rking towards this end in quite a number of ways. The large number

blished so far cover the following subjects: Incentives; Personnel Management; vity; Work Study; Quality Control; Materials Handling; Small Industry; Defence Budgetary Control; Operations Research; Labour & Productivity; Inventory the Engineer; and Training.

of In-country Teams are really nothing more than 'walking and talking' instruments of inter-firm comparison. Essentially, an In-country Team consists of a number of working persons mostly of intermediate categories who go round and see the performance of other firms in the line, learning the 'secrets' of their higher levels of performance, the way they are handling and economising materials, intensifying machine performance, reducing fatigue, raising worker morale, the techniques of fuel utilisation and all other odds and ends which sum up into a higher level of output per every rupee invested or per man-hour spent: thus informed, the boys come home, and try to raise their productivities in various lines to the maximum level they saw in other cases. Through these In-country Teams, NPC has really made a massive investment in the evolution of IFC at the ground level. Up to March 1964, as many as 153 In-country Teams were sponsored, and in these about 1,400 men from industry participated.

The Study Groups set up by NPC to xray the productivity in five major lines of manufacture (Cement, bicycles, electric motors and transformers, jute and rayon) are also efforts in the same direction: and their reports are really *essays in inter-firm comparison*. In fact, for this special issue, we have drawn extensively on the Report of the Cement Group, now released for publication.

Organisationally, the major policy decision recently taken by NPC to set up Industry Productivity Councils, amounts really to the creation of a base in each industry on which inter-firm comparison can be effectively built up. Actually, but for the declaration of Emergency, there was a proposal under consideration in NPC to invite the distinguished IFC expert, Mr H Ingham (whose article appears in this issue) to 'sell' the idea to Indian industry and to help NPC in the establishment of an IFC Centre in India on the British model.

As it is, small, earnest research groups have been struggling in parts of the country to organise IFC on a small scale within friendly groups of companies or on the basis of balance-sheet analysis. The men behind these efforts—Mr SN Cooper of the Associated Cements and Mr JN Bose, President of the Institute of Cost and Works Accountants of India—have been good enough to make their material available to us for publication in this special issue. The Department of Business Management of the University of Delhi has, under the direction of Prof Das Gupta, done a substantial amount of work in the field of IFC; and two articles, based on its valuable work, appear in this journal.

Abroad, a massive quantum of work has been done in IFC by the European Productivity Agency, now taken over by the Organisation of Economic Cooperation and Development (OECD). In the United Kingdom, high quality work is being done in Mr Ingham's own Centre on a clearly commercial basis, for even the best of firms have realised that it pays to know the real secrets—without knowing the names—of the higher performances of competing firms: for such in fact is IFC—everybody is a gainer and nobody is a loser. Without knowing who's who and without the necessity of revealing any secrets of technology or finance or any magic formulae in the monopolistic possession of a concern, every participating management comes to know its own real weaknesses and dis-economies and gets the indications by which it can push its performance to the highest known level in every aspect of resource-utilisation. As Mr Ingham has put it in his article, IFC gives management "a flash of insight".

How IFC destroys certain illusions can be illustrated briefly by two case studies cited by the British Centre of IFC. For example, they had the case of a metal manufacturing company

in Birmingham which had increased its productivity from eight to 16 lb. of product per man-hour over a period of five years, and which was very proud of this fact. After taking part in IFC, it found that other comparable firms had an output of 30 to 40 lb. per man-hour! Another example is that of an electrical firm whose profits on capital employed had increased from 15 per cent to 19 per cent. It found, however, that the average for its section of industry was 25 per cent and that this was being achieved by other firms through greater economy in stock-holding and quicker collection of debts.

Our problems are of course different. We do need IFC as a *diagnostic tool for management, but we really need IFC at all working levels.* A worker in a factory, for example, can certainly be made conscious of the low rate of his output--though machines and materials are identical—if taken, probably just across the road, to another worker in another factory turning out a lot more work. Probably, incentives would be necessary, and incentives can be furnished.

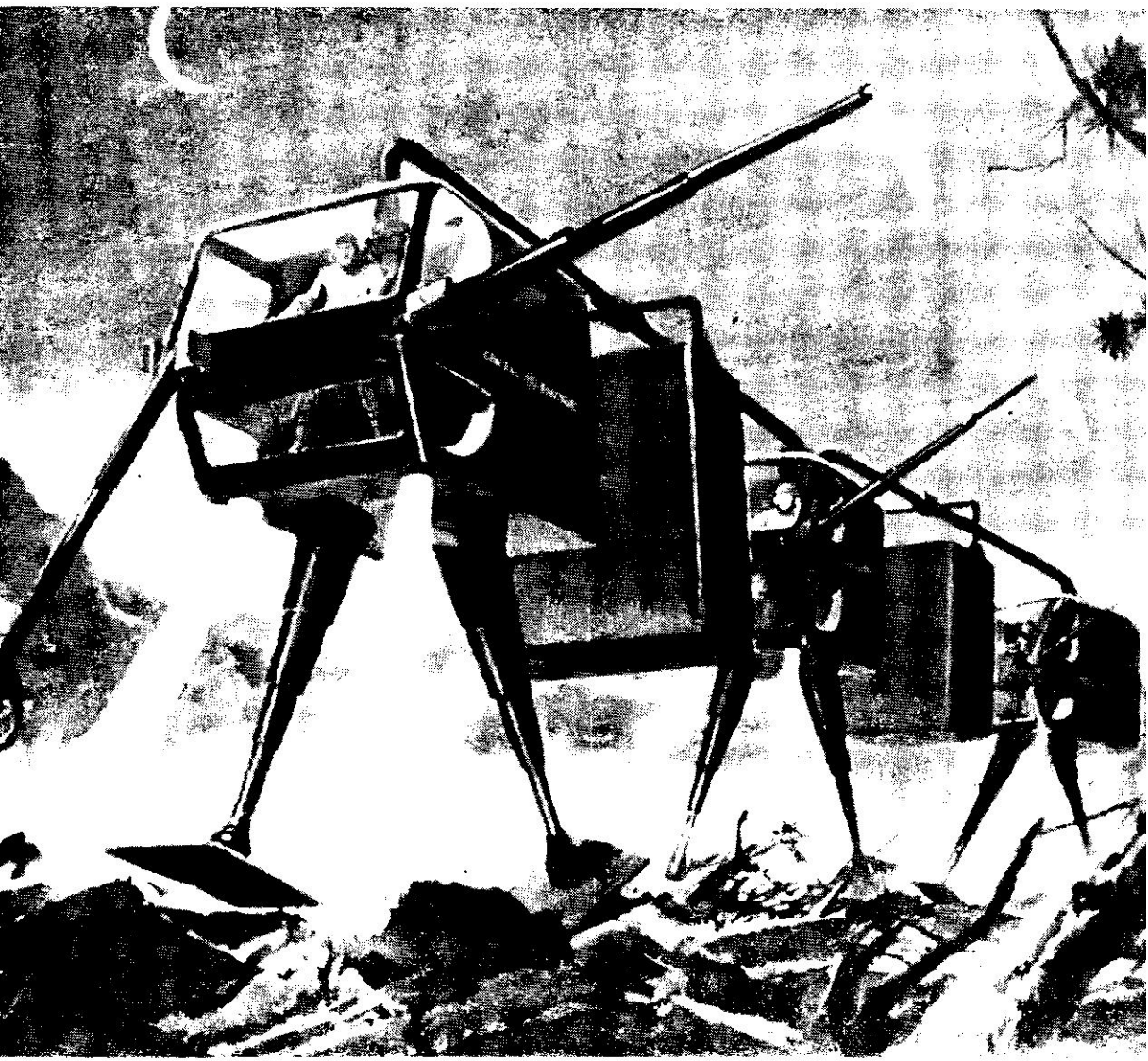
In the first instance, however, it appears necessary to create consciousness both among management personnel as well as among the working classes that a much higher level of performance is possible because all other attendant circumstances are more or less identical. The rest of it is a purely economic problem and can be adequately handled within the present cost-price structure, for when a management comes to realise that a lot more profit can in fact be made by paying a satisfactory wage, if the worker only cooperates in raising the level of output to what is within the limits of possibility, employer-labour relations will improve considerably and much higher productivities would be achieved all along the line. This is the potentiality of IFC.

In fact, it is one of the worst illusions of the Indian economy to imagine a dead level of low productivity. The more striking fact is the simultaneous existence of an extremely wide range of productivities attained by various firms working in the same line with practically the same managerial capacities, the same raw materials, labour drawn from the same background, etc.

As the NPC Cement Report reveals—and this generalisation holds true practically for all Indian industry -while one factory requires less than five man-hours for producing a ton of cement, another factory requires more than 20 man-hours; and within this broad range, the other factories have their respective levels of productivity. It is true that within a certain margin, there would be valid reasons for differences in productivity. But it should be possible, with appropriate organisation, to telescope the differences materially and move the whole system to the maximum level actually attained. For this, IFC constitutes the most powerful instrument.

The tragedy of IFC in India is that though, as the report on p. 451 says, "India provides a virgin field for exhaustive research in the field of inter-firm comparison of a purposive nature", very little in fact has been done. Here is an area which requires little investment. It involves no overhauling of plant lay-out, installation of new machines, revolution in management, retrenchment of personnel, liquidation of inventories, and the like. Of course, it does mean a change in managerial attitudes from treating business as a mystique to considering it as a game for mutual profit and pleasure. IFC is such a game in which without revealing identity or knowing it, we come to know how A, B, C, D are running, why they are running faster than we are, how we can run as well as they do, for the good of the country, and for our own good.

# MACHINE-MADE SUPERMAN



A machine to turn men into supermen is being developed for army use, by scientists at the advanced laboratories in New York State. The machine, a 17-foot-high metal skeleton, will amplify every movement of arms and legs of a man inside it—enabling him to lift heavy weights, and stride easily through rugged terrain.

*The technique of Inter-firm Comparison adopted in the USA, UK, and other European countries is of great potential value to India. Here, Ingham claims that IFC gives management a "flash of insight", and reviews the experience of the Centre for Inter-firm Comparison, which has successfully operated IFC in the UK for several years.*

H Ingham

# IFC Has Many Advantages

INTER-FIRM COMPARISON is a technique designed for encouraging managerial efficiency, which is itself a vital factor in promoting economic growth. It stimulates top managements to keep business policies and operations under constant critical review, and to take proper action towards improvement. It also provides managements with data reflecting the success and efficiency of competitors: this, as experience in the UK and other countries has shown, provides a powerful stimulant to self-criticism at top level because it throws into sharp relief otherwise undetected weaknesses in a firm's policy and performance, and indicates the direction in which remedial action should be taken.

Let us first look at our 'end product' which is the flash of insight in the mind of the managing director whose firm has taken part in an inter-firm comparison. It gives him an instant picture of his firm's relative profitability and makes him see at once where his business is weaker than his competitors, what weaknesses call for his personal attention, and in what directions improvements are indicated.

A motor car distributor, for instance, found that his profits were comparatively low because whilst his competitors could recondition and sell used cars within about two months after they had purchased them, his firm sold them only after three months or more. Why? Because he operates in the centre of a large town where he cannot expand workshop facilities. Should he then rent additional workshop space in the suburbs? Should he reduce his second-hand car purchases and direct his efforts into other more profitable activities (e.g., sales of new vehicles)?

These are policy questions whose importance, but for its participation in an IFC, the management of the firm may not have recognised.

In the view of the British Centre for Inter-firm Comparison, *it is essential that the content of IFC should appeal to those at top management level* in the firms concerned, because 1. A stimulus to self-criticism at top level will have the strongest impact on the development of the firm concerned; 2. Top management is in the best position to decide on remedial action, and to see to its implementation; and 3. In fact, it is the top management which in the first instance is in the best position to decide whether the firm concerned should take part in an IFC.

**Centre's Task**

The Centre has, therefore, as a matter of policy, set out to deal with matters of relevance to those at top management level responsible for the overall direction and planning of business operations, and its special sets of top management ratios are designed to indicate to the managing director—*How* the overall success of his business compares with those of other similar firms; *Why* it differs from theirs; *What* aspects of his firm's policy and performance need his attention; and *What* specific policy questions need to be tackled in order to improve the overall profitability of the firm.

The system of management ratios developed by the Centre (known as the 'Pyramid' system) is illustrated by the following example, which, although much condensed, illustrates how the managing director of a light engineering company can benefit from a comparison of his firm's ratios with those of other firms.

Each of the five manufacturing companies whose ratios are shown in Table I reproduced in Appendix I offers a wide range of electric switches on a catalogue basis. Many firms of this type find it difficult to predict for which of the many items in their range they will receive orders. Some of them will not take the financial risk of manufacturing in anticipation of orders (that is, for stock), but will tend to produce on receipt of customers' orders on a one-off or small batch basis. This, in view of the wide range involved, can easily result in accumulations of work in progress. Furthermore, firms of this type may have to hold material stocks covering a wide range of parts, and this can constitute a threat to their liquidity, particularly in times of low business activity. However, such firms can reduce the liquidity risks resulting from large material stock-holdings and from accumulations of work in progress by producing for stock, in advance of orders, either those items for which (as would appear from analysis of past sales) there is a continuous demand, or those standard components or sub-assemblies which are common to several of their end products.

The ratios shown in Table I (Appendix I) and in the 'Pyramid' diagram[1] (Appendix II) are being used in this IFC for the following reasons:

1. Operating profit/Operating assets: This ratio reflects the earning power of the operations of the business. A favourable ratio of operating profit (profit before tax arising out of the normal operations of the business) to assets employed in producing operating profit, will help a company to show a satisfactory return on its capital, and will put it into a strong competitive position. Such a company will attract good staff and operatives, and will be able to finance its developments out of retained earnings, and to build up reserves. Also, this ratio can be regarded as a general indication of the success of management in running the business as a whole.

**"Why Do We Differ"?**

We now come to the set of supplementary ratios which when compared by managements of similar firms in an industry will indicate to them why their primary ratio differs from those of the others.

A firm's 'operating profit/operating assets' is determined by its profitability of sales and its turnover of assets. Ratio

[1] The Pyramid diagrams shown in Appendices III and IV indicate sets of ratios used in IFC for distributive trades and contractors.

2 shows *what* profit margin has been earned on sales, whilst ratio 3 indicates *how often* it has been earned. Therefore, a firm whose primary ratio is comparatively low, can, by comparing its ratios 2 and 3 with those of others, establish for which of these two basic reasons it has been less successful. Ratio 3 shows how many times assets have been turned over, and ratio 3a the days required to turn assets over once.

2. Operating profit/Sales %
3. Sales/Operating assets times
3a. Operating assets/Average daily sales days

A useful first step in tracking down the cause of a comparatively low 'profit/sales' ratio is that of attempting to identify the department whose costs had a particularly unfavourable effect on profits. This can be done by IFC of the following ratios:

4. Production cost of sales/Sales %
5. Distribution and marketing expenses/Sales %
6. General and administrative expenses/Sales %

In some industries further 'identifying' ratios, such as 'Cost of research and development/Sales', and 'Promotional costs/Sales', are added. In industries where firms make a wide range of products which carry different profit margins, answers to the above question would be provided by IFC of sales and gross profit analysis percentages.

**Production Cost Ratio**

IFC of ratios 7, 8 and 9 shows how much each of the specific production cost items accounts for differences in ratio 4. The purpose of ratio 7a is explained below:

7. Cost of materials/Sales %
7a. Cost of bought out finished parts/Sales %
8. Direct labour cost/Sales %
9. Production overheads/Sales %

A firm's ratio 8 may be comparatively low (and its turnover of fixed assets—ratio 11—may be comparatively fast), because a substantial number of parts and sub-assemblies built into the final product are bought from suppliers outside the firm, rather than manufactured by the firm. IFC of ratio 7a will indicate to what extent differences in this respect have affected the production cost and asset utilisation ratios of participating firms.

Under-utilisation of installed capacity would be indicated by a relatively high ratio of production overheads/sales (ratio 9), if this coincided with relatively slow turnovers of work in progress (ratio 13), and capital invested in fixed assets (ratio 11).

IFC of ratios 10 and 11 shows how much the difference between a firm's turnover of assets (ratios 3 and 3a) and that of others taking part is owing to differences in the turnover of current assets (ratio 10) or to that of fixed assets (ratio 11).

10. Current assets/Average daily sales
11. Fixed assets/Average daily sales

} Days required to turn the asset over once

Should a firm find that its ratio 10 compares

## *Interlinking of Productivities*

**Sri Ram Kishen, who has succeeded Sri Pratap Singh Kairon as the Chief Minister of the Punjab, paid a surprise visit to the Secretariat in Chandigarh, and found a number of officials arriving late. Asked to explain, they blamed the inefficiency of the local transport system. Thereupon, he directed the Transport Department to ensure the punctual running of buses. Office productivity is thus interlinked with the productivity of the local transport system. Apart from this, he has also taken other steps to organise a more efficient conduct of business in the Secretariat.**

unfavourably with those of others, IFC of ratios 12 to 15 will show it in which part of its current assets funds were tied up longer than was the case in other firms.

| | | |
|---|---|---|
| 12. | Materials stocks/Average daily sales | Days required to turn the asset over once |
| 13. | Work in progress/Average daily sales | |
| 14. | Finished stocks/Average daily sales | |
| 15. | Debtors/Average daily sales | |

IFC of each of the ratios 4 to 6, and 11 to 15 will give rise to further questions. However, it is not advisable to overload a first comparison in any industry with additional ratios. The experience gained in the course of an actual IFC will show where further details are required, and whether additional refinements will serve a useful purpose.

**Individual Reports**

With the Table of Ratios (Appendix I) each of the five firms will receive a General Report re-stating the purposes of the exercise, referring to some matters of method, and presenting (as in Appendix II) a diagram illustrating the relationship between the ratios which are used in the scheme. In addition, each firm will receive a confidential Individual Report relating to operating profit on operating assets, operating profit on sales (ratio 2), production costs (ratio 4), turnover of assets (ratios 3 and 3a) and comments on marketing/production policy.

IFC resulting in confidential Individual Reports has so far been conducted—in many cases for two or more successive years—by the Centre for firms in numerous industries and trades. The impact of the Centre's comparisons is not necessarily affected by differences in the products made by the firms taking part. This is very well illustrated in the following instance:

A manufacturer of motor car accessories asked the Centre to prepare a comparison for light engineering manufacturers; he and some other firms with which he was in contact would provide a satisfactory definition of 'light engineering' in terms of processes and weights of products and components. He and the others were aware of the fact that the firms concerned were making different products in different ways for different purposes, but to those who wondered what could be learned from differences between the ratios of such firms he would give the following answer:

If he found that, for instance, his ratio of production overheads/sales was 21 per cent, whilst those of other light engineering manufacturers (of similar type and size) were ranging from 13 to 19 per cent, he would regard this as a danger signal and *'look inwards'*. The resulting investigation might bring to light real weaknesses; on the other hand, it might show that an apparently unfavourable ratio was not due to inefficiency, but that it reflected a policy (e.g., in respect of mechanisation) which had proved to be profitable. Whatever the outcome of such investigations the comparison would have raised doubts in his mind about the effectiveness of his management and because it did this he and the other firms concerned wished to take part in such an exercise.

This is an example of the insight which firms hope to gain from participation. This example illustrates that *it is not the object of an IFC to compare 'firms' as such*, but to reveal what effect certain differences in their features and practices have on their performance. Incidentally, background information on features likely to affect the comparability of figures of different firms is always asked for by the Centre.

**It would, therefore, be wrong to assume that inter-firm comparisons are ruled out unless all participants are of similar size, make the same products in the same way, operate in the same locality, employ the same kind of plant, use the same method of distribution, etc. In fact, if there were no differences between the firms taking part, they could learn nothing from the comparison.**

**Comparability of Figures**

What people really mean when they raise the question of comparability is that firms should be *sufficiently* comparable for useful conclusions to be drawn from comparisons

of their figures. From this it follows that the degree of comparability required can only be decided when it is known what sort of conclusions the comparison is intended to provide, or, in other words, what its objectives are. It is, therefore, not advisable to generalise on this point. But practical experience shows that it is possible to meet the requirements for comparability in many situations.

The Centre has, for instance, now conducted three inter-firm comparisons for light engineering companies. Some of these offer a wide range of products of their own design which are manufactured to customers' orders; others make products to customers' specifications (general engineering firms). Firms of these types do not make 'a product'. Even so, their managements have to deal with the same problems of co-ordination between sales and production, i.e., within each 'type' of business, different firms face the same kinds of risks and opportunities, and have to cope with the same effects of unbalance between sales and production (e.g., a slow turnover of stocks, accumulations of work in progress, and under-absorption of fixed production overheads due to under-utilisation of installed capacity). These are problems which within a 'type' of business turn up in the same form, and which closely affect the overall profitability of the firms concerned. The fact that firms within a type have these problems in common makes it possible for them to draw useful conclusions from IFC of their management ratios.

To achieve comparability of the ratios themselves, the Centre provides firms which have decided to participate in an IFC with simple, but detailed, instructions and definitions of terms. In drawing these up, care is taken to ensure that participants can contribute figures without difficulty; participation in an IFC should not impose a burden on their accounts department, because the figures required would in most cases be available from existing records. Definitions would cover such items as 'sales', 'fixed assets', 'work in progress', 'production overheads', 'direct labour costs', etc.—items in respect of which figures are to be contributed by participants. Furthermore, definitions will provide guidance on accounting methods to be used, e.g., firms will be told what asset values are required and how they are to be arrived at. The Centre will, of course, not use published balance-sheet and trading account figures, because these would not have been arrived at on a uniform basis, and would, therefore, not be comparable.

Draft definitions and valuation principles are discussed with representatives of the industry so as to arrive at definitions which can be used without difficulty.

**Confidentiality**

*The Centre's security system is designed to prevent any leakage of confidential information.* Features of this system include: 1. Non-disclosure of the names of participants; 2. The allocation to each firm of a code number which appears on questionnaires and other documents instead of its name and address. The key to the code is known only to one executive member of the Centre's staff who is in charge of the inter-firm comparison in question; 3. The collection of performance data in the form of ratios and percentages rather than absolute figures, if desired; 4. Stringent security arrangements within the Centre to prevent unauthorised persons having access to the data of firms; 5. The presentation of the results of comparisons in such a way that the data of individual firms cannot be identified; and 6. The report resulting from a comparison is made available only to participants.

The Centre is a non-profit-distributing organisation which, to cover its costs, charges a fee for participation in its IFC schemes. The fee payable by each firm for each comparison ranges from about 50 to 200 guineas depending on the complexity of the scheme, and the kind of services offered. The Centre's fees are low, bearing in mind that

*the 'end product' is an instrument for managerial self-diagnosis.* The fees charged have been found low by all firms interested in IFC for top management.

By circularising its brochures and examples, and by publishing articles, organising promotional meetings and holding seminars, the Centre draws the attention of top managements of firms in an industry or trade to the probable value which they will derive from participation in an IFC. Often these promotional and educational activities are sponsored or supported by a trade association of the industry concerned. Frequently, firms which are interested in an IFC will help the Centre in its promotional work.

An IFC scheme will start in one or the other of the following ways: if a firm is interested in obtaining comparative data through taking part in an IFC, it will contact the Centre which is available to form a group of similar companies. Some firms will initially contact their trade associations and as a result of such action, many trade associations have already asked the Centre to operate a scheme jointly with them.

## Conditions of Success

The 'market' for IFC is potentially very wide. However, there are a number of obstacles in the way of participation by firms—for example, reluctance to disclose hitherto confidential data to an outside body; their objection being that no two firms are alike, etc. *The Centre has succeeded in overcoming these and other obstacles* because—

a) Through its sponsoring organisations, its Council of Management, and its Patrons, it has been able to build up *a reputation for neutrality* which encouraged firms to contribute confidential information to the Centre's pooling activities.

b) *The inter-firm comparisons of the Centre are not conducted to provide 'statistics', but to develop a diagnostic tool for top management.* Comparative investigations conducted by, e.g., academic research bodies, or official statistical agencies, are usually, not primarily, concerned with the interests of the individual firm, but use its figures in building up a general statistical picture of the industry concerned. In the view of the Centre, a dual purpose exercise attempting to combine a statistical survey with a management service is less effective than a scheme which concentrates on one objective. Therefore, the Centre selects ratios and presents reports solely and exclusively for providing a diagnostic service to top management.

c) The experience gained in any comparison conducted by the Centre is systematically applied to the planning and conduct of subsequent IFC, thereby ensuring a *continuing improvement in the Centre's methods.*

d) The content of the Centre's schemes is attractive to the top managements of firms, because it offers them a mechanism for a general review of their policies and performance.

e) The Centre is staffed and equipped to assist firms in interpreting the significance of the results and in deciding on the action required.

f) Finally, firms involved in the Centre's schemes develop a sense of active participation—they are consulted at each stage of the project, and are encouraged to act on the results.

The last-mentioned point is important, because by itself participation in an IFC will not automatically bring about changes: it can do no more than help management in becoming aware of weaknesses, and of the directions in which changes should be introduced. It is up to the management to use the results of an IFC effectively, i.e., to draw the right conclusions and to make the right decision.

Thus, the impact of IFC depends, to a considerable extent, on the general level of managerial ability already possessed by firms. Education for management has an important part to play in raising this level, and the Centre itself, therefore, places considerable emphasis on educational activities in conjunction with the British Institute of Management and the British Productivity Council.

# APPENDIX I

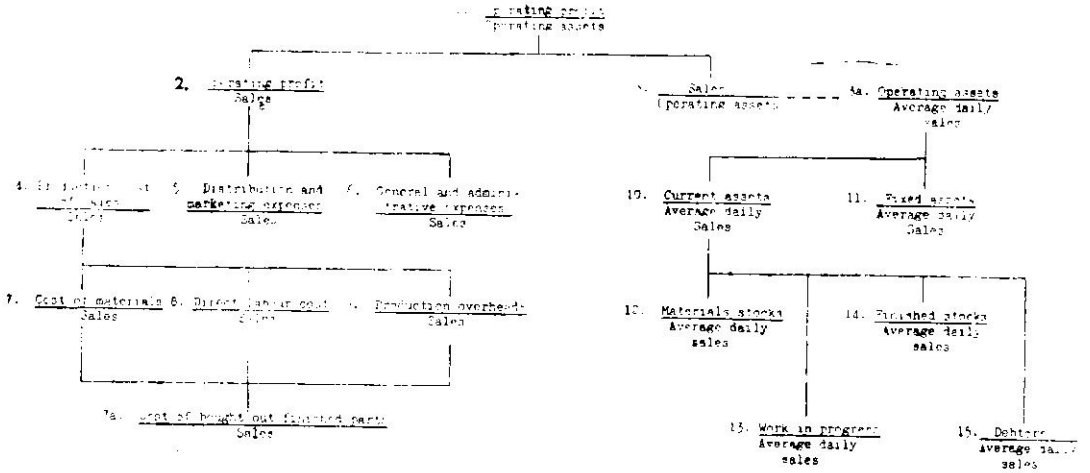
## TABLE I

| Ratio | Firm | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1. Operating profit/Operating assets (%) | 20.1 | 18.4 | 13.3 | 10.6 | 7.5 |
| 2. Operating profit/Sales (%) | 19.3 | 18.2 | 11.9 | 10.9 | 9.3 |
| 3. Sales/Operating assets (times) | 1.04 | 1.01 | 1.12 | 0.97 | 0.81 |
| 3a. Operating assets/Average daily sales (days*) | 350 | 361 | 326 | 376 | 450 |
| 4. Production cost of sales/Sales (%) | 67.3 | 68.3 | 72.6 | 72.7 | 76.1 |
| 5. Distribution and marketing expenses/Sales (%) | 9.1 | 8.9 | 10.2 | 11.0 | 8.1 |
| 6. General and administrative expenses/Sales (%) | 4.3 | 4.6 | 5.3 | 5.4 | 6.1 |
| 7. Cost of materials/Sales (%) | 43.4 | 43.9 | 43.8 | 48.5 | 43.5 |
| 7a. Cost of bought out finished parts/Sales (%) | 16.3 | 16.0 | 15.5 | 9.5 | 5.2 |
| 8. Direct labour cost/Sales (%) | 9.3 | 10.4 | 10.1 | 9.2 | 12.7 |
| 9. Production overheads/Sales (%) | 14.6 | 14.0 | 18.7 | 15.0 | 19.9 |
| 10. Current assets/Average daily sales (days*) | 100 | 109 | 113 | 91 | 128 |
| 11. Fixed assets/Average daily sales (days*) | 250 | 252 | 213 | 285 | 322 |
| 12. Material stocks/Average daily sales (days*) | 20 | 21 | 21 | 13 | 34 |
| 13. Work in progress/Average daily sales (days*) | 9 | 8 | 8 | 5 | 33 |
| 14. Finished stocks/Average daily sales (days*) | 24 | 24 | 23 | 25 | 16 |
| 15. Debtors/Average daily sales (days*) | 47 | 56 | 61 | 48 | 45 |

*Days required to turn the asset over once.

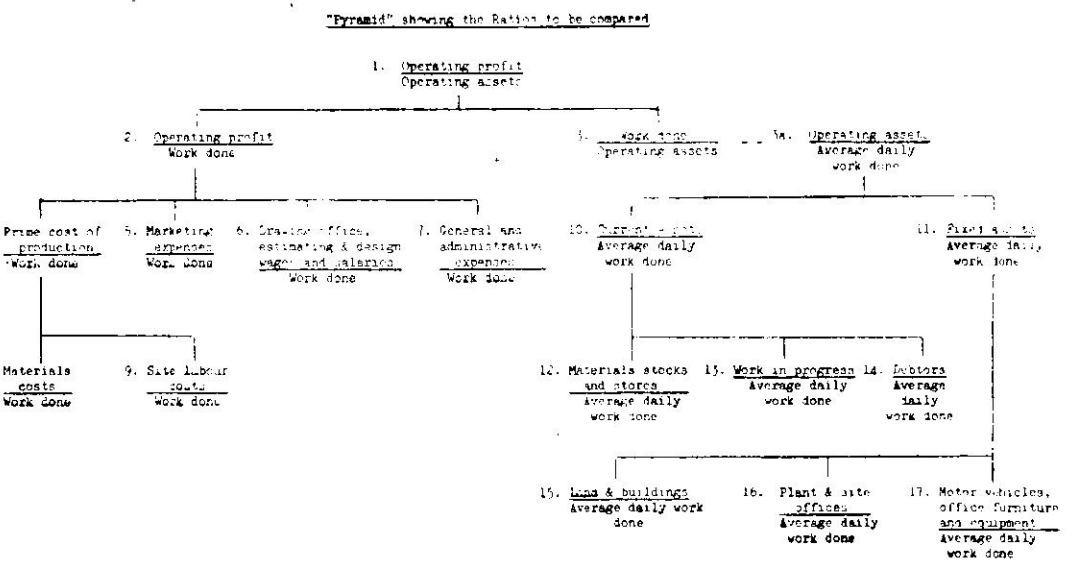
# APPENDIX II

## "Pyramid" of ratios shown in Table I (Appendix I)



## APPENDIX IV

Interfirm Comparison:
Heating & Ventilating Contractors (1)




# *A CLASH OF PRODUCTIVITIES!*

**In January 1964 the US Surgeon-General declared smoking to be a suicidal habit leading to cancer of the lungs. The fabulous US cigarette-manufacturing industry felt its productivity to be threatened, and made frantic efforts to save itself from the deluge. On the other hand, the US Treasury also felt its own productivity to be threatened, for the US Government derives nearly $ 400 million as revenue from cigarettes.**

**In January (when the Surgeon-General's report was published), the Federal Government obtained over $ 53 million as revenue from cigarettes in one single month. This revenue declined by nearly $ 21 million, and it was expected that if this trend continued, the entire revenues from cigarettes would disappear by the end of the year. Probably this will not happen, as most people's memory is short, and a few people are afraid of death in the long run. Immediate death is of course frightening, but if it is a long way off then one has almost a nostalgic feeling for fatality.**

**The issues are, however, fundamental: Is the productivity of the individual citizen, his health and other vital interests, the deciding factor for policy? Or, is it the productivity of private industry, or, what is more intriguing, the productivity of tax revenues? We, in this country, face almost identical issues in the name of Prohibition.**

*The market for Inter-firm Comparison is potentially very wide, but there are a number of psychological and technical obstacles in the way of participation by firms. An expert here analyses the types of obstacles encountered, and indicates the methods to avoid them.*

F Posse

# Psychological & Technical Obstacles to IFC

MANAGERS, for the most part, have regular recourse to comparisons in *time* (such as the comparison of the results of one period with those of a previous period) in order to guide their decisions. On the other hand, comparisons in *space* (such as inter-firm comparisons proper) are more rare since, in this domain, there are a great many obstacles. It is nevertheless true that this type of inquiry is the only one which provides an objective yardstick, and thus sound management control.

Research into the standards of efficient management should, of course, automatically bring out the cause and effect relationships leading to a given result. Once the standards and their causal relationship are known, the head of the firm can direct his efforts towards specific objectives. He can then use rational management methods, instead of relying on *hunches* and *commonsense*.

The problems involved in inter-firm comparisons can be divided into two classes—those of a human and psychological nature, and those of a purely technical nature. Attention must be paid to the dangers inherent in comparing accounting data and financial ratios. Errors in this domain are the cause of much of the distrust shown by heads of firms for this important management tool. The solutions found for purely technical problems often serve only to aggravate the existing psychological obstacles.

One might think that the head of a firm who has a chance to take part in a group carrying out inter-firm comparisons would not hesitate to do so. But a number of human and psychological obstacles stand in the way. Apart from *fear* that the figures submitted for comparison may fall into the hands of competitors, there is also *indifference*. Many heads of firms fail to realise how much they might benefit from such research, because they do not have enough imagination to picture in advance the solid results that might be obtained. It must be admitted that the *organisers* of inter-firm comparisons are partly responsible for this

state of affairs, as they do not always present the results in such a way that their usefulness will be readily apparent.

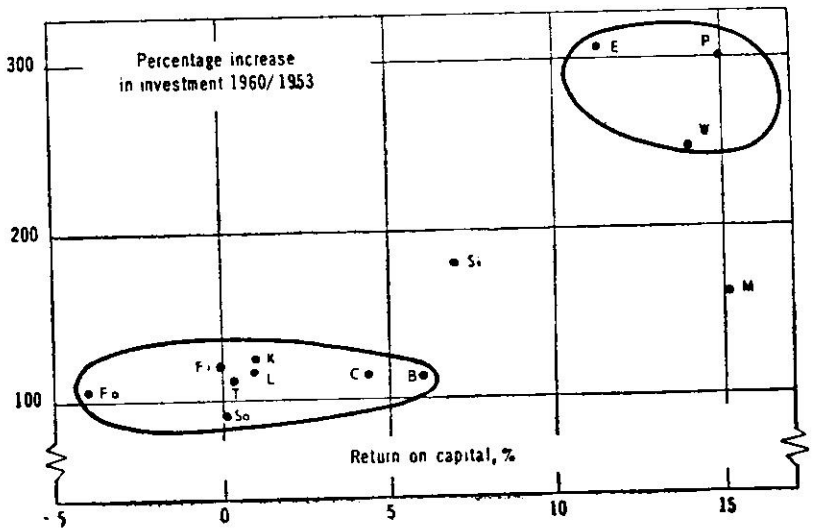
### Ways to Avoid Obstacles

What can be done? First, heads of firms must be made to realise that it is in their *interest* to determine their real position in relation to their competitors. If they are at the head of the list, they will be reassured as to the efficiency of their methods; if they are low down on the list, they will have to take steps to improve their situation. Another way of arousing interest is to present *results* of comparisons in other sectors, in the form of graphs, diagrams, and indices. For example, at the first meeting with a group of interested persons from a given industry, attention could be drawn to the advantages of active investment. This can be done by showing them a graph (Figure 1) similar to that prepared during a survey in the foundry and heating equipment industry. The balance-sheets of 13 firms were analysed in an effort to determine the relationship between the declared profits for the years 1958, 1959, and 1960, and the total investment up to 1960, on the basis 1953=100. Five firms which went in for active investment obtained the highest profits, and the stagnant firms with no definite investment programme declared very low profits.

This striking example lends direct emphasis to the advantages of inter-firm comparisons. Consultants may also stress the importance of *personal contacts* when collecting data. This may be of immediate use. By drawing attention to certain anomalies, the problem is made clear, and that is the first step towards solving it.

An organiser who is trying to interest a group of furniture manufacturers in inter-firm comparisons might mention the various 'tips' obtained by the brickmakers as a result of the personal contacts needed for collecting the basic data. It was found that a worker who opened the clay control valve whenever a tub arrived, could be replaced by a pneumatic lever requiring an investment of less than the worker's annual salary. A high level of coal consumption per ton of bricks manufactured is sometimes due to the presence of moisture in the upper part of the kilns, requiring a great many calories per kilo to evaporate it. This discovery was made during an inspection carried out by a consultant who was working on a description of the firm.

*Figure 1.* CORRELATION BETWEEN THE INCREASE IN INVESTMENT AND THE RETURN ON CAPITAL




It is best to begin by emphasising only two or three *striking factors* which, as they are readily understandable, produce an immediate result. When the two graphs in figures 2 and 3 were presented to a group of firms from the road transport industry, they immediately found it worth-while to make a comparison between annual activity and waiting time at the fixed costs of

the fleet of lorries. The participants agreed to assemble these figures from the drivers' log-books, and to communicate their analyses to each other.

The organiser must also enjoy the *confidence* of his principals. A stranger cannot hope to be initiated into the head of the firm's personal affairs, such as the relationship between shareholders in a family firm. The survey can start off on the basis of simple ratios: the proportion of wages paid per cost centre, the relationship between domestic and export markets, the speed of stock

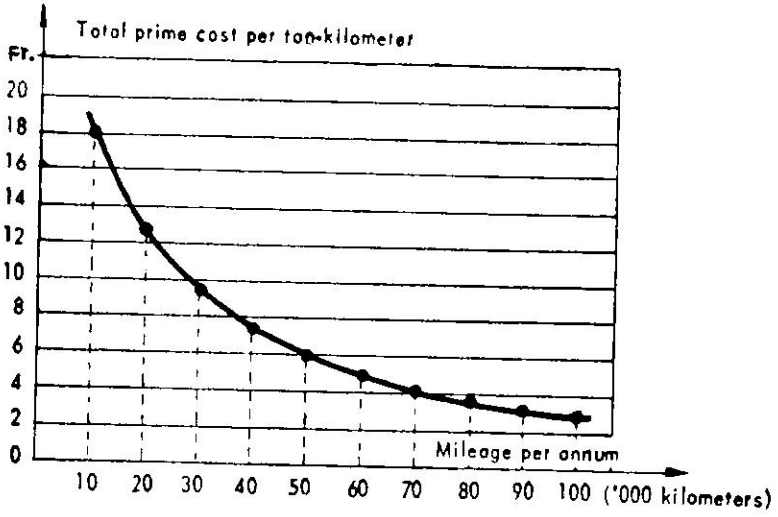



*Figure 2*
TOTAL PRIME COST/ MILEAGE

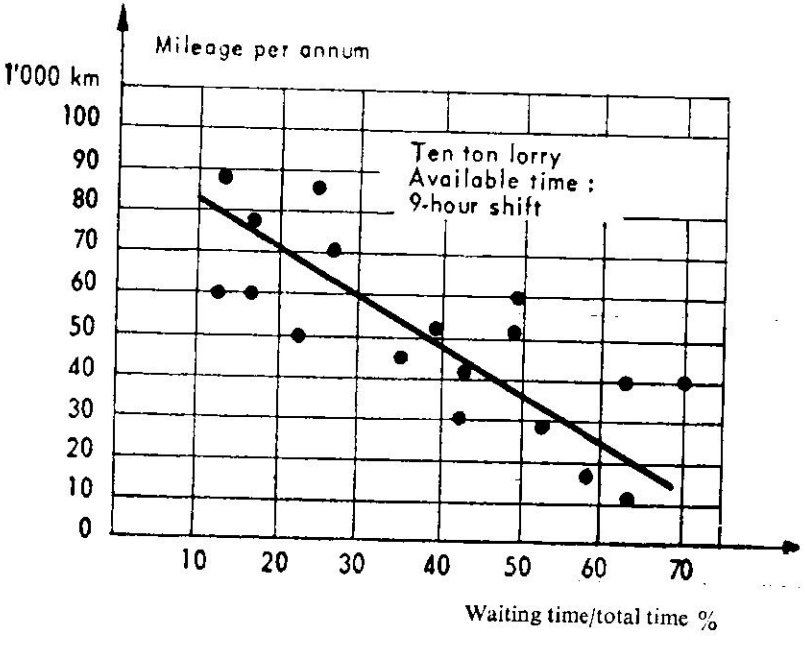



*Figure 3*
MILEAGE/ WAITING TIME

turnover, average settlement time by the customers, regional distribution of sales, etc. Once the first results are obtained the ice is broken, and it is possible to go further. Also, results should be presented in a form that will make it possible for the head of a firm to draw conclusions immediately. A few suggestive graphs with figures and some direct deductions have more effect than speeches about the usefulness of inter-firm comparisons in general.

A group of metallurgists may fear that the raw data used to determine the relationship between the number of man-hours per length of weld and per thickness of plate are not assimilable. The graph included here (Figure 4) may help them to solve the problem.

The results of other surveys are also useful if they are suitably presented. To begin with, certain highlights should be brought out: extent of energy consumption per ton, differences in the ratio of man-hours to units produced, differences in regional sales, etc. One of these factors is then analysed: *Is there a relationship between the energy consumption per ton and the nature of the finished products*? It is not uncommon to find that some of the participants have already thought of carrying out collective studies on certain points of detail. It is then sufficient to point out to them how useful an inter-firm comparison can be in detecting problems and indicating the kind of research that should be undertaken.

**Method Recommended**

Once this approach has been successful and 10 or 15 participants are ready to participate, it is advisable to select a method capable of arousing their interest. First, it is necessary to demonstrate the comparability of the results and the value of the measuring instruments needed to obtain them. If this is not done, the whole effort may be endangered.

If the starting point is a ratio which, in theory, symbolises the efficiency of the management, but which is not pertinent in practice, the participants will soon lose their

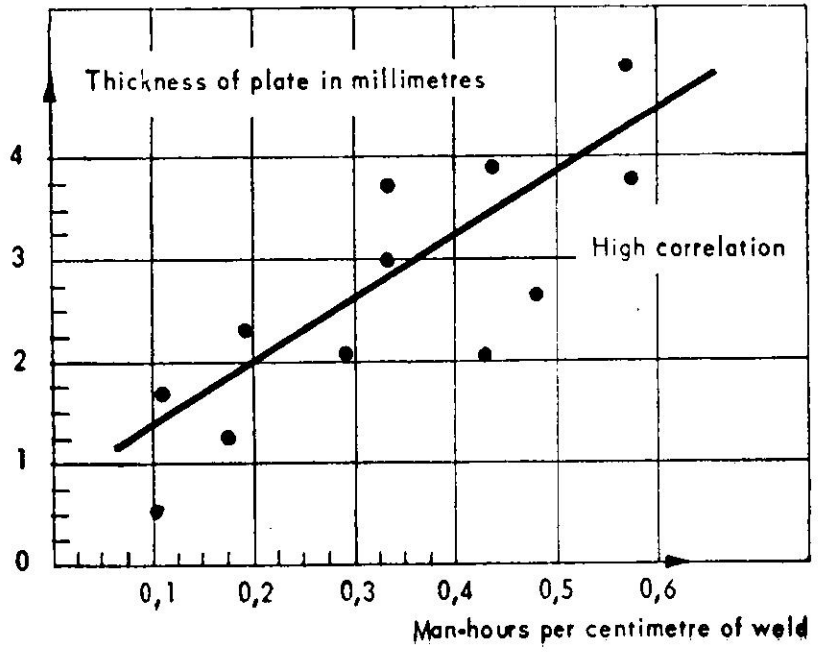



*Figure 4*
MAN-HOURS PER CENTIMETRE OF WELD THICKNESS OF PLATE

enthusiasm. For example, the relationship between net profit and total capital is undoubtedly characteristic of each firm. But what is the net profit? Is account taken of depreciation or of rent? How are the stocks of materials and the work in hand assessed? What is the total capital? What value has been assigned to investments made 10 years ago? How are land and buildings evaluated? Have devaluations been taken into account? Doubtless there will not be any immediate criticism from the participants, but the survey will have started badly.

Obviously, the organiser must be thoroughly familiar with the sector in which the comparison is made. Nevertheless, the significant character of the factors to be compared should be discussed with the participants. It is nonsense to discuss profits in general when only fiscal profits are known.

The problem of the unit of measurement must also be considered, or failure may result. For example, is it possible to count and compare the hours of work without any qualitative distinction between skilled and unskilled labour, women workers and men workers, normal hours and overtime, or hourly rates and piece-rates? A discussion with the participants on measuring instruments and units of measurement can eliminate many psychological obstacles which stand in the way of progress with inter-firm comparisons. These obstacles are numerous, and every effort must be made to overcome them. It falls upon works councillors, trade association organisers, university research workers, and those responsible for promoting higher productivity in the economy to render inter-firm comparisons attractive to industrialists.

### Technical Problems

Technical problems arise because it is impossible to find a group of firms fulfilling the following ideal requirements:

1. Manufacture of a single finished product from identical raw materials.
2. A labour force of comparable quality.
3. The same production process and similar production methods.
4. The same degree of integration.
5. A similar system of administration.

The ideal case of an inter-firm comparison such as that in the brick-making industry already considered is encountered only rarely. Most of the time it is necessary to:

1. Equate raw materials into a standard raw material, and finished products into a standard product, by using conversion coefficients.
2. Classify the firms taking part into homogeneous groups working to a uniform procedure and doing work which is comparable in quality.
3. Confine the inquiry to specific stages of the production process, to certain production centres, or again to specific products.

By these methods, it is possible to make comparisons which reveal differences for which the reason must then be sought—a first step towards discovering means of increasing efficiency and raising productivity.

It is generally advantageous to take labour

## SAFETY DEVICE

*A light-sensitive cell, otherwise known as a photo-electric cell, is a most useful safety device in industry, particularly in printing and paper-making, reports* **Mass Production.** *It adds:*

*A break in the paper in a rotary printing press will result in yards of paper being caught up and entangled in rollers throughout the machine. To clear all this paper is a long, tedious, and expensive task. To avoid such a calamitous pause in production, the machine must be stopped as quickly as possible. For this a photo-electric cell is used. A beam of light directed across the plane of the paper between rollers is obscured by that paper; but if there is a break, the beam of light will impinge on a photo-electric cell which will operate a relay bringing the machine to a halt.*

as the basis of productivity, because the most varied services can then be reduced to a common denominator—i.e., the number of hours worked. Moreover, labour is the dominant factor in a large number of production processes. This method must naturally be abandoned if there is great diversity in the type of work done, unless it is possible to reduce them all to a common basis with a conversion coefficient.

The same is true if the labour force is a minor one. In this case, there is a danger that small variations in the measurements will unduly influence the productivity calculation. In a hydro-electric power station, for example, the proportion of labour in production costs is so small that it cannot be used for comparisons of efficiency.

In the brick-making industry, there is only one final product—the ton of bricks. It is true that an attempt was made to establish a relationship between the wage bill per ton and the shape of the bricks—i.e., solid or hollow—but all the shapes were reduced to tons by the adoption of a simple formula. There are, however, very few opportunities to do this in practice. It is not possible for a stove manufacturer to reduce the 35 models he produces to terms of tons, cubic metres of heating capacity, or in terms of a global number of units.

In an inter-firm comparison in the stove industry, the analysis could be limited to certain operations—foundry, moulding shop, and enamelling ovens. But if this is done, the overall picture is lost. Among 10 firms studied, the number of man-hours per ton in the foundry may indeed show little dispersion around a mean value, but a stove of a given type, weighing about 70 kgs. to 80 kgs., with an identical thermal efficiency for a given number of cubic metres of heating capacity, may in one firm have a cost price 50 per cent above the average for the group.

The factors which inflate costs are:

1. Too high a price paid for the raw materials—e. g., scrap, ore, and coke.
2. Excessive use of dearer raw materials—for example, more scrap than ore.
3. Casting of thicker section than necessary.
4. Certain castings could, with advantage, be replaced by plate.
5. The run is changed too often, its length is, therefore, too short, and set-up cost great.
6. The planning department does not prepare runs and in consequence work is interrupted, intermediate stocks are too large, financial charges are high, and transport costly.
7. Assembly cannot be carried out on a line because runs are too short, and finished products are varied.
8. The components of the various sizes are not standardised, and there is in consequence a great variety of feet, doors and gratings which could be interchangeable between models.

All these factors influence the cost price very considerably, but they do not become apparent when a comparison is made at a given stage of production. The ratio of man-hours per unit of finished product would be more significant, but how can these finished products be reduced to a standard unit?

The output of a stove factory may be measured by assessing the finished products according to certain criteria, such as selling

## PRODUCTIVITY OF INDIAN AIRLINES

**Despite the public being "fed up with IAC," to use the language of its General Manager, the Corporation is likely to declare "a handsome profit in 1963-64." In fact, the profit is estimated as the highest in IAC's history.**

**The Caravelle service which was recently introduced will alone yield a surplus of more than Rs. 10 million. In fact, its utilisation is the highest in the world.**

**IAC has three Caravelles—two in operation, and one as a standby. The two planes operate in 10 sectors, which means that a Caravelle is in the air for the best part of the day. In air traffic, this, in fact, is the recognised Measure of Productivity.**

price, cost price, and weight or operations involved in the manufacture of the finished article. None of these criteria, however, is above criticism.

The selling price would be a valid yardstick in a free market where there was perfect competition: the housewife could then attach the same value to the type of cooker, whoever the manufacturer might be. In this case, output would equal $\Sigma(N_i P_i)$, where $N_i$ being the number of appliances of type $i$ with a selling price $P_i$.

An output equal to $\Sigma(N_i K_i)$, where $K_i$ is the cost price per type, leads to absurdities. The concept of cost price varies, in fact, from one firm to another. One has only to think of the problems of amortisation, calculation of interest rates, and evaluation of stocks. The cost price embodies all the mistakes made in managing the firm—unnecessary operations, slow rate of turnover, absence of mass production methods, lack of planning, etc. The ratio of wages to $\Sigma(N_i K_i)$ may, therefore, show only a slight variation between the various firms, whereas productivity in one firm could actually be double that of another.

The use of weight alone as a measure of output is acceptable in the brick-making industry, in an industrial bakery or in a cement works, as long as some suitable conversion formula is used. But stoves are not sold by the kilogramme. Use of the ratio man-hours/ton produced would favour the firms which make industrial stoves in large quantities for the mass market, but would operate against those which include a large number of luxury models in their production range.

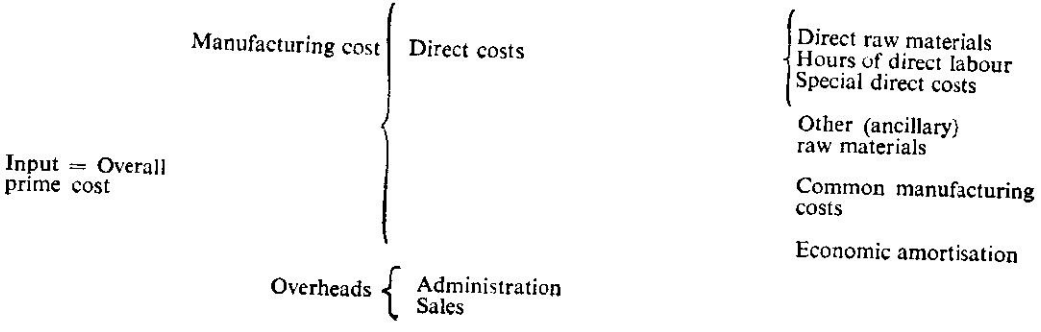
To relate output to the sum of the evaluated operations leading to the finished article gives a very theoretical result, which implies that all the operations are necessary.

## Input Measurement

The method least open to criticism is that where output is regarded as the sum of all the finished manufactured products assessed in relation to a well-defined objective value. Stoves are thus divided into groups—industrial space heaters, unfinished cast stoves, cookers, domestic heaters, etc.—and each group subdivided according to efficiency: domestic heaters, for example, being classified as of 25-30 $m^3$ or 30-35 $m^3$ heating capacity on the results of laboratory tests.

Manufacture of a quality above the minimum required is then regarded as wasteful. If the manufacture of bricks of a density of 600 kgs./cm.$^2$—i.e., above the standard of 400 kgs./cm.$^2$—involves higher wage costs, it is wasteful, as the bricks are not on this account *better* bricks.

Once output has been established on a sound basis, input may be studied—raw materials, labour and capital—and ratios of every real significance may be deduced. Input covers all the factors which took part in providing output. The table below may be taken as a basis.



The relationship of one of the direct factors to total production, or output, takes the form of a number without dimension—i.e., a ratio. The number of relationships which can be established is in theory infinite, particularly if the accounts are used for compiling the information. In practice, the number of ratios of real significance is small, for three reasons:

1. It is impossible to define exactly what is meant by investment, amortisation, direct labour, stock, rate of turnover, length of run, interest, overheads, marginal cost price, total cost price, and shop cost price.
2. It is difficult to interpret exactly a statement such as 'Brickworks *A* has a higher investment per ton-of-bricks ratio and a lower maintenance per ton-of-bricks ratio than Firm *B*.' Too many subjective values are concealed in this statement.
3. The time needed to measure input and output correctly makes it impossible to examine a large number of ratios (relationships) in detail.

Let us simply examine the input of two factors—hours of direct labour and investment—since these two factors usually vary inversely.

**Wages**—It is practically impossible to compare total wage input with total output, and we are, therefore, obliged to begin by measuring various operations separately. To define an operation exactly requires a detailed knowledge of the sector, and participants must likewise observe a certain measure of discipline when defining the firm's activities. Thus in a brickworks, transport of the bricks from the press to the drying sheds must be recorded under *pressing* and not *drying*.

**Investment**—Investments are included in the input calculation by means of amortisation. In an inter-firm comparison, it is important to establish the ratio of total investment to input. No calculations are more arbitrary than those involved in the evaluation of investments. Blind use of figures from the accounts can give most fictitious results. The value placed on investments varies, depending on how they are regarded, as follows:

1. *Purchase value*—the price paid for the equipment at the time of purchase, whether or not this price has been reassessed since the war. In view of the continual slow and steady devaluation of the currency, this sum is of no more than historical value.
2. *Replacement value*—the price which would now have to be paid to replace precisely the same equipment. In many cases, however, old machinery or buildings cannot be replaced exactly, as they have long been rendered out of date by technical progress. Replacement value thus has an entirely subjective significance.
3. *Residual value*—this is an accounting concept, the difference between the purchase price and the value already recorded for the investments—i.e. the difference between the amount of devalued currency and the

## INDIA NEEDS THIS TYPE OF PRODUCTIVITY

**India earns a sizable amount of foreign exchange through the export of cashewnuts, particularly to the USA.**

**But there is the other side of the story. At present, the nuts are shelled by hand which is not only slow, but is also highly dangerous as cashewnut oil can destroy the use of the hand, and, in addition, bring blindness.**

**To tackle this problem, the National Institute of Agricultural Engineering in the UK is studying the means to devise a small unit which will mechanise the shelling of cashewnuts. The idea is to step it up to the rate of 200 lb. of nuts an hour, while the unit will be so compact that it can be moved from village to village where crops are grown.**

amortisation allowed for tax purposes in this currency.

4. *Market value*—this is the assessed value of the complete installation, in working order, as it would be if transferred *en bloc*, and is a subjective value varying with the valuator's degree of optimism regarding the future of the firm.
5. *Economic value*—this is a concept which tries to avoid these criticisms, being based on two principles: (a) The value of equipment is determined by the output which can be obtained with it—e.g., a hydro-electric power station and a thermal station with the same economic value; and (b) The value is also based on the price which would now be payable for the same equipment, taking account of technical improvements.

An example has been taken from the textile industry to illustrate the points just made. It deals successively with output, input, and three ratios, covering the weaving departments of 12 firms. On output, reducing the production of the winding department to a basic unit gives rise to no difficulty: the unit is the spool. The factor *weight per spool* must, however, be taken into account, and this constitutes a third ratio.

Regarding input, only the productivity of direct labour is considered in a given department of the weaving plant: thus no overall picture is obtained.

In the winding department, four operations can be distinguished—cleaning, loading of drums, transport of pirns, and pirn winding. There is a practical difficulty in defining the operations exactly so as to make it clear where they start and finish and to obtain uniformity among the 12 firms taking part.


**The Worry Wart: Bogged in detail and never-ending preparation**

*In democratic countries, there is a strong dislike of being forced to provide data, even when it is for people's own good, says the author of this paper, who, briefly, defines the purposes of IFC studies, and discusses ways of productivity comparison and economic growth.*

A Nicol

# Productivity Comparisons & Economic Growth

INTER-FIRM COMPARISONS (IFC) originated in the plant level studies conducted by the US Bureau of Labour Statistics (BLS) under a programme entitled "Case Study Data on Productivity and Factory Performance."

Among the operational activities conducted by the European Productivity Agency (EPA) as part of the Marshall Plan for European reconstruction after World War II, the establishment of National Productivity Centres and the encouragement of the IFC technique featured strongly. Whilst the BLS turned its attention to other important problems, IFC was further developed in Europe, notably in the form of financial ratios and the Pyramid system.

The Productivity Measurement Advisory Service (PMAS), set up under the EPA, conducts, among other things, IFC pilot studies on an international scale. Despite the private inter-firm comparisons conducted by firms with branches in several countries, mainly concerned with costs or financial data (though some did include productivity), this was virtually unexplored territory. Indeed there are severe misgivings about the practicability of such comparisons: "the major obstacle to all these efforts is that of obtaining the necessary detail and adequate coverage. This problem becomes more difficult when the focus is broadened from the firm to the national level, and even more complex when international comparisons are attempted."

Karl Borch, who ran the Productivity Measurement Advisory Service for the European Productivity Agency from its inception

until 1959, in a paper entitled *A Survey of Productivity Comparisons in Europe* read before the International Conference on IFC in Vienna in 1956, pointed out that "a number of strong and convincing reasons can be advanced for confining IFC to comparison of productivity, and in particular of labour productivity:

(i) Productivity measured by output per man-hour, per kilowatt-hour, etc., is a better measure of real efficiency than cost data which may be influenced by arbitrary or fluctuating prices.

(ii) Firms are more ready to release productivity figures than cost figures for comparison purposes.

(iii) Productivity figures are of a more general nature than cost data, and lend themselves more easily to comparison between different regions and different countries."

Borch defined two purposes of IFC studies:

(i) The pure research aspect of obtaining information about the causes of productivity changes and productivity differences; and

(ii) The immediate practical aspect of obtaining information which will be of direct use to management of the participating firms.

To Borch's two purposes I would add a third: the target aspect of economic planning, which is applicable to both micro and macro analyses. In a non-Communist society, the expectation of businessmen is a very important factor in investment decisions. In any form of society there is also what might be called the driving force of an idea. Let it suffice to say that a high standard of living is a good thing, and the lower our starting point, the faster we wish to grow economically. Given this desire, however, does it necessarily follow that we should measure our growth in terms of human labour alone? We may define growth as the rate of output per capita (labour productivity) or rate of accumulation of plant and equipment per capita (wealth), but our measure of it need not be "per capita" at all. In agriculture, we often measure productivity in terms of output per unit area of land, and we could certainly measure growth in terms of output per unit of time or capital equipment per acre of land. The key to the choice of denominator is the purpose for which we desire a measure. It was Allyn A Young who maintained that *productivity* and *scarcity* are synonyms. For developed countries, where labour is scarcer than capital, "labour" productivity is a natural choice. In a country in the course of development, where the opposite is true, would not "capital" productivity be the better criterion?

**Different Measure for Asia?**

One reason for the predominance of the "labour" productivity measure is that it measures the productivity of the factors other than labour. The latter is the least variable in its productive effort of all the factors of production, and, therefore, the best denominator for this purpose. The same reasoning is applied to the choice of land area in measuring agricultural productivity. There is, of course, variability in the quality of both land and labour, but this is *relatively* small.

Thus it would appear that per capita is a bad measure for a country like India, China or Japan, where the population is increasing rapidly. Growth measured as output per capita is more likely to fall off than to increase, whilst output per capital stock of plant and equipment would not only provide a good indicator of growth, but also take into account the efficiency of the capital goods and the intensity with which they were used. An increasing stock of plant and equipment should be accompanied by at least a corresponding volume of output (the time-lag between acquisition and employment might give some trouble here). Productivity so measured would be that of human effort—the skill of the workman even, as well as that of the manager. It might have the advantage of discouraging investment in labour-saving devices aimed at an increase in productivity but at the expense of costs. Concentration

upon this type of equipment is viewed by most people as being suitable for countries with a labour shortage, but uneconomic and anti-social in a country like India or China with a large under-employed labour force. A different type of measure in Asia to that used in Europe and North America would mean that international comparisons would be impossible except between countries with similar problems. But, in the same way as Indian figures have been expressed, for comparative purposes, in the measures used in the developed countries, if India adopted a capital-based productivity measure, the figures for the other countries could also be similarly calculated for comparability.

Two productivity comparisons are mentioned by Dr Weigel, in his address to the Euro-Economic Congress. He classifies these as "genuine" inter-firm comparisons, as they were conducted by independent institutions rather than by a firm covering only its dependent companies in other countries. These are: *Productivity Comparisons in Coarse Cotton Weaving* by the ETH, Zurich, Switzerland; and *Productivity Comparisons in Close Weaving* by the AIUFFAS, Krefeld, Germany.

In democratic countries there is a strong dislike of being forced to provide data, even when it is for the people's own good, and nothing of this sort is envisaged for the future. There is, however, in the Census data of each country, a mass of valuable numerical information which only emerges in the published reports in the form of averages and aggregations. Some time in the future, this vast source of plant data will be tapped for international productivity comparisons at the level of the firm which should prove very interesting *vis-a-vis* the macro-economic comparisons at national and branch levels.

# *A New Computer*

**A new instrument of birth control, which has just been put on the market in Switzerland, would be of great interest to family planners in India, writes the *Economic Times*. It is a pocket-size precision computer, which computes with automatic accuracy the fertile and infertile periods of the female user, the paper says, and adds:**

**It is being introduced into American and European markets after several years of successful testing and marketing in selected localities in Central Europe. It is called the CD INDICATOR and has already earned the unqualified endorsement of the medical profession in Switzerland, and religious groups have approved the instrument as a natural method of family planning.**

**The CD INDICATOR is a scientific instrument, which has none of the dangerous side effects, generally associated with oral drugs prescribed for family planning. It is actually a cylindrical device measuring about two inches in length and one inch in diameter. The computer is simple to operate. The user sets two dials in passing the full cycle of fertility and infertility. The adjustment of a third dial each month automatically provides full and reliable data on fertile days during the following period. It is sold in the American market for Rs. 75.**

**If manufactured in India, this INDICATOR will sell for less than Rs. 25, which would bring it within the purchasing capacity of a middle class family.**

*There are several reasons calling for an intensive application of IFC—chiefly, increasing of production, using the present facilities generally. Here is an examination of the special problems of the economy of developing nations which can be solved by IFC.*

Richard Hippenstiel

# IFC: An Economic Opportunity

SINCE the second decade of this century, the technique of Inter-firm Comparison (IFC) is being increasingly applied to practically every branch of industry. In Germany, it was especially Prof Schmalenbach who encouraged the comparison method for purposes of industrial planning and control. The significance of IFC—sometimes being denied by representatives of theoretic economy, but generally stressed by practicians—is growing steadily in practically all countries regardless of their economic system and their state of economic development. In Europe, a great many national as also international institutions are undertaking quite a large number of comparative studies in the field of economy.

This leads to the question: What are the ultimate goals of all these comparisons, and which special problems of the economy of the nations under development, in contrast to the economy of highly industrialised countries, can be solved by means of IFC?

There is no intention of developing a complete theory of IFC within the framework of this article. However, I like to point out that, within the European economic system, IFC is being applied mainly as a comparison of costs and industrial output. Consequently, our institute—Forschungsinstitut für Rationalisierung an der Rheinisch-Westfälischen Technischen Hochschule Aachen—is carrying out two different types of IFC:

1. Comparisons based upon cost data.
2. Comparisons of production methods.

Comparisons using cost data—there is as it were a confrontation of the costs of the participating firms—are subdivided into

highly differentiated cost components, and list the departments to be burdened with these costs, or attribute them to the products to be charged with these costs. This accounting system provides for an accurate view of the total cost structure. The transparency of the costs in relation to the industrial output makes it possible to spot sources of loss and leakages within the enterprise, thus enabling management to effect the maximum possible reduction in the total production cost.

**Methods Comparison**

The comparison of production methods concerns rather the technical and engineering spheres, but represents a means of reaching the same goals on a different level, and by different means. In solving a clearly defined and limited problem, methods comparison can answer questions concerning exclusively the rationalisation in regard to industrial production. Ultimately, this type of comparison shows the production costs depending solely upon the production methods used. All other factors normally contributing to the costs like wages, costs of energy and buildings, and machine depreciation are being standardised in order to eliminate their influence.

Apart from industrial rationalisation—which, of course, is always an objective of such comparisons—there are some other reasons in today's Europe calling for an intensive application of inter-firm comparison. A very important point is the unpreparedness of some branches of industry for such contingencies as the European Common Market, when markets that have been restricted so far on a national basis, will be converted into parts of a much larger economic community leading to a much stronger competition. In this case, the results of an IFC will be interpreted first in order to gain a general view over the current situation of the specific branch. This holds particularly true of branches, where too optimistic a prognosis of the economic development of recent years has led to excessive production capacity. Since this excessive capacity results in excessive supply, a general decline of prices will be inevitable in such cases. Here, the legitimate means of an inter-firm comparison should *redirect the firms to cost-conscious thinking* by showing the cost structure of a representative number

## *How Far Are We from Millennium of Productivity?*

*How new technologies knock out old jobs, while probably creating new ones, is well illustrated by diesel-powered trains taking the place of the old coal-fired engines. The American Railways continue to employ 30,000 firemen on diesel-powered engines, though the latter have really no fire to stoke! The railway managements naturally desired to abolish these jobs which had completely lost their purpose. The workers, however, fought it up to the Supreme Court level, where, after all, they now appear to have lost. While these 30,000 firemen will lose their jobs, those who continue to be employed in the American Railways will still enjoy the old standards —paid holidays, expense allowances when away from home, and what is most important, a journey of only 100 miles would still be considered to be a full day's work for a train crew. American trains normally run very fast, and at their speeds a driver would earn a full day's pay if he drives a train for an hour and a half or two hours. If he drives back home in another fast train, he would have earned a full day's wage for being out of home for only 4 hours at the most: 2 hours driving and 2 hours being driven. How far are we from this millennium of productivity?*

of firms. Since price-fixing is generally unlawful, there is every reason to hope that, in the long run, a market stabilisation will result, because no businessman can afford to sell his products deliberately below his prime costs.

**Human Factor**

Certainly, these aspects are of much less significance for countries where industry is still developing. Here, neither the case of market saturation will occur, nor the question of joining an international economic organisation as a full member is likely to be considered in the near future.

In this case, however, the most important general objective should be seen in a highly economic production using the available facilities. It is evident that the IFC can contribute to solve this problem, too. The studies will be focussed less on the costs and the cost structure of the firms, but much rather on their output, since *the aim of a fast-developing economy* (which, primarily, has to meet the domestic demand) *is to produce as much as possible rather than to produce at the lowest possible costs.* Each firm should try to utilise the existing production facilities towards the maximum output that can be economically justified. *The most interesting key figure in this respect is productivity as quantitative relation of output and input.* Consequently, comparative studies should be based upon the measurement of productivity. Special importance should be given to comparisons of labour productivity, since human labour as production factor is still playing a less important role in countries under development than the capital factor. The task of such comparisons, however, may not be seen only in the confrontation of figures. They must be carried out in a way that permits analysis of all aspects of production. *The comparison results must lead to a more efficient use of the labour force, to a better use of the production facilities, and to check the appropriateness of the production methods used.* Therefore, useful comparison results should include not only dynamic figures, but also constitutional characteristics allowing to judge production aspects like product types and quantities, application of production factors, fabricating sequence, etc. If a similar data collection from numerous firms is at hand, it will be *relatively easy to find promising measures for rationalisation.* Only after the economy has progressed further in such a way that the domestic demand has been satisfied, it will make sense to carry out IFC with the aim to examine the cost structure in order to find loss sources and reduce the production cost generally.

The aim of comparative studies within the industry of nations under development should be neither to stabilise the market nor strengthen against competitors as in Europe, but to increase production generally using the present facilities.

## OFFICE AWAY FROM OFFICE

*Most offices worth the trouble of investigation are not, strictly speaking, offices at all, but suites . . .*

*Even in the large corporation buildings, however, evidence of individual taste increases as one nears the summit. The fifth vice-president gets Action Painting No. 5, but the chairman can have a collection of Chinese bronzes if he chooses . . .*

*Some residential architects are advocating the office-away-from-the-office—a room off the bedroom or den where a chap can go with his attache case and unfinished business.*—ELAINE KENDALL *in* **The New York Times Magazine.**

*In the competitive world in which we live, IFC would be highly profitable even to the best of firms. The problems and possibilities of IFC are examined in this paper which makes a vigorous plea for an organisation in India, on the model of the British Centre for IFC, to raise business efficiency.*

# *Problems & Possibilities of IFC in India

INDIA really provides a virgin field for exhaustive research in the field of inter-firm comparison of a purposive nature. A preliminary apprehension of the technique exists in different industries, though in different contexts. There is a growing realisation of the fact that organised inter-firm comparison in industry can open up a number of possibilities to improve the functional efficiency of units in different industries and in different areas.

At present, the problems in the organisation of such inter-firm comparisons are many, the primary one being the reluctance to disclose relevant information to an outside body. There is a great deal of hush hush about the intimate functional working of individual concerns, and a great deal of apprehension in regard to harassment by taxation and other authorities, besides the natural fear of competitors. However, some work in this behalf has been done by the textile industries research associations at Ahmedabad, Coimbatore, and Bombay. These comparisons, however, have not been conducted neither on a comprehensive scale, nor has there been a close analysis of the factors involved. They have been for the most part limited to the technical aspects of performance of the units; but a beginning has surely been made in a rather difficult line.

Purely financial comparisons on the basis of aggregate analysis have been made from the balance-sheet data of several companies belonging to the transport and equipment, vegetable oil, jute, paints and varnishes, and rubber industries by the *Economic Times*, Bombay. One limitation of these overall comparisons relating to these industries is that the reasons for the variations in the performance of particular units are not known, and all the significant ratios are not given. They are not thus very purposive

*This paper is based on a study conducted under the auspices of the Department of Business Management and Industrial Administration, Delhi University.

from the point of view of the concerned units. Still, as a start, the effort of *The Economic Times* is laudable.

### A Difficulty

Some of the managing agency houses in different parts of the country also make such comparisons on a limited scale. These comparisons are more related to particular aspects of performance of the units under them. A difficulty in regard to such comparisons by the managing agents is that if a number of units in the same industry does not come within the fold of the managing agents concerned, such comparisons are often wide off the mark. In any case, they are very general in character, and business managements have little use for them in practice. The other problem is that the firms under the managing agents, being subject to the same overall policy decisions, inter-firm comparisons may not reveal the shortfalls with regard to such policies themselves. The type of organisation necessary for making such comparisons effective is not present in these managing agency houses and as yet, such comparisons are restricted only to a preliminary study of performance.

**The Government of India has also to study the performance of individual firms in different connexions and has to juxtapose these performance-data in regard to price fixation, grant of protection to individual industries or units, subsidy in some industries, and licence for import or for expansion of the productive capacity.**

The Directorate of Technical Development in the Ministry of Economic and Defence Co-ordination, Government of India, also appraises financial and technical performances of the units in different industries under the Directorate. The data in regard to annual capacity, production, and average employment for the cement industry in India studied by the Department of Business Management and Industrial Administration, Delhi University, have been supplied by this Directorate. The data relate to individual units from which different ratios can be calculated showing the movements in regard to different factors of production *vis-a-vis* installed capacity. Before Independence, such data would not have been available at all. Apart from this, the Company Law Administration has prepared a number of basic papers and published studies in regard to different financial aspects of the performance of individual companies in India, belonging to different industries.

As regards public enterprises in India, the Estimates and Public Accounts Committees urged the Government of India some time back to furnish reports on the performance of these enterprises for discussion in Parliament. The Comptroller and Auditor-General of India had also been requested by the Public Accounts Committee to furnish audit reports on the commercial and industrial undertakings in India separately. So far, the Ministry of Finance has submitted two reports on the working of industrial and commercial public enterprises in India for discussion in Parliament. The Auditor-General has also published a separate audit report last year on the affairs of public enterprises, covering different aspects of accounting procedures and performance as also management policies. Though from the point of view of inter-firm comparison, these studies and reports would not appear complete, they do provide some basic information in regard to the performance of individual units on the basis of which studies can be made showing the different movements in different firms influencing their overall performance.

### Price-fixation

In regard to price-fixation by the Government in different industries, all aspects of performance of these units are kept in view. So far, the Tariff Commission has fixed 'fair' prices on the basis of what Marshall called 'a representative firm'. The method of working out this representative firm has not, however, been uniform in all industries. This representative firm generally indicates the representative conditions in regard to different aspects making for its total performance, and facilitates easy comparison with the

individual firms so that the untoward movements in regard to particular factors or facets of production, cost and finance, can be detected and the reasons therefor ascertained. As yet, exhaustive studies on the basis of the Tariff Commission's reports have not been made. It may be mentioned that though information about different elements of cost as provided in the Tariff Commission's reports would be found useful for comparison, data in this regard are not complete.

In fact, many of the Government reports would acquire a purposive character only if a conscious effort was made to work out data relevant for analysis. It is, however, to be appreciated that in many of the reports of the Tariff Commission and the Wage Boards in different industries including cotton textiles, cement, and sugar, the terms of reference were necessarily narrow, and working out details would have been rather out of place. Still, the Cost Accounts Branch of the Finance Ministry prepared detailed cost studies of different units in different industries which could possibly prove purposive in different contexts.

Even for the purpose of the Finance Ministry's reports on the working of public enterprises in this country, as suggested by the Estimates and Public Accounts Committees, working out details in respect of cost, productivity and performance would prove much more useful than they are now. As a matter of fact, the present reports on the working of public enterprises do not afford a closer view of their working on the basis of which comparable performance could be established or loop-holes in their functioning detected, and proper corrective action taken by Government and the Estimates Committee.

*. . . many of the Government reports would acquire a purposive character only if a conscious effort was made to work out data relevant for analysis. . .*

In this respect, one can venture to suggest that even the Estimates Committee reports on different public enterprises do not afford a uniform basis of appraisal of the performance of these units in their different aspects. One would wish that all reports by the Estimates Committee were on the lines of that on the National Newsprint and Paper Mills (Nepanagar) which provides, in a short compass, a great deal of extremely useful information about different aspects of its functioning. Preparation of standard methodology of inquiry would, in the circumstances, seem indicated.

Certain other steps by the Government of India may also be necessary. To make effective comparison in the performance of firms belonging to the same industry or different industries, units belonging to the same size-groups or different size-groups, and units situated in different areas of the country, reporting of detailed performance in different respects should be made compulsory in regard to all private and public sector companies.

In this connexion, mention may be made of the need to show the ratios, and in some cases, the performance ratios in the annual reports of companies. The financial and other relevant ratios may be shown in a separate statement attached to the annual reports. The method of computation of these ratios may be standardised. Thus, the annual reports may be made really expressive of some of the aspects of the concerns' performance under a standard terminology.

The Company Law Administration has already standardised the terminology to

be used in the annual accounts and the breakdown of details under the Indian company legislation. In addition, statement of cost by companies, total available man-hours and actual man-hours worked in respect of different products, and employment of different categories may also be given in separate appendices for the purpose of appraisal of performance on the basis of these details. Even now, many companies do give such figures. From the basic figures thus furnished, data for inter-firm comparison can be computed for different purposes.

While it is rather difficult for Government departments to marshal the required information, and to analyse it for knowing the trends over a period of time, the problem does not pose much difficulty for the managing agency houses and the textiles industries' research associations or trade or industrial associations, though it does involve a shifting of emphasis from merely financial reporting in the annual accounts to performance reporting, including finance, cost and productivity.

## Expert Cells Needed

To all these organisations, however, the problem of collecting and organising, for analysis, all relevant information will involve a lot of effort, requiring the establishment of expert cells to undertake the task. An organisation on the lines of the British Centre for Inter-firm Comparison may, therefore, be established to handle this job, and to render tailor-made advices to the management of the respective concerns. The worth of such a body will not be minimised even when the annual reports contain all the relevant ratios—for the main task of such a body would then be to interpret the data and to trace the reasons for *undesirable* movements; to assist in preparation by each unit of an effective, realistic, budgetary control system and fixation of standards; to assess the existing systems of communication, and report on the variances from budgets and the standards; to gauge the organisational aspects thoroughly; and to help improve practices and procedures in all matters of concern to these units.

## "Realities Hidden"

Needless to emphasise in this context that even with the best analysis of the presently available financial data, only an incomplete picture emerges from annual reports as far as the performance of individual units is concerned. The case laws on companies are replete with instances as to how the realities are hidden from the public in the annual accounts. The idea of 'secret reserves' in company assets is itself taken as a shady affair arising out of under-valuation of assets or over-valuation of the liabilities. As a matter of fact, the annual accounts are looked at with some suspicion by many, as disclosing much less than they are supposed to do.

Organised on the lines indicated above, such a centre for inter-firm comparison may also assist the Government in the respective administrative departments, the Planning Commission, and, more than all others, the individual units in different industries and different sectors, in taking the necessary and suitable policy measures to improve their functional standards in the ways that the best units in these respective lines may be functioning.

Some of the policy measures taken by the Government with respect to replacement of machinery by imported machines, grant of import licences, installation of production capacity, employment, taxation and mobilisation of resources from one sector to another will be on a much surer ground when these policies are based on an awareness of the actual conditions pertaining to these industries and units.

*The fact that IFC—considered as the main technique of Management Accountancy—has still very little application in India's industrial set-up is an indication "not of backwardness, but of the lack of competition among the various industries..."*

N Sen

# Inter-firm Financial Ratios & Comparison

PROGRESSIVE management the world over has always asked itself the question—"How is my company performing in comparison to that of others?" The published trading and profit-and-loss accounts, and the balance-sheets along with the annual reports provide scanty data for purposeful study and assessment of the performance of a company. The figures available from these reports just indicate, in a general way, the profitability, stability, solvency and growth of an organisation, but they do not throw light on whether a company has really made the optimum use of all the available resources in men, materials, etc.

The answer, however, depends fully on the availability of more detailed data, and the possibility of comparison with the competitive units in the same line of manufacture. It is the IFC that provides the management with a vivid comparative picture of how its operating performance, financial results, and product-cost structure compare with those of other firms of similar size, nature, industry or trade.

IFC involves the process of bringing together a number of identical firms and collecting their business figures and statistics through a neutral organisation in which the participating firms repose their full confidence. The firms are carefully screened and put into different size-groups, their figures examined from a close range, comparative performance of each firm of the group drawn up showing the strong and weak points of its operations, and finally the reports are published without disclosing their identity, but using only codes and expressed in terms of certain well-established

ratios and percentages. The figures under comparison may relate to the financial results, viz., the position of assets, liabilities, profit, capital employed, etc., expressed in terms of financial ratios; cost structure of the products, viz., material cost, labour cost, overhead, works cost, office and administrative cost, selling and distributive cost, etc., expressed in terms of cost ratios; physical and operational performance such as output or operation per man-hour, expressed in terms of productivity ratios and percentages; and so on. The main objective is to compare each and every important element of production—marketing, administration, and finance—with others for amelioration and improvement. Such a detailed information is equally profitable for large, medium and small concerns, and even for the well-managed modern units in the competitive market, for, however best a firm may be, it cannot be the best in all respects.

The various complex processes of IFC are generally carried out by professional organisations, trade associations, and similar other bodies manned by experts, such as chartered and cost accountants, economists, bankers, and financial analysts, who are absolutely free from any vested interests whatsoever. They are only meant for rendering fair and impartial service to the member firms whose data are processed by them in the strictest secrecy and confidence, and tabulated on a uniform pattern and procedure. A clear-cut set of instructions are given to the participating firms to maintain a uniform accounting and costing system, uniform procedure for recording, calculating and analysing data, and for filling in the report forms in the prescribed pro forma giving complete information so that they can be easily comparable.

The task of IFC is not so easy that it can be fulfilled without any difficulty. In fact, the major hurdles to be crossed before it is introduced are:

a. Assurance to the participating firms of the full anonymity and confidential treatment of all information, figures, and data so voluntarily supplied to the common pool. The main obstacle is to overcome the traditional reluctance of the managements to part with data which they consider most confidential, and which may injure the interests of the units if they are made public.

b. Setting up of neutral organisations for the purpose with no vested interests at all.

c. Manning of these organisations by experts in the different fields of management.

d. Attraction of a good number of companies in the same industry or trade so as to allow the IFC to operate on as wide a base as possible.

**IFC Technique**

The fundamental technique of IFC is fully based on the ratio analysis of some important figures which are of special significance to management. In particular, it provides for a breakdown of the entire information supplied by the member companies into various sections which are expressed in terms of some well-established ratios and then compared with the corresponding ratios of other participants in the IFC scheme. While introducing the IFC in the UK about a decade back, the British Centre for Inter-firm Comparison developed the Pyramid Structure of Ratios for manufacturing industries, giving primary ratios and a few supporting ratios to indicate the general profitability and stability of a concern, and a few general and explanatory ratios supporting the breakdown of cost factors to narrow down systematically the possible major reasons for differences in the overall success of a unit. The diagram has proved to be of immense help to industrialists. The important financial ratios —more or less the same as those in the Pyramid diagram—so far developed for higher managerial control are tabulated in the table on the next page (the figures given are only by way of an example of the pattern of comparison for IFC):

## Inter-firm Ratios and Comparison

| | Name of ratio | Basis | Unit | Interquartile range of results of about 100 firms of similar size and products | Years of study 1962 | 1963 |
|---|---|---|---|---|---|---|
| 1. | Capital employed ratio | Net profit on total capital employed | Per cent | Upper quartile | 8.50 | 9.10 |
| | | | | Median | 6.20 | 6.50 |
| | | | | Lower quartile | 4.15 | 4.60 |
| 2. | Operating ratio or net profit ratio | Net profit on net sales | Per cent | Upper quartile | 5.81 | 6.05 |
| | | | | Median | 4.17 | 4.42 |
| | | | | Lower quartile | 2.03 | 2.48 |
| 3. | Return on invested capital ratio | Net profit on tangible net worth | Per cent | Upper quartile | 13.95 | 14.65 |
| | | | | Median | 9.34 | 9.82 |
| | | | | Lower quartile | 5.18 | 5.72 |
| 4. | Turnover ratio | Net sales to total capital employed (total assets) | Times | Upper quartile | 3.50 | 3.80 |
| | | | | Median | 2.20 | 2.60 |
| | | | | Lower quartile | 1.50 | 1.90 |
| 5. | Current ratio or working capital ratio | Current assets to current liabilities | Times | Upper quartile | 3.97 | 4.00 |
| | | | | Median | 2.82 | 2.90 |
| | | | | Lower quartile | 2.15 | 2.25 |
| 6. | Ratio of net profit on net working capital | Net profit on net working capital | Per cent | Upper quartile | 32.90 | 33.00 |
| | | | | Median | 18.10 | 18.50 |
| | | | | Lower quartile | 10.31 | 10.50 |
| 7. | Ratio of net sales to tangible net worth | Net sales to tangible net worth | Times | Upper quartile | 3.43 | 3.80 |
| | | | | Median | 2.48 | 2.55 |
| | | | | Lower quartile | 1.82 | 2.05 |
| 8. | Ratio of net sales to net working capital | Net sales to net working capital | Times | Upper quartile | 7.36 | 7.50 |
| | | | | Median | 4.98 | 5.10 |
| | | | | Lower quartile | 3.31 | 3.50 |
| 9. | Inventory ratio | Net sales to average inventory | Times | Upper quartile | 11.90 | 12.00 |
| | | | | Median | 8.10 | 8.40 |
| | | | | Lower quartile | 5.50 | 5.70 |
| 10. | Average collection period | Total Sy. Drs. & B/Rs to sales × 365 days | Days | Upper quartile | 34.00 | 32.00 |
| | | | | Median | 42.00 | 40.00 |
| | | | | Lower quartile | 51.00 | 48.00 |
| 11. | Fixed capital utilisation ratio | Fixed assets to tangible net worth | Per cent | Upper quartile | 32.20 | 32.00 |
| | | | | Median | 46.30 | 45.00 |
| | | | | Lower quartile | 60.50 | 58.00 |
| 12. | Borrowed-owned capital ratio | Current debts to tangible net worth | Per cent | Upper quartile | 18.60 | 17.50 |
| | | | | Median | 26.70 | 25.60 |
| | | | | Lower quartile | 39.20 | 38.10 |
| 13. | Ratio of total debts to tangible net worth | Total liabilities to tangible net worth | Per cent | Upper quartile | 39.40 | 38.05 |
| | | | | Median | 51.90 | 50.10 |
| | | | | Lower quartile | 76.10 | 74.15 |
| 14. | Ratio of inventory to net working capital | Inventory to net working capital | Per cent | Upper quartile | 33.50 | 32.00 |
| | | | | Median | 55.90 | 54.00 |
| | | | | Lower quartile | 81.20 | 79.00 |
| 15. | Ratio of current liabilities to inventory | Current debts to average inventory | Per cent | Upper quartile | 67.10 | 65.20 |
| | | | | Median | 98.50 | 95.05 |
| | | | | Lower quartile | 177.70 | 172.00 |

Besides these major financial ratios, there are a good number of supplementary ratios which are in use both for managerial control and for IFC, viz., earning ratio (gross earnings to net sales), fixed property ratio (total net sales to tangible fixed assets), acid test ratio (liquid assets to current liabilities), ratios of fixed assets to capital, net sales to closing stock, production cost to sales, office and administrative cost to sales, selling and distributive cost to sales, and the like. For all these ratios there are some predetermined standards in relation to one and the other laid down on the basis of sound commercial principles and prudent managerial practices—such as a business is considered financially solvent and sound if it maintains a current ratio of 2:1, and so on. They are, therefore, used by the management both for internal business regulations and external financial comparison. To put it more precisely, they are used by the management for a comparative study of their own figures over a period of three to four years as also for the purpose of comparison with similar other firms to disclose the trend of progress on the one hand, and the strong and weak points of the state of affairs of the company on the other.

*The fact that IFC has still very little application in our industrial set-up is an indication not of backwardness, but of the lack of competition among the various industries. Indian firms now enjoy a sellers' or sheltered market, but the time is not very far when it would turn into a buyers' market, and they will have to face a serious competition among themselves.*

In the face of such a marketing situation, there would be no other alternative for them than to be efficient and competitive, producing quality goods at the lowest possible cost. They would also be able to withstand the competition in the international market which would enable them to boost their exports to earn foreign exchange, so badly needed for India's economic development. Considerable efforts are being made by leading professional associations to offer the invaluable benefits of IFC to the Indian trade and industries in the very near future. The sooner it is introduced in our management process the better.

# *Cutting Labour Costs in Shipbuilding*

**The British Ship Research Association (BSRA), reports *Good Business*, is working on a programme of research into all aspects related to productivity and cost reduction. They and several shipyards have made a detailed study of the basic requirements for planning and production control, using a system of network analysis.**

**The study is expected to make it possible to advise the shipbuilding industry on the form and value of network systems as well as provide standard networks, activity lists and job lists for issue to foremen. These job lists will require only minor alterations to suit particular requirements, thus eliminating much of the preliminary work.**

**Also under investigation by BSRA are new and improved costing systems, both for the building of the hull and for outfitting. It is recognised that day-to-day management control depends on detailed breakdowns of all costs being available quickly, i.e., within 10 to 14 days at the outside.**

*In recent years greater stress has come to be laid on railways' operational aspects, and here inter-railway comparisons are becoming an important means of promoting operational efficiency, stimulating the adoption of improved methods, technique and equipment, and weeding out wasteful practices.*

LA Natesan

# Aspects of IFC on Railways

It is not probably quite so well-known that Railways have used inter-firm comparisons almost from their very commencement. Starting in most cases as private undertakings allowed to operate under special charter or parliamentary statute, a large amount of public and private savings went into their financing. The craze for railway construction affected the pioneering countries, and the failure of some of the early companies causing losses to investors, led early to State or parliamentary legislation. The trend towards sound management has been a slow process.

There are two principal forms of inter-railway comparisons—financial and operational. Under the first, it is usual to consider the gross earning power of railway capital. This is expressed by the percentage of gross earnings on the railway capital. It is a fair criterion of the investment. If the gross percentage is high, it indicates the capacity of the capital employed to produce a large amount of earnings. But as the conditions of no two railways are alike, there are bound to be differences.

A large gross percentage of earnings on capital may not always indicate a financially favourable position. This happens when the expenditure incurred to produce the gross earnings is high. The proportion of the earnings that is represented by the expenditure is thus of special significance. The ratio of working expenses to gross earnings—called 'operating ratio'—is the most common financial index of comparison for railways. The higher the ratio, the less the proportion of the earnings that would be available to meet the expenses involved, besides the direct expenses such as service of capital, and payment of dividend. If the ratio indicates a decrease, it would suggest improved financial results, and consequently the demand from the investing public for the shares of the railway in this

category is likely to increase, thereby inducing a rise in the quotations. If the ratio shows an increase, the reactions tend to be in the reverse direction.

Even the operating ratio may not be a completely reliable enough index. For, if the capital expenditure is high, the net return even on a low operating ratio may prove insufficient to pay a reasonable rate of profit on the investment. This may be the result of differences in construction cost. The extent of variations in the cost of construction per mile of line is so great that the amount required to pay an adequate return on the capital investment of the railway will also correspondingly vary. Obviously, an operating ratio which may exhibit a satisfactory relationship between gross earnings and working expenses may prove a poor judge of performance from the point of view of the total investment.

These shortcomings in the indices of inter-railway comparisons may be overcome by taking the net earnings and expressing it as a percentage of the capital investment. Thus what is sought to be ascertained from the productivity of capital and the operating ratio is expressed more satisfactorily by the percentage of the net earnings to the capital investment. The inter-railway comparisons from this point of view may be illustrated with reference to the latest figures of the Indian Railways for 1962-63. The units of comparison already dealt with are also added and the points made in connexion therewith are borne out by the following figures:

*. . . where conditions differ, as under State management, the financial results of working may cease to provide a good enough index of efficiency of management. . .*

The ratios of net earnings to capital on the eight railway systems disclose considerable differences. The Central, South-Eastern and Western indicate more than 10 per cent. In the descending order we next have the Eastern, Northern and the Southern. The North-Eastern had less than one per cent and the North-Eastern Frontier –3.97 per cent. The financially more satisfactory performance of the first group, and to a much lesser extent of the next group referred to above, accounted for the final results of the year.

The shortcomings of the percentages of gross earnings to capital and the operating ratio are clearly brought out in the table. The percentages of the Eastern, Northern, North-Eastern, Southern, and South-Eastern Railways stood between 31 and 33. But the ratio of net earnings to capital has been less than one per cent on the North-Eastern, while on the others it ranged

**(Inc. worked lines)**

| Railway | Percentage of gross earnings to capital | Operating ratio | Percentage of net earnings to capital |
|---|---|---|---|
| Central | 27.36 | 67.04 | 12.05 |
| Eastern | 31.97 | 72.26 | 8.68 |
| Northern | 32.77 | 76.15 | 6.67 |
| North-Eastern | 32.12 | 96.93 | 0.95 |
| North-Eastern Frontier | 17.01 | 123.36 | –3.97 |
| Southern | 31.07 | 86.63 | 4.15 |
| South-Eastern | 31.40 | 62.74 | 11.70 |
| Western | 38.98 | 74.10 | 10.09 |

from 4.15 on the Southern to 11.70 on the South-Eastern.

That a lower percentage of gross earnings to capital need not denote a lower ratio of net earnings to capital is indicated by the figures of the Central and Western Railways. The former had a gross earnings ratio of 27.36 and a net earnings ratio of 12.05, and the latter a gross earnings ratio of 38.98 and a net earnings ratio of 10.09.

These features stress the importance of avoiding undue emphasis on any one particular unit of inter-railway comparison.

**Financial comparisons are quite valuable under conditions of free enterprise responding to the incentive of the profit motive. Even so, the efficiency of transportation as such needs to be watched. Inter-railway comparisons are indeed of great value in this case.**

Where conditions differ, as under State management, the financial results of working may cease to provide a good enough index of efficiency of management. This happens generally when the policy of the State is influenced by social considerations which may tend to inhibit maximisation of returns on the investment. The appraisal of railway performance in such cases has to be based on the physical factors of operation, the test of productivity being based on the volume of transportation related to labour and materials consumed.

In making inter-railway comparisons, what is usually done is to select averages related to certain significant units of working, throwing light on particular phases of railway operation. One of these is based on the train-kilometrage (mileage) as the unit of railway operations. Quite a number of aspects of railway working are considered from this point of view. Ton kms. afford an important basis for a number of items of comparative data. Another is the average use of the vehicles composing the train. There is next the speed of transportation. Fuel consumption is yet another. The serviceability of the equipment, reflecting the effect of proper maintenance, and indicating the percentage of the equipment available for work, apart

from that under or awaiting repairs, is still another important basis of comparison. The accident record provides a further subject for inter-railway comparisons.

The utility of inter-railway comparisons from these points of view may be illustrated with reference to the train kilometer (mile) analysis. The train kilometer represents the movement of the train over the distance of a kilometer. The train kilometers operated on the Indian Railways during 1962-63 amounted to 395 million, of which 253 million were operated on the broad gauge lines which represent for the most important part of the national network. Only a small part of the train kilometrage on the broad gauge is under electrical and diesel traction—12 million and 10 million respectively—amounting to about 10 per cent of the total. A further breakdown of the figures indicates the kilometrage under passenger and goods services, mixed services, and departmental traffic. The train kilometrage is commonly taken for working out averages of different phases of working. The wide range of its applicability may be seen from the following table showing the unit costs for certain select aspects of working:

**Train kilometer cost against select units of expenditure in Indian Railways (1962-63)**

| | Broad gauge (Figures in paise) | | | | | |
|---|---|---|---|---|---|---|
| | C | E | N | S | SE | W |
| **Maintenance and Supply of Locomotive Power** | | | | | | |
| General administration | 3.64 | 4.97 | 4.79 | 6.70 | 5.65 | 2.93 |
| Locomotive running repairs (steam) | 40.29 | 61.48 | 33.99 | 33.18 | 45.30 | 46.30 |
| Locomotive workshop repairs | 31.61 | 40.13 | 27.91 | 50.35 | 49.56 | 31.02 |
| Equipment | 6.05 | 13.90 | 4.19 | 6.44 | 10.98 | 5.10 |
| Running staff | 63.85 | 96.05 | 47.15 | 58.01 | 81.80 | 53.47 |
| Fuel | 266.56 | 186.25 | 200.54 | 289.47 | 221.93 | 314.84 |
| Water, oil, tallow, etc. | 17.92 | 13.98 | 7.76 | 10.02 | 21.24 | 15.92 |
| Dearness allowance | 8.28 | 9.45 | 6.90 | 7.10 | 11.03 | 6.97 |
| **Maintenance of Carriage and Wagons** | | | | | | |
| General administration | 1.69 | 2.44 | 1.39 | 1.20 | 1.70 | 1.51 |
| Equipment | 3.02 | 4.83 | 3.94 | 2.35 | 1.88 | 5.15 |
| Operation | 18.33 | 33.98 | 17.86 | 12.93 | 11.63 | 13.30 |
| **Traffic Department** | | | | | | |
| General administration | 9.61 | 22.61 | 11.04 | 12.15 | 30.03 | 10.38 |
| Station staff | 65.17 | 82.18 | 77.88 | 78.87 | 76.62 | 77.91 |
| Train staff, running and overtime | 10.46 | 16.15 | 10.56 | 13.00 | 18.47 | 9.12 |
| General operating staff | 3.83 | 7.17 | 4.58 | 5.33 | 5.00 | 6.05 |
| Travelling and other allowances | 8.05 | 14.01 | 10.43 | 9.86 | 8.25 | 11.82 |
| Clothing | 1.41 | 3.38 | 4.12 | 0.91 | 2.31 | 1.98 |
| Total operating expenditure | 148.72 | 193.54 | 151.90 | 180.98 | 202.48 | 165.23 |
| **General Departments** | 68.55 | 105.51 | 78.50 | 85.62 | 96.62 | 78.22 |

The most striking feature is the extent of variations against the same unit of performance from railway to railway. The general administration cost per train km. of the Mechanical Department was lowest on the Western Railway at 2.93 paise, and the highest on the Southern Railway at 6.70 paise. Steam locomotive running repairs cost was 33 paise on the Southern, and 61.48 paise on the Eastern. On carriage and wagons, the picture is similar. The unit train km. cost ranges from 1.88 paise on the South-Eastern to 5.15 paise on the Western Railway. The expenses connected with the

Traffic Department stood at the lowest on the Northern Railway and the highest on the South-Eastern Railway. The cost of the General Departments, one would expect, might exhibit few such differences, but the train km. average varied from 78.22 paise on the Western Railway to 105.51 paise on the Eastern.

**Differences**

So great are the differences of unit train km. costs from railway to railway that one might well despair of finding any particular use for these statistics. These reflect the conditions of working which cannot be, and are not, the same on all the railways. On some, goods trains may be more than passenger trains; on some others the proportions might be different; in collieries' areas the pilot engines to work the empties to the collieries and hauling the loaded wagons are a special factor affecting the engine and vehicles kilometrage and cost; the gradients of sections have a bearing on fuel and other engine costs; the salinity of water affects locomotive working. In the face of these bewildering complexity of conditions, it is not possible to expect any uniformity. Where, however, the conditions are similar, substantial differences in train km. costs shown by inter-railway comparisons disclose possible leakage of money, and the need for better watch on operations and expense. If a high-cost railway is observed to bring down expense under a particular unit of operation, and this is to be ascribed to a change of technique, the knowledge of this is of value to other railways which may explore possibilities of reducing expenditure by the adoption of a similar practice. The difficulties of steam locomotive operation in areas of water scarcity can be circumvented by diesel locomotives, and thereby cost can be reduced. International inter-railway comparisons have been of great value in disclosing such possibilities as these.

It should be understood that unit train km. costs are only one of the many ways of comparing the performance of one railway with another.

The most versatile and valuable method of analysis and comparison is the rating of performance based on the ton km.—the unit representing the movement of a ton of goods over one km. As transportation consists essentially of carriage of a certain quantity of weight over a given distance, the ton km. has been considered a more satisfactory unit measure than any other. A remarkably large number of comparative indices are derived from the ton km. On the financial side, there are the earnings and expenditure and net earnings per ton km. On the operating side, there are the average number of tons carried per train, the ton kms. per wagon, average distance, kms., carried per ton of goods, etc. There are likely to be differences between railway and railway, but these must have adequate reasons. One of the largest items of expense in railway working is under fuel, and the unit cost is worked out on the basis of the amount of fuel consumed per 1,000 gross ton kms. This is worked out separately for passenger and goods services, because of their special characteristics from the point of view of transportation.

**Recent Trend**

Railway accidents have provided another important aspect of inter-railway comparisons. Most accidents are traceable to the failure of the human element and of an avoidable character. The number of pure accidents which fall into the category of the unavoidable is comparatively few, and nothing can be done about them.

**Inter-railway comparisons have provided an important instrument of efficient management and control. From financial comparisons the sounder and more efficient undertakings have been distinguished from the others, thus encouraging investment in the former. In recent years greater stress has come to be laid on the operational aspects, and here inter-railway comparisons are**

**becoming an important means of promoting operational efficiency, stimulating the adoption of improved methods, techniques and equipments, and weeding out wasteful practices.**

# APPENDIX

## A Historical Note

Though Railways were mostly private undertakings, to begin with, the following comparative figures given by Jeans (*Railway Problems*, 1887, p. 93) in respect of the railways of a number of countries in 1883 provide an example of the use of the inter-railway comparisons so long ago, as well as of the differences between railway and railway.

**Gross earnings power of Railways**

| Railways of | Percentage of gross receipts on capital invested |
|---|---|
| Germany | 10.4 |
| France | 9.8 |
| Belgium | 9.4 |
| Holland | 7.6 |
| Austria-Hungary | 8.7 |
| Italy | 7.2 |
| Switzerland | 8.1 |
| Norway | 5.4 |
| Sweden | 17.7 |
| Denmark | 9.5 |
| Canada | 8.0 |
| USA | 10.9 |
| UK | 8.8 |

The shares, stocks or bonds of most railway companies were quoted in the share markets and the ease of transferability conduced to wide change in ownership, which, in many cases, extended beyond the national boundaries of the country to which the railway belonged. Thus, British investment in railway construction in the British Empire and outside had much to do with this development. The comparative attractiveness of the railway stocks and shares from week to week from the point of view of the investing public was affected by the weekly or periodical statistics of earnings, expenses and net earnings. These statistics are expected to foreshadow the final results of working of the railway during the year. This picture, which may look promising at the beginning of the financial year, may prove to be mistaken in the light of any worsening in the business during the later months of the year. It may also happen that the operation of the undertaking might be far from satisfactory, and may ultimately lead to financial bankruptcy. Therefore, a watch on the transportation performance becomes no less important to the public interested in the investment than to the management. Inter-railway comparisons will disclose whether a particular railway is registering better performance and promising improved financial results. If it does, the share quotations may be expected to reflect this and, what is more, it may be able to command better credit from bankers and financing institutions.

These remarks apply to private railway companies. Where railways are operated by the State—as is the case in most countries today—the position in essence is not different, as a comparative assessment of improved operation and results has to be made on the basis of inter-railway comparisons.

Jeans also gives the following figures of operating ratios in certain countries in 1883 (*Railway Problems*, 1887, p. 100):

| Railways of | Operating ratio |
|---|---|
| Brazil | 58.50 |
| Canada | 76.00 |
| Algeria | 75.90 |
| British India | 48.50 |
| New South Wales | 54.00 |
| New Zealand | 68.00 |
| Victoria | 67.00 |
| Queensland | 49.00 |

From these statistics, the investor may draw inferences as to the comparative profitability of different railways. The variations in the property investment per mile of line in 1925 have been brought out in the comparative statistics for certain countries shown below (*Government Ownership and Operation of Railroads*, WMW Splawn, 1928):

| Railways of | | $ |
|---|---|---|
| Sweden | | 48,933 |
| Norway | | 81,496 |
| Denmark | | 73,884 |
| Belgium (average rate of exchange) | | 43,136 |
| Switzerland | | 183,432 |
| France (State and Private) | | 53,211/42,772 |
| Germany | | 187,095 |
| Japan (State system) | | 169,029 |
| Argentina (Private) | | 68,502 |
| Chile | | 128,199 |
| Great Britain | | 279,656 |
| South Africa | | 50,835 |
| Egypt | | 65,944 |
| INDIA | | 63,428 |
| Australia: | New South Wales | 95,456 |
| | Victoria | 74,268 |
| | Queensland | 44,090 |
| | South Australia | 55,259 |
| | West Australia | 28,868 |
| | Australia | 34,547 |
| | Tasmania | 46,402 |
| New Zealand | | 75,650 |
| Canada: | Canadian National | 117,640 |
| | Canadian Pacific | 52,777 |

*While one cement factory requires less than five man-hours to produce a ton of cement, another needs more than 20. This paper, based on NPC Study Team Survey, answers why this situation obtains, and indicates what IFC could do to telescope the differences materially and help attain increased output.*

# Productivity Comparison in Cement Industry

CEMENT today plays a very vital role in development projects and other nation-building activities. Though the first cement factory in India (capacity 10,000 tonnes) was set up in Madras six decades back, the industry received a great fillip only after Independence. There are now 34 factories in different parts of the country, with an installed capacity of 10 million tonnes. The per capita consumption is as low as 18 kgs. compared to Switzerland (386 kgs.), Germany (295), USA (272), France (204), UK (204), and Italy (191). Despite the increase in the number of factories, the demand for cement in India has outstripped the supply excepting for a brief period during 1958-59.

Man-hours required per tonne of cement produced provide a suitable basis for comparison of the level of productivity in the different cement plants. The application of the method involves calculation of the labour time requirements. Productivity may be expressed as labour time required per unit output or as its reciprocal, output per unit labour time. The former is more widely applied for measurement of productivity, because the unit labour requirement, in terms of time, is readily measurable and it is universally applicable to all plants, processes, and industries. It can be directly added and subtracted, but not the output data in its different physical quantities. Table I shows the man-hours required per tonne of cement produced in the various cement factories. The quarry labour is not taken into account in calculating the man-hours. The sales organisations of companies are also excluded from these calculations. The principle generally followed is that the number of workers, direct and indirect, from the receipt of raw materials to the despatch of finished

products, is taken into consideration. The managerial personnel are also included.

Great disparity in productivity exists in the different cement factories. The man-hours per tonne varies from 4.47 (Saurashtra) to 20.12 (Banmore), which shows that it has not been possible to adopt the latest techniques and mechanisation in the latter type of factories, perhaps owing to the age of the plant, its design, lay-out, etc. This also proves that there is vast scope for improvement in the level of productivity in our cement industry. Better plant lay-out, better methods of material handling, preventive maintenance, statistical quality control, and incentive wages are some of the techniques which could be adopted with advantage to increase productivity.

The productivity of the Indian worker compared with his counterpart in the Western countries is depressingly low. The man-hours per tonne of cement produced in various countries of the world are shown in Table II:

TABLE I

| Name of cement plant | Man-hours per tonne |
|---|---|
| Banmore | 20.12 |
| Bhupendra | 6.43 |
| Chaibasa | 9.50 |
| Khalari | 19.25 |
| Kistna | 8.78 |
| Kymore | 9.15 |
| Lakhori | 11.26 |
| Madukkarai | 7.73 |
| Mancherial | 8.65 |
| Shahabad | 7.33 |
| Sindri | 5.87 |
| Sevalia | 10.90 |
| Andhra | 10.50 |
| Ashoka | 6.47 |
| Bagalkot | 9.76 |
| Digvijay | 10.00 |
| Dalmia (Bharat) | 8.60 |
| India | 6.23 |
| Kalyanpur | 11.50 |
| Madras | 19.63 |
| Mysore Iron and Steel | 9.50 |
| Orissa | 9.52 |
| Ramakrishna | 7.69 |
| Rohtas Industries | 5.53 |
| Satna | 8.00 |
| Saurashtra | 4.47 |
| Sone Valley | 17.90 |
| Travancore | 15.00 |
| UP Government | 10.01 |
| Average | 10.18 |

TABLE II

| Country | Man-hours per tonne |
|---|---|
| USA | 1.50 |
| Belgium | 1.51 |
| Japan | 1.75 |
| UK | 1.82 |
| Germany | 2.20 |
| INDIA | 10.18 |

The man-hours per tonne of cement produced are 10.18 in India. It should be noted that this is nowhere near the corresponding figures of the UK, the USA, and Japan where it is near about 2. It is interesting to examine how such a great disparity exists in the man-hours per tonne of cement. Our machinery for cement production is in no way inferior to the machinery installed in other countries. But our workers labour under a peculiar conventional disability. A person doing a particular job will attend to that job alone, even if he has plenty of spare time. Thus a man engaged in oiling will not do the cleaning, the cleaner will not do the oiling, and a machineman will not do either of these jobs. The principle of the division of labour is thus carried to a ridiculous extreme, with the result that there are many persons unnecessarily hanging around each piece of machinery.

Higher productivity might, in the short run, mean some redundancy, especially in the over-staffed older plants. This can happen in India, just as it has sometimes happened in the UK under the impact of automation. Some cement factories have entered into agreements with their labour that natural wastage of labour due to deaths and retirements will not be replaced. Such factories are able to get rid of the redundant labour without resorting to retrenchment. It is recommended that such a procedure should be adopted in other factories also, and that they should thus, progressively reduce their man-hours to a reasonable level.

*Delhi University's Department of Business Management and Industrial Administration, which has done valuable work in the field of IFC studies, presents here some hitherto unpublished data relating to the "rather indifferent trend" in productivity in the cement industry. The benefits and scope of IFC are referred to first in the paper, which assesses the measurement of productivity of 34 cement factories for the years 1959-62, and indicates the ways to improve productivity.*

# Twelve Ways to Improve Productivity

INTER-FIRM COMPARISON has evolved from experience primarily as a management tool to increase the functional efficiency of concerns. Basically, the method implies juxtaposition of information pertaining to different firms in industry or business to analyse the deviations in the performance of particular concerns from the general run of these firms. Such comparison has been effectively made among plants in a multi-unit concern to know which plant is working more or less efficiently than others, and why. Inter-industry comparisons are also similarly made to find out the inter-related character of investment in various sectors when rapid economic development is envisaged.

Inter-firm comparisons may cater for the demands of different interests like the Government, the shareholders, the debenture holders, the investors in general, bankers and financiers, management at different levels, workers, and research institutions. The type of comparisons made and the degree of emphasis on different factors would be naturally different in different cases, in regard to the discernment of details of movements in particular segments in the performance-zodiac of industry and business.

It is primarily for the management that inter-firm comparison has been evolved as a technique in industry. From the point of view of the working of a particular firm, it is at times impossible to know what is happening outside, and why. Inter-firm comparison, by an expert outside body, affords suitable knowledge, satisfying to a large extent this need for management to know *what* the competitors in the line are doing, and *how*.

To the workers and their unions, inter-firm comparisons help to give an idea of the relative paying capacity of the firms in question, in terms of wages and the wage-scales, production bonus, increasing the possibility of employment, etc., as well as the relative efficiency of the workers in particular

firms *vis-a-vis* other firms in the same industry, the same area, or the same class of workers.

**Factors of Production**

Comparison among firms may be in a narrow range involving detailed study of particular factors like finance, cost, productivity, or management performance. Each of these factors can be treated as a separate element on which focus is made from the angle of different facts making for it. In fact, cost or productivity studies have been made separately for firms participating in different programmes of such comparison. Such separate studies, however, are not so very relevant because from the point of view of the organic functioning of a unit, there is a close relationship among these factors, and they act and react on each other intimately. Thus seeking to arrest the untoward movements in one factor may result in tracking down the movements of other factors, though apparently unrelated to the question immediately at issue. *This inter-relationship among factors of production has to be adequately underlined in inter-firm comparisons.*

Inter-firm productivity comparison, viewed in terms of production per section, department, plant or firm basis, may be based on how the firm is defined in particular cases. In comparing the total productivity of individual firms, aggregation of the sectional, departmental or plant productivity may be involved. This aggregation may relate to adding up service-department-performance to production-department-performance. This is, of course, a problem which every concern faces in measuring its total productivity. In comparisons among firms, this problem is also present, and has to be properly accounted for.

Data for productivity in the Indian cement industry are discussed here on the basis of each factory. This factory basis of inter-firm comparison is not inconsistent in view of the fact that as a productive unit, the factory is a more consistent *unit* than the company, which may consist of several factories engaged in the manufacture of different products. As a matter of fact, the ACC has 14 factories under its control. The cost figures in the Tariff Commission's reports naturally aggregate the total production of all these factories under the ACC *vis-a-vis* the cost per ton or tonne, as the case may be. This aggregate involves contrary movements in performance in terms of different factors that have a great deal of influence on cost variations which require to be singled out for the purpose of management control. Total production cost and cost per unit of product in each factory, correlated with productivity data, would have provided some highly interesting sidelights on efficiency. Unfortunately, the necessary information on cost factory-wise could not be obtained.

**Analysis of Data**

The measurement of productivity of 34 cement factories, for the period 1959-62, is assessed here on the basis of the data provided by the Directorate General of Technical Development (Mineral Industries Directorate), Ministry of Economic and Defence Co-ordination, Government of India. The data provided related to annual capacity, production, and monthly average of daily employment for the four years. Table I shows the relevant information in this connexion. The data for 1959 in respect of installed capacity and production were in terms of long tons, which for the purpose of comparison have been converted into metric tons on the basis of 1.016 metric tons per long ton. In each year, calculation of the man-hours required per tonne of cement in each factory has been made on the basis of the original data. The man-hours required per tonne of cement can be otherwise mentioned *as unit labour requirement*, being the reciprocal of the quantitative measurement of productivity, namely, production per man-hour. For this purpose, total man-hours have been calculated by multiplying the data on monthly average of daily employment by 2,640 in each case,

assuming 330 working days per year and eight working hours per day.

### Trends in 1959

In 1959, the installed capacity in the units showed a wide range. The lowest installed capacity was in the Porbandar Cement Factory where it came to 42,672 tonnes. It was closely followed by the Travancore Cement Factory with 50,782 tonnes, and the Banmore Cement Factory with 60,960 tonnes. The highest installed capacity was in Jaipur Udyog, where it was 818,888 tonnes, followed by Kymore 523,232 tonnes, and India Cements 462,686 tonnes. Production during the year was the highest in Jaipur Udyog (593,746 tonnes), followed by the Shahabad Cement Factory of ACC (464,873 tonnes).

*...Productivity in the cement factories during 1959-62 remained in almost all the cases beyond the control of the management...*

In a number of factories, the actual production was more than the installed capacity. It exceeded capacity in Banmore, Dwarka, Madukkarai, Sevalia, and Shahabad under the ACC. Among the other units where production exceeded installed capacity, mention may be made of the Mysore Iron and Steel and the UP Government cement factories. The excess in these cases was not, however, as significant as in the case of the Shahabad Cement Factory. It may be mentioned that capacity was under-utilised in most of the units.

Man-hours per tonne of cement worked out to 4.1 in the case of the Sindri Factory in 1959, which figure was the lowest among all factories not only under the ACC, but also in the industry as a whole. In two units, Sindri and Ashoka, the unit labour requirement was less than five man-hours. While in the Sindri unit it was 4.1, in Ashoka it was 4.7 man-hours per tonne. In Orissa Cements and Rohtas Industries, it came to 5.0 man-hours and 5.5 man-hours per tonne respectively, while in Jaipur Udyog, Digvijay Cement Company and Bhupendra Cement Factory it was 6.6, 6.8 and 7.7 respectively. At the other extreme, an instance is provided by the Porbandar Factory under the ACC, where the unit labour requirement worked out to 133 man-hours per tonne. The other instances on the high side are provided by the Travancore Cement Factory, where the unit labour requirement was 39.4 man-hours, and the Banmore Factory (36.5 man-hours).

### In 1960

In 1960, a new cement company, Saurashtra Cements, came into being, with an installed capacity of 203,180 tonnes, and the installed capacity was expanded in Chaibasa, Kymore, Shahabad, Bagalkot, Mysore Iron and Steel, and UP Government factories. Production was the highest in Jaipur Udyog, where it recorded a substantial rise over the 1959 figure to 662,390 tonnes. Production was the lowest in Saurashtra Cements. With regard to employment, a diverse trend was noticeable in relation to 1959. While in some units employment increased substantially, in some others the decrease in employment was quite significant. The units where employment expanded substantially were Jaipur Udyog, where it rose from 1,480 in 1959 to 2,250 in 1960, and India Cements from 990 in 1959 to 1,580 in 1960. In Shahabad, on the other hand, employment declined from 1,950 in 1959 to 1,610 in 1960, while the installed capacity actually expanded very substantially in this unit. The reduction in employment coupled with the expansion of production resulted in an improvement in the unit labour requirement position in a number of units. In the Saurashtra Cement Company, the man-hours required per tonne

of cement came to 145.6, which was the highest unit labour requirement among all units in 1960. The second place on the high side was of the Porbandar Cement Factory where the unit labour requirement came to 122.6 man-hours per tonne of cement. The lowest unit labour requirement was recorded in Orissa Cements where it came to 3.9. Significant decline in unit labour requirement was recorded in the Banmore Factory under the ACC, Andhra Cements, Birla Cements, Dalmia (Bharat), Panyam Cement Factory, Sone Valley Cement and Travancore Cement Factory. In the Travancore Cement Factory, the fall was by more than 21 man-hours per tonne, i.e., from 39.4 man-hours in 1959 it came down to 18.1 man-hours in 1960.

### In 1961

In 1961, the installed capacity expanded in three units, all under the ACC, viz., Chaibasa, Mancherial, and Shahabad. It continued to be the highest in Jaipur Udyog during the year. A new cement company came into production, viz., Madras Cements, with an annual installed capacity of 67,050 tonnes. In terms of production, there was significant expansion in Jaipur Udyog, where it rose from 662,390 tonnes in 1960 to 755,203 tonnes in 1961. The number of units where production was in excess of installed capacity during this year was eight, of which the significant cases were Bhupendra and Dwarka. Contrary to the trend noticed in 1960, production in a number of units recorded a fall in 1961. The unit labour requirement, in terms of man-hours per tonne of cement, was the lowest in Rohtas Industries, where it came to 3.20 man-hours per tonne of cement.

### In 1962

In 1962, the annual installed capacity was expanded noticeably only in one case, e.g., the KCP Cement Factory where the installed capacity rose from 101,590 tonnes to 253,970 tonnes. In all other units, the installed capacity was the same as in 1961. As regards production, while in some units there was an increase, in some others it showed a decline. During the year, production in eight units was more than the annual installed capacity. Among these, the case of Dalmia (Bharat) was significant—its actual recorded production was 495,426 tonnes against an installed capacity of 419,050 tonnes.

There was little significant change in the pattern of daily employment on a monthly average. Thus, employment had declined in a number of units, while it recorded a slight rise in some others. The unit labour requirement also showed a diverse trend as in previous years. However, it had declined significantly in the case of the Porbandar Cement Factory where from 133.6 man-hours in 1959, it had come down to 73.2 in 1961, and 46.8 in 1962. The number employed in this unit also fell from 360 in 1961 to 310 in 1962.

Thus, productivity among the cement factories, during the period under review, remained in almost all the cases beyond the control of the respective managements.

## A Contrast in Productivity

*Narrating the impressions of his recent visit to Egypt and Europe, at a meeting of the Central Industrial Relations Machinery Officers' Association, Sri D Sanjiviah, Minister for Labour and Employment, Government of India, said: "...Workers in the UAR have spacious quarters at a low rent—the rent for two rooms, a kitchen and a verandah being not more than Rs. 5. What is more important, prices are kept under firm control, with the result that a good meal can be had for as low as 12 paise to 15 paise."*

*He was equally impressed by the prosperity of workers in West Germany where about 80 per cent of them owned cars.*

The number of factories falling under different class intervals, according to the number of man-hours required per tonne of cement over the four years (1959-62), is shown in Table I-A derived from Table I. The reasons, among others, for this rather indifferent trend in productivity are found in the fact that the extent of capacity utilisation during the period of four years had not been uniform in the same factory as also among the factories over the period; so were also the cases of employment and efficiency. In the circumstances, the unit where efficiency was the highest differed from year to year.

It is also noticeable that productivity in terms of the unit labour requirement was more or less—irrespective of the rise or fall in both production and employment—individual. However, it is also seen from the table that in some factories production rose but employment fell—for instance, the case of Jaipur Udyog Ltd., meaning a rise in productive efficiency, in terms of the unit labour requirement, being less correspondingly. Productivity has been measured here in terms of the unit labour requirement. It can also be measured in terms of the production per man-hour, or index numbers can be computed on the basis of the formula: $\frac{\text{Index of Production}}{\text{Index of Employment}} \times 100$. The index numbers thus computed would show the trend over the period. This formula has not been applied here in view of the fact that among the units, absolute measures of efficiency would be more relevant than merely knowing the trends in terms of the changes in the functional attainments of each factory under review. The index numbers would, of course, help in cases where the management is interested to know only the trends over the period, not as much in the absolute figures, or both. However, it is possible to compute index numbers on the basis of the figures of man-hours per tonne of cement over the period of four years which will show the relative changes in each unit compared.

The figures shown in the tables are, however, not indicative of the divergent capital intensities in the factories under review. It is well-known that the functional attainment of labour is very largely conditioned by the relative capital intensities. It has not been possible to show the relation of unit labour requirement with the relative intensities of capital in the different factories, in

TABLE I-A

**Frequency distribution of factories according to man-hours required per tonne of cement during 1959-62**

| | | 1959 | 1960 | 1961 | 1962 |
|---|---|---|---|---|---|
| Under 5 | Man-hours | 2 | 4 | 3 | 3 |
| Above 5 up to 10 | „ | 13 | 13 | 14 | 15 |
| „ 10 „ „ 15 | „ | 8 | 6 | 8 | 8 |
| „ 15 „ „ 20 | „ | 3 | 6 | 4 | 3 |
| „ 20 „ „ 25 | „ | 1 | — | 2 | 3 |
| „ 25 „ „ 30 | „ | 2 | 1 | 2 | — |
| Above 30 | „ | 3 | 3 | 1 | 2 |
| Total | „ | 32 | 33 | 34 | 34 |

view of the fact that in the multi-unit concerns the figures of capital are shown in lump sum in the annual accounts, and cannot be attributed to the individual factories. The figures relating to capital employed per ton of assessed production by 19 factories, which were examined by the Tariff Commission for 1960, are given in Table II[1].

Tables III and IV show the requirement of man-hours per tonne of cement by factories arranged according to size, determined on the basis of installed capacity (Table III), and employment (Table IV). In determining the size, the figures of installed capacity and employment for 1961 have been taken as the basis. These two tables together would show that there was no clear relationship of the performance of the units with size, as determined on the basis of installed capacity and employment. On the other hand, both in terms of installed capacity and employment, individual factories interchanged position among different size-groups over the period commencing from 1959 to 1962.

TABLE II

**Capital employed by different cement producers based on Tariff Commission report of 1961**

| Producer | Assessed average annual production for next price period | Profit per ton recommended by Tariff Commission | Total estimated earning (2) × (3) | Percentage of return proposed by Tariff Commission on employed capital | Calculated employed capital $\frac{(4) \times 100}{(5)}$ | Employed capital per ton of assessed production (6) ÷ (2) |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1. Andhra | 180,000 | 10.70 | 1,926,000 | 14 | 13,757,000 | 76.43 |
| 2. Ashoka | 200,000 | 8.44 | 1,688,000 | 12 | 14,067,000 | 70.34 |
| 3. ACC | 3,863,000 | 12.17 | 47,013,000 | 14 | 335,807,000 | 86.93 |
| 4. Bagalkot | 185,000 | 12.59 | 2,329,000 | 12 | 19,408,000 | 104.91 |
| 5. Dalmia (Bharat) | 375,000 | 10.69 | 4,009,000 | 14 | 28,636,000 | 76.36 |
| 6. Dalmia (Dadri) | 195,000 | 10.18 | 1,985,000 | 14 | 14,179,000 | 72.71 |
| 7. India | 507,000 | 12.36 | 6,267,000 | 12 | 52,225,000 | 103.01 |
| 8. Jaipur Udyog | 750,000 | 11.17 | 8,378,000 | 12 | 69,817,000 | 93.09 |
| 9. Kalyanpur | 135,000 | 11.91 | 1,608,000 | 12 | 13,400,000 | 99.26 |
| 10. KCP | 195,000 | 13.47 | 2,627,000 | 12 | 21,892,000 | 112.27 |
| 11. Madras | Not examined by Tariff Commission | | | | | |
| 12. Mysore Government | 89,700 | 8.50 | 762,000 | 12 | 6,350,000 | 70.79 |
| 13. Orissa | 350,000 | 11.85 | 4,148,000 | 14 | 29,629,000 | 84.65 |
| 14. Panyam | 90,000 | 14.37 | 1,293,000 | 10 | 12,930,000 | 143.67 |
| 15. Rohtas | 315,000 | 6.58 | 2,073,000 | 12 | 17,275,000 | 54.84 |
| 16. Satna | 225,000 | 12.24 | 2,754,000 | 10 | 27,540,000 | 122.27 |
| 17. Saurashtra | Not examined by Tariff Commission | | | | | |
| 18. Digvijay | 410,000 | 10.71 | 4,391,000 | 12 | 36,592,000 | 89.25 |
| 19. Sone Valley | 215,000 | 6.71 | 1,443,000 | 12 | 12,025,000 | 55.93 |
| 20. Travancore | 50,000 | 12.74 | 637,000 | 10 | 6,370,000 | 127.40 |
| 21. UP Government | 363,000 | 11.46 | 4,160,000 | 8 | 52,000,000 | 143.25 |
| Weighted average | 8,692,700 | 11.45 | 99,491,000 | | 783,899,000 | 90.18 |

[1] The relevant data in this connexion, as given in the table, are taken from V Podder's book, *Cement Industry in India* (p. 77).

TABLE III

**Man-hours per tonne of cement by individual factories during 1959-62**

| Name of companies by installed capacity (Tonne) | 1959 | 1960 | 1961 | 1962 |
|---|---|---|---|---|
| I. 50,001—150,000 | | | | |
| 1. Banmore | 36.5 | 27.3 | 25.53 | 24.9 |
| 2. Khalari | 27.1 | 30.7 | 27.40 | 31.8 |
| 3. KCP | 8.7 | 7.3 | 6.49 | 4.6 |
| 4. Madras | — | — | 15.48 | 9.0 |
| 5. Mysore Iron | 9.8 | 11.1 | 11.08 | 10.8 |
| 6. Panyam | 27.1 | 16.1 | 19.50 | 15.7 |
| 7. Travancore | 39.4 | 18.1 | 22.74 | 21.3 |
| 8. Kalyanpur | 9.4 | 9.3 | 11.41 | 9.6 |
| 9. Porbandar | 133.6 | 122.6 | 73.20 | 46.8 |
| II. 150,001—250,000 | | | | |
| 10. Dwarka | 8.9 | 8.9 | 9.21 | 11.9 |
| 11. Sevalia | 15.6 | 17.8 | 23.02 | 19.5 |
| 12. Andhra | 19.5 | 12.3 | 13.90 | 12.5 |
| 13. Bagalkot | 8.3 | 6.3 | 7.04 | 8.3 |
| 14. Dalmia (Dadri) | 9.7 | 9.6 | 11.43 | 10.1 |
| 15. Saurashtra | — | 145.6 | 7.71 | 7.2 |
| 16. UP Government | 8.4 | 10.1 | 13.27 | 10.8 |
| III. 250,001—350,000 | | | | |
| 17. Kistna | 11.7 | 10.4 | 10.10 | 12.1 |
| 18. Madukkarai | 17.1 | 18.8 | 17.50 | 20.6 |
| 19. Mancherial | 14.8 | 10.4 | 7.90 | 6.6 |
| 20. Sindri | 4.1 | 4.2 | 4.19 | 4.5 |
| 21. Ashoka | 4.7 | 4.5 | 5.87 | 6.0 |
| 22. Birla | 14.2 | 8.4 | 6.87 | 7.5 |
| 23. Rohtas | 5.5 | 4.5 | 3.20 | 5.2 |
| 24. Sone Valley | 21.0 | 15.2 | 17.53 | 15.4 |
| IV. 350,001—450,000 | | | | |
| 25. Bhupendra | 7.7 | 6.7 | 6.56 | 7.0 |
| 26. Digvijay | 6.8 | 5.9 | 6.98 | 5.6 |
| 27. Orissa | 5.0 | 3.9 | 4.25 | 4.1 |
| 28. Lakheri | 14.6 | 16.5 | 13.97 | 14.7 |
| 29. Dalmia (Bharat) | 10.4 | 7.8 | 8.17 | 6.8 |
| V. 450,001—650,000 | | | | |
| 30. Chaibasa | 10.1 | 9.3 | 9.75 | 8.5 |
| 31. Kymore | 12.5 | 12.53 | 11.07 | 10.7 |
| 32. Shahabad | 11.1 | 9.1 | 8.51 | 9.6 |
| 33. India | 7.8 | 8.9 | 8.73 | 8.5 |
| VI. 650,001 and above | | | | |
| 34. Jaipur Udyog | 6.6 | 8.9 | 8.09 | 7.6 |

TABLE IV

## Man-hours per tonne of cement by individual factories during 1959-62

| | Name of companies by numbers employed | 1959 | 1960 | 1961 | 1962 |
|---|---|---|---|---|---|
| (a) | Below 200 | | | | |
| 1. | KCP | 8.7 | 7.3 | 6.49 | 4.6 |
| (b) | Between 201 and 400 | | | | |
| 2. | Porbandar | 133.6 | 122.6 | 73.20 | 46.8 |
| 3. | Ashoka | 4.7 | 4.5 | 5.87 | 6.0 |
| 4. | Madras | — | — | 15.48 | 9.0 |
| 5. | Mysore Iron | 9.8 | 11.1 | 11.08 | 10.8 |
| 6. | Rohtas | 5.5 | 4.5 | 3.20 | 5.2 |
| (c) | Between 401 and 600 | | | | |
| 7. | Mancherial | 14.8 | 10.4 | 7.90 | 6.6 |
| 8. | Sindri | 4.1 | 4.2 | 4.19 | 4.5 |
| 9. | Bagalkot | 8.3 | 6.3 | 7.04 | 8.3 |
| 10. | Kalyanpur | 9.4 | 9.3 | 11.41 | 9.6 |
| 11. | Orissa | 5.0 | 3.9 | 4.25 | 4.1 |
| 12. | Panyam | 27.1 | 16.1 | 19.50 | 15.7 |
| 13. | Saurashtra | — | 145.6 | 7.71 | 7.2 |
| 14. | Travancore | 39.4 | 18.1 | 22.74 | 21.3 |
| (d) | Between 601 and 1,000 | | | | |
| 15. | Dwarka | 8.9 | 8.9 | 9.21 | 11.9 |
| 16. | Kistna | 11.7 | 10.4 | 10.10 | 12.1 |
| 17. | Andhra | 19.5 | 12.3 | 13.90 | 12.5 |
| 18. | Banmore | 36.5 | 27.3 | 25.53 | 24.9 |
| 19. | Birla | 14.2 | 8.4 | 6.87 | 7.5 |
| 20. | Dalmia (Dadri) | 9.7 | 9.6 | 11.43 | 10.1 |
| (e) | Between 1,001 and 1,200 | | | | |
| 21. | Bhupendra | 7.7 | 6.7 | 6.56 | 7.0 |
| 22. | Chaibasa | 10.1 | 9.3 | 9.75 | 8.5 |
| 23. | Khalari | 27.1 | 30.7 | 27.40 | 31.8 |
| 24. | Digvijay | 6.8 | 5.9 | 6.98 | 5.6 |
| 25. | UP Government | 8.4 | 10.1 | 13.27 | 10.8 |
| (f) | Between 1,201 and 1,500 | | | | |
| 26. | India | 7.8 | 8.9 | 8.73 | 8.5 |
| 27. | Sone Valley | 21.0 | 15.2 | 17.53 | 15.4 |
| 28. | Dalmia (Bharat) | 10.4 | 7.8 | 8.17 | 6.8 |
| (g) | Between 1,501 and above | | | | |
| 29. | Kymore | 12.5 | 12.53 | 11.07 | 10.7 |
| 30. | Lakheri | 14.6 | 16.5 | 13.97 | 14.7 |
| 31. | Madukkarai | 17.1 | 18.8 | 17.50 | 20.6 |
| 32. | Sevalia | 15.6 | 17.8 | 23.02 | 19.5 |
| 33. | Shahabad | 11.1 | 9.1 | 8.51 | 9.6 |
| 34. | Jaipur Udyog | 6.6 | 8.9 | 8.09 | 7.6 |

TABLE V

**Production as percentage of installed capacity in the Indian cement industry by individual factories during 1959-62**

| | Name | 1959 | 1960 | 1961 | 1962 |
|---|---|---|---|---|---|
| 1. | Banmore | 100.8 | 102.9 | 103.0 | 104.3 |
| 2. | Bhupendra | 96.9 | 112.3 | 114.3 | 106.7 |
| 3. | Chaibasa | 85.5 | 94.3 | 54.5 | 66.5 |
| 4. | Dwarka | 116.1 | 116.6 | 112.9 | 99.4 |
| 5. | Khalari | 119.7 | 108.3 | 111.0 | 94.1 |
| 6. | Kistna | 85.3 | 96.2 | 97.7 | 82.8 |
| 7. | Kymore | 66.3 | 72.4 | 81.5 | 86.4 |
| 8. | Lakheri | 94.1 | 80.9 | 91.8 | 85.9 |
| 9. | Madukkarai | 106.0 | 95.1 | 103.0 | 92.4 |
| 10. | Mancherial | 79.9 | 94.5 | 54.2 | 67.9 |
| 11. | Porbandar | 21.3 | 18.7 | 30.4 | 40.9 |
| 12. | Sevaliaad | 100.6 | 94.9 | 89.2 | 100.1 |
| 13. | Shahab | 120.4 | 91.2 | 86.7 | 79.6 |
| 14. | Sindri | 94.0 | 90.2 | 91.0 | 85.4 |
| 15. | Andhra | 60.5 | 80.0 | 74.5 | 85.3 |
| 16. | Ashoka | 57.5 | 61.3 | 48.2 | 58.5 |
| 17. | Bagalkot | 96.7 | 66.4 | 88.7 | 87.7 |
| 18. | Birla | 46.4 | 67.1 | 97.0 | 90.7 |
| 19. | Dalmia (Bharat) | 65.1 | 92.9 | 97.0 | 118.2 |
| 20. | Dalmia (Dadri) | 62.5 | 61.0 | 73.5 | 73.2 |
| 21. | Digvijay | 90.5 | 102.9 | 87.0 | 108.0 |
| 22. | India | 72.6 | 101.2 | 97.4 | 97.7 |
| 23. | Jaipur Udyog | 72.5 | 80.9 | 92.2 | 93.0 |
| 24. | Kalyanpur | 90.5 | 95.1 | 85.1 | 97.0 |
| 25. | KCP | 62.4 | 68.2 | 74.8 | 45.4 |
| 26. | Madras | — | — | 55.4 | 91.4 |
| 27. | Mysore Iron | 102.6 | 78.8 | 79.9 | 81.0 |
| 28. | Orisa | 71.2 | 96.3 | 100.6 | 102.6 |
| 29. | Panyam | 73.7 | 120.9 | 107.3 | 111.0 |
| 30. | Rohtas | 81.2 | 97.6 | 86.8 | 83.8 |
| 31. | Saurashtra | — | 31.2 | 83.2 | 90.8 |
| 32. | Sone Valley | 65.9 | 83.5 | 80.2 | 92.4 |
| 33. | Travancore | 61.9 | 132.0 | 104.5 | 107.6 |
| 34. | UP Government | 105.6 | 100.8 | 92.5 | 114.2 |

TABLE V-A

**Frequency distribution of factories in the cement industry in India by classes of percentages of installed capacity utilised during 1959-62**

| Class interval | 1959 | 1960 | 1961 | 1962 |
|---|---|---|---|---|
| Below 50% | 2 | 2 | 2 | 2 |
| Between 50% and 60% | 1 | — | 3 | 1 |
| Between 61% and 70% | 7 | 5 | — | 2 |
| Between 71% and 80% | 5 | 3 | 4 | 2 |
| Between 81% and 90% | 3 | 3 | 9 | 8 |
| Between 91% and 100% | 6 | 11 | 8 | 10 |
| Above 100% | 8 | 9 | 8 | 9 |
| Total number of factories | 32 | 33 | 34 | 34 |

The percentage of capacity utilised in various factories during 1959-62 has been indicated in Table V. The number of factories falling in different size-classes has been shown in Table V-A, as derived from Table V. Table V suggests that the percentage of capacity utilised has not been consistent in most factories during the review period. On the basis of the table, it is possible to mention that the suggestion by the industry to the Tariff Commission (1961) for cost determination on the assumption of a certain average percentage of capacity utilised—for instance, the suggestion of the ACC that its own production should be assumed at higher than 90 per cent of its overall capacity—was in consonance with the current costing practice for each individual factory. It is conventionally based on the concept of normal capacity in regard to standard costing, for instance. For the industry as a whole, however, this can hardly be a fair basis with such a wide divergence in the percentage of capacity utilised, as Table IV suggests; unit rates of cost for each element would then represent over- or under-absorption.

However, the basis adopted by the Tariff Commission in its 1961 report, that of "rated capacity, production in the past, operative efficiency, age of the plant, and installation of balancing equipment during the next three years, etc.," seems fair subject to the fact that it leaves little scope for price variation on the basis of variations in production which may be beyond the control of the management. Therefore, the observation of the Tariff Commission—

> "that we consider it important that there should be for each unit a target of production which must be reached if it were to earn the profit provided in the price, and that the units which do better than their respective targets should be rewarded with higher profits from larger production"

—does not do justice to the concerns where production falls below targets owing to uncontrollable factors.

**It is a good sign that most of the cement factories are concerned about the indifferent trends in their functional efficiency. As a matter of fact, the units have unequivocally expressed their anxiety for improving efficiency, based on their awareness that not only was the efficiency lower than that of other countries, but also that it was lower than what could be achieved in the given conditions in the factories.**

It was suggested by a number of cement companies that to improve productivity the following steps, among others, are essential:

1. Fixing of workloads, where possible, by fixing standard time for repetitive jobs by application of Time Study;
2. Improvement of methods by application of the techniques of Motion Study;
3. Improvement of working conditions in the plant;
4. By technological improvements;
5. Minimising of wastage;
6. Maintaining of cordial relationship with labour;
7. Establishment of grievance procedure in order to settle the grievances of employees expeditiously at the lowest step;
8. Participation of labour in improving production by having regular production committee meetings and inviting suggestions from employees and rewarding them for good suggestions;
9. Minimising of accidents;
10. Removing of inequities in wage structure by introduction of job evaluation;
11. Introduction of piece-work wherever feasible; and
12. Maintenance of high morale among employees.

It may be mentioned here that productivity in terms of production per man-hour, or man-hour required per unit of output, is not labour productivity as is commonly understood, but total productivity expressed in terms of man-hours.

*This paper discusses the role of IFC in the agricultural merchants' trade, and the services rendered in this direction by NACAM, which includes companies operating in all parts of the British Isles. The author says that the use of the performance ratios suggested by NACAM helps in planning and forecasting within the individual company, and also in forecasting trade investments as a whole.*

HJW Lankshear

# IFC in Agricultural Merchandising

THE National Association of Corn and Agricultural Merchants (NACAM), in the United Kingdom, is the trade body composed of all those merchants who handle grain and other agricultural products. The trade[1] has at least three levels of activity:

1. The purely merchanting aspect, purchasing grain for resale or purchasing feeding stuffs, fertiliser and other requisites from the manufacturers for distribution to farmers.
2. The production aspect, manufacturing compound animal feeding stuffs, cleaning and dressing seed grain, etc.
3. The retail trade through the medium of retail shops.

Late in the 'fifties, the NACAM instituted a Management Advisory Service (MAS) whose main function was to provide management consultancy to member-firms. This service as it developed disclosed the need for standard measures of performance, and at a very early stage it was found necessary to draw up a uniform framework for the Trading and Profit and Loss Accounts in order that the final results for each financial year could be compared between different firms as a measure of productivity and efficiency.

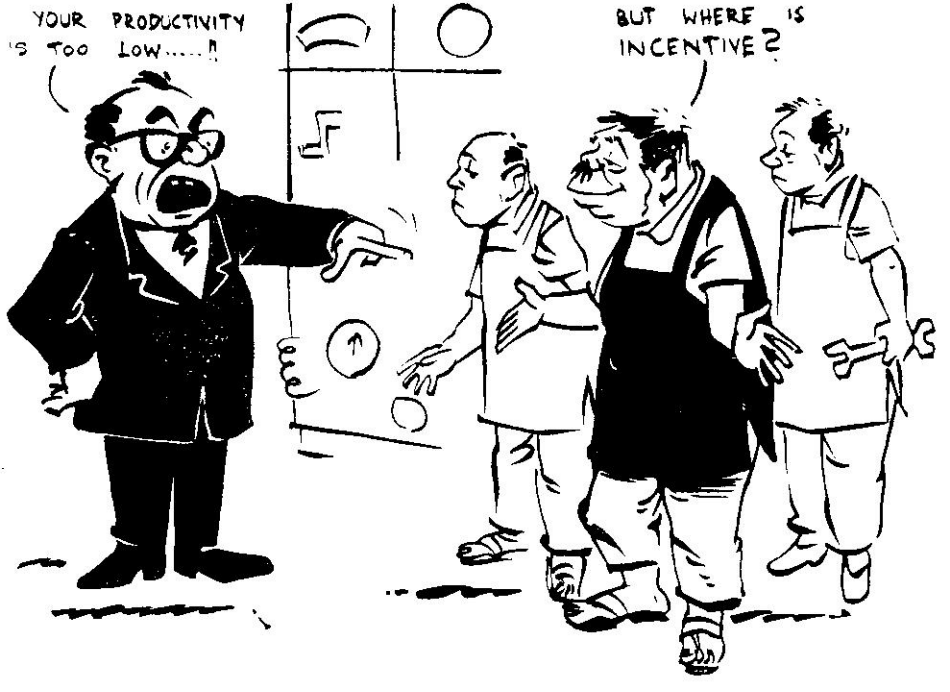
Following this, it was a natural step to introduce a system of annual inter-firm

[1]NACAM is a diverse Association: its members handle the grain harvest, purchasing it from the farmer, cleaning and processing it, and disposing of it to the users such as flour millers and brewers. They also supply (and in many cases manufacture, or process) a wide variety of goods of the farmers'—seeds and seed grain, the requirements including compound animal feeding stuffs, and fertilisers. In addition, many of the firms undertake such services as the spreading of lime and other fertilisers, the collection and grading of eggs and wool, and the sale of seeds, pet foods and garden requisites through retail shops to the general public.

comparison; this service (which is open, on payment of a fee, to all member-firms of the association) has now been in operation for six years, and is becoming accepted as an integral part of the equipment of management within the trade. The service is operated by the circulation of a questionnaire which contains full definitions and instructions for its completion. This is completed by each member-firm from its own annual accounts, and is returned to the MAS which classifies these results statistically, and publishes the results to all participating firms. The results normally take the form of a standard average, but wherever it is thought advisable a "spread pattern" is supplied, showing the distribution between wide limits. In addition, certain statistical inferences are drawn; it has, for example, been possible to draw up a standard average composition of staff both for administration and production and certain standard averages of performance for office organisation and sales force. Every year the methods used are re-examined.

In the circulation of this information, figures are given not only for the whole of the reporting firms, but also for three classified trade groups. It has been found, for example, that those firms having more than a certain percentage of their total turnover confined to wholesale grain fall into a clearly defined cost pattern, many of whose ratios differ considerably from those engaged primarily in production. Such items as gross profit, capital and stock turnover rates, and staff performance per £ 100.000 of sales turnover, are found to vary very widely between groups, although within each group the figures remain remarkably constant.

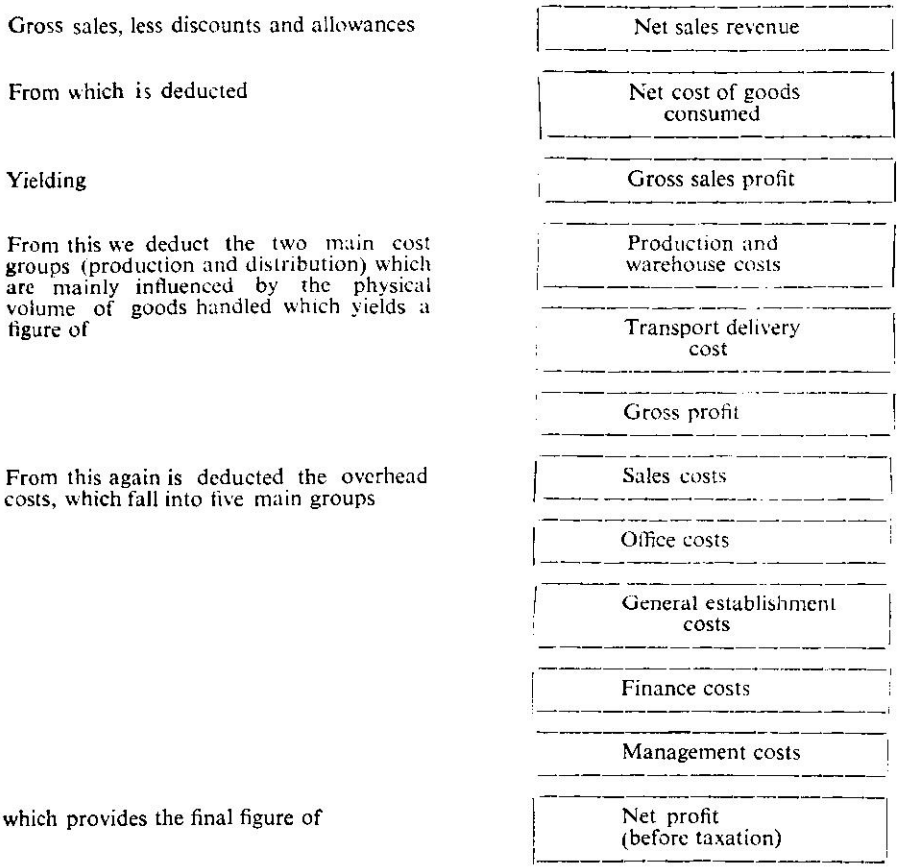
The information supplied in this inter-firm comparison falls into three main groups:



1. The purely financial figures obtained primarily from the annual accounts of the participating firms.
2. Production and distribution figures.
3. Figures on staff performance.

To a great extent, the first of these is the usual conventional method of inter-firm comparison, whilst the second and third are not so frequently encountered, although in a trade, such as that being considered here, they are of particular importance. It is proposed, therefore, to discuss each of these in more detail.

I. **Financial and profit ratios:** The first series of financial ratios turn round the standardised form of Trading and Profit and Loss Accounts. The form of these ratios is designed to separate the profit rates and cost groups both normally found in the trade, and they may best be illustrated by the following diagram:




The reason for extracting a profit rate before the impact of the production and distribution costs lies mainly in the fact that a considerable amount of management skill is used in market forecasting. Fluctuations in profit rates owing to variations in skill can, therefore, be identified from variations in the gross sales profit rate, before they have been complicated by variations in efficiency in production, distribution or administration.

These three profit rates and certain cost groups are identified for the whole of the reporting firms, and also for the three trade sections previously mentioned.

In addition to these figures, the following financial ratios are also discussed in some detail:

1. Liquidity ratio, i.e., the ratio of current assets to current liabilities.
2. The ratio of current assets to fixed assets (this is of particular importance in a trade where the amount of fixed assets may vary very greatly according to whether the impetus is on wholesale merchanting or production).
3. The rate of annual turnover of average stock.
4. The rate of annual turnover of Real Capital Investment.
5. The net profit, expressed as a percentage return on the Real Capital Investment.

The only other financial ratio normally considered concerns the credit allowed to the farmers. The ratios normally examined are therefore:

a. The average debtors outstanding, in terms of weeks' sales.

b. The credit charges made compared with the total volume of credit granted.

These ratios represent the sum of the financial ratios, and when duly considered with the appropriate comments they can be taken as covering the whole working of the firms' reporting.

II. **Production and distribution**: The figures for distribution include the following:

1. The range of operation of vehicles.
2. The method of calculating the costing, when charging customers for delivery.
3. The basic costs of operation, expressed both in terms of miles run and tons carried.
4. Details of any piecework or bonus systems for drivers.
5. Overall figures of mileage travelled per year per vehicle, tonnage carried per vehicle, and the number of times that the total tonnage capacity of the fleet is used per year.
6. An attempt is made to work out the average composition of a transport fleet in terms of different sizes and types of vehicle, and from this a standard fleet composition for a given sales turnover.

These figures cover the main ratios which are produced for distribution. For production figures, the following are used:

1. The number of man-hours worked on each of the main types of activity (production of various goods, handling goods in and out of store, etc.).
2. The number of man-hours per ton of production for the various commodity groups, together with the estimated wage cost per ton.
3. The average tonnage throughout per man employed.

These figures cover the employment of labour, and similar figures are normally taken to cover the usage of space. These include:

a. The number of cubic feet of storage space required annually for each ton throughput.

b. The number of cubic feet required per ton of production.

c. The number of times each ton-unit of storage space is used in a year.

It is realised that these are general figures which do not produce a great deal in terms of actual costs. On the other hand, as the NACAM includes companies operating in all parts of the British Isles, it is evident that local conditions regarding labour rates and the cost of storage or production space may vary considerably. By expressing the ratios in terms of man-hours and cubic feet rather than actual cash value, it is evident that more valid comparisons can be made which can be used even when local conditions vary.

III. **Figures on staff performance:** By the nature of the trade, the staff costs form a large proportion of the total overhead costs, and it is, therefore, essential to examine the performance per unit of staff. One interesting feature of this section of the investigation is an assessment of the way in which the time of Working Directors is spent, and it is found that this is generally divided between sales supervision, purchasing, production administration, and overall management. A surprisingly large amount of their time in the medium and smaller companies is spent on purely functional work, and a lesser proportion on overall general management.

The average composition of staff is then examined, and from this it is possible to build up a typical staff organisation in relation to a given sales turnover.

The next items of staff performance examined are the office costs and performance. The following figures are examined:

1. Office costs per sales-ledger posting—it is considered that the number of sales-ledger postings is the index of activity within a company in this trade, as all other operations such as cash books, and purchase ledgers are ancillary to selling, and, therefore, the volume of sales-ledger posting is the datum to be taken. This is developed further to examine the number of sales-ledger accounts handled per member of office staff, and this is related to the method of ledger posting; here again it is found that there are definite relationships between the degree of mechanisation and the numbe rof ledger accounts handled per member of office staff, and hence the total office costs per sales-ledger posting.
2. The performance of the sales organisation is examined, and it is here that perhaps the greatest detail has been employed. The average turnover per sales representative is examined not only in its total value, but in respect of the various classes of commodity normally handled in the trade. Further, figures include the average number of calls per day made by each representative, the average number of sales-ledger accounts each representative handles, and the average mileage covered each year by each representative in his car. By this means a composite picture of the salesman's performance in relation to customers served on the one hand, and sales made on the other, can be built up both for the total number of reporting companies and also for the various trading groups represented.
3. A final sales figure employed affects the retail shop turnover, and here the two units of measurement employed are the sales turnover per member of staff and the sales turnover per £ 100 of retail shop wages.

Summing up the results obtained so far from the report, we find that several quite consistent patterns emerge, and these have been of great assistance not only to the management of individual companies but also to the general consultancy work carried out by the MAS. When a new company is visited on a consultancy basis, a brief examination of its basic trading figures yields sufficient ratios to compare with the general averages disclosed by this statistical service, and provides clear indications as to what should be the targets for examination. The use of these performance ratios helps in planning and forecasting within the individual company, and also in forecasting trade investments as a whole. It is hoped to develop the service even further, and to extend it to produce a uniform costing system for all the activities of the trade as a whole.

*India lacks suitable statistical data for inter-firm comparisons. The author of this paper indicates how far inter-firm ratios can be compared with advantage, and the extent to which they could be used to measure productivity.*

SN Cooper

# Inter-firm Ratio Analysis

FOR Inter-firm Comparison, ratio analysis is very valuable. Ratios greatly help to shape and formulate managerial policies. In fact "every managerial policy, or absence of managerial policy, is reflected somewhere in the figures either in the Balance-Sheet or in the Profit and Loss Statement." In the interpretation of ratios a single ratio taken by itself does not convey much meaning, and, therefore, is of limited value. Ratios should be interpreted, therefore, by reference to standards of comparison such as (a) ratios of past years of the same firm, (b) ratios of competing firms in the same industry, and (c) industry averages. A study of trend relationships and industry averages will tell a firm how it stands in relation to its past and the industry.

Standards of comparison can be developed provided—

(a) The accounting methods throughout the industry are substantially uniform in policy and procedure.

(b) The products handled are substantially similar.

(c) The various organisations operate under similar geographic conditions and are financially sound.

Further, data as to costs and financial accounts should be uniform in method, calculation and presentation to serve as a foundation for the standards to be developed.

Any scheme of ratio analysis would require that member-firms provide data relating to capital, profits, inventories, cost, overheads, etc., compiled on a uniform basis, so that the final result gives meaningful comparisons.

**Types of Ratios**

Ratio Analysis would normally cover the following: 1. Profitability Ratios, 2. Utilisation of Investment Ratios, 3. Assets 'Mix'

Ratios, 4. Growth Ratios, 5. Cost Ratios, 6. Inventory Ratios, and 7. Value Added Ratios.

### 1. Profitability Ratios

Current thinking in India recognises that, by and large, *profitability should be the main criterion in judging management efficiency*, whether in the public or private sector. In the public sector, the tax-payers' money is invested in producing goods and services. Increasing the profit of such a business, without charging unduly high prices to the consumer, would enable public revenues to be augmented by the return on the capital invested. In addition to providing a return on the capital invested, the profits earned should leave reasonable amounts for being ploughed back into the business for the purpose of its natural growth.

**An encouraging example of profitability in the public sector is provided by the Hindustan Machine Tools. In the context of the country's economy, increased profitability arising out of improved management efficiency will ultimately generate resources to increase production which is the only lasting solution to the problem faced by any developing country. Profitability Ratios should take pride of place in Inter-firm Ratio Analysis.**

The following ratios are important:

(a) Trading Profit (before charging interest on borrowings, depreciation and taxation)

---

Total Capital Employed (Total Assets)

The profitability of one business as against another is best compared by the profits earned before deducting interest on borrowings, depreciation and taxation (including Super Profits Tax), on the total capital employed made up of shareholders' funds, i.e., paid-up capital and reserves, as also amounts borrowed from outsiders. Since borrowed funds are included in the total capital employed (total assets), the trading profits are taken into account before charging interest. It is known that depreciation is charged on different methods and taxation is affected by the age of the plant, additions to the block made in recent years, development rebate allowable during the year, losses brought forward from previous years, etc. Profits before depreciation and taxation are, therefore, appropriately comparable. Thus, trading profits, before deducting interest on borrowings, depreciation and taxation, expressed as a percentage of the total capital employed (total assets), furnish a realistic index of the profitability of one firm against another, irrespective of the method of financing it, e.g., from shareholders' funds or borrowings. For this ratio, profits are considered before charging the statutory development rebate reserve, as the latter is a mere statutory appropriation dependent on the development rebate earned on capital expenditure incurred on plant and machinery brought into use during the year.

(b) Net Trading Profit (after charging interest on borrowings, depreciation and taxation)

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Total Capital Employed (Total Assets)

Ratio 1 (a) furnishes a guide to profitability before deducting interest, depreciation, taxation, and the development rebate reserve. Since depreciation and taxation are important 'outgoings', it becomes necessary to determine a ratio taking the trading profits after deducting depreciation, taxation (excluding Super Profits Tax) and interest on borrowings. The statutory development rebate reserve would be treated as part of net trading profit. The Super Profits Tax is assumed to be an 'extraneous' item to be disregarded in making inter-firm comparisons. This ratio is likely to vary from firm to firm due to the factors of depreciation and taxation and, therefore, has less value for comparing profitability than ratio 1 (a).

(c) Trading Profit (before charging interest on borrowings, depreciation and taxation)

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Net Sales

This ratio reveals the profit margin earned on net sales before deducting interest, depreciation, taxation and the statutory development rebate reserve. As profit is earned on sales, increase in the margin of profit must lead to increased profitability on the capital employed. Depreciation varies from one business to another, according to the method adopted and the age of the plant. Further, interest, taxation and development rebate reserve are 'appropriations', and, therefore, the profit margin on net sales before deducting interest, depreciation, taxation, and the development rebate reserve provides a realistic and comparable index from firm to firm.

(d) Net Trading Profit (after charging interest on borrowings, depreciation and taxation)

Net Sales

This ratio is a continuation of ratio 1 (c) and it is developed after deducting the varying but important 'outgoings' in the form of interest, depreciation and taxation (*excluding* SPT).

(e) Net Worth

Fixed Assets

This ratio indicates the relationship of net worth to fixed assets. Where fixed assets are all financed from net worth, this ratio indicates the portion of the net worth expended on fixed assets. It will enable management to see whether capital expenditure incurred out of shareholders' funds is in line with what has been incurred by other firms.

(f) Net Trading Profits (after charging interest on borrowings, depreciation and taxation)

Net Worth

This ratio indicates what is earned on the shareholders' funds after paying tax. From the shareholders' angle this is a very important ratio. The larger the borrowing the

# New Electron Microscope

**A new electron microscope has been introduced in Britain by AEI Ltd., which will help to increase the productivity of biologists. Designed specially to meet their needs, this instrument will be able to probe even deeper into fundamentals of biological processes free from the need to give a lot of their attention to the working of the instrument itself.**

**In a feature titled "Development in Industry", *Good Business* says: "Over half the total of electron microscopes in the world is being used in biological work . . . It is for the biologists that a control system of unprecedented simplicity has been devised, making this new EM6B the easiest electron microscope to operate. All the controls necessary for normal operation were arranged on panels within easy reach of the operator. Adjustments can be made through the range of magnifications from X1,000 to X250,000 without change of pole-piece and by the use of a single graduated control. During such changes the focus remains substantially constant throughout.**

**The electron-optical system of the EM6B is based on a new objective lens of short focal length which involves a radical departure from conventional design, and so makes possible a much higher resolving power. In other words, this microscope with its extremely high magnifications will allow a biologist to see detail much finer than has hitherto been possible."**

more favourable will be this ratio, subject to the limitation that a larger borrowing carries with it a larger risk of repaying the borrowing.

It must be pointed out that profitability ratios would be affected by internal factors applicable to each firm. For example, in computing ratios of profitability based on the total capital employed (total assets), abnormal Capital Work-in-Progress may get included in total assets, resulting in a lower profitability ratio. Similarly, the capital employed by each firm would refer to the time the plant, machinery, etc., were installed. In these circumstances, profitability ratios must be adjusted prior to making use of the same as a measure of productivity.

**2. Utilisation of Investment Ratios**

It is known that the faster the capital is turned over, the greater are the chances of maximisation of profits. The following ratios provide the test of effective utilisation of investment:

(a) $\frac{\text{Net Sales}}{\text{Total Capital Employed (Total Assets)}}$

Profits in relation to sales may be satisfactory, but volume of sales in relation to total assets may not be so. Sales margin is only one factor that contributes to the profit, the other is the frequency with which the assets are utilised in the operation of the business during the period, i.e., investment turnover. A firm annually turning over its capital employed (total assets) at a faster rate is likely to earn higher profits. This ratio would enable management to consider whether the total capital employed is used effectively.

(b) $\frac{\text{Fixed Assets}}{\text{Total Capital Employed (Total Assets)}}$

The cost of constructing factories and acquiring capital assets must naturally be kept in check in order to increase profitability. Management can judge the effectiveness of its capital expenditure by comparing the ratio of fixed assets to total capital employed (total assets). It would pay a firm to keep its ratio in line with other efficient firms.

(c) $\frac{\text{Net Sales}}{\text{Fixed Assets}}$

Fixed assets are for producing the goods sold. This ratio indicates the number of times fixed assets are turned over. A higher net sales to fixed assets ratio would ordinarily result in higher profits. It is a rough measure of effective utilisation of fixed assets. If sales volume is small in relation to fixed assets, it may be presumed that there is over-investment in fixed assets, or that fixed assets are not being utilised effectively.

(d) $\frac{\text{Net Sales}}{\text{Current Assets}}$

This ratio indicates the relationship between the net sales and the current assets. It also shows the number of times current assets are turned over in carrying on business operations during a given period.

(e) $\frac{\text{Debtors}}{\text{Net Sales per day (Sales} \div 365)}$

Control over outstandings is of prime importance not only for reducing the amount locked up in working capital, but also for avoiding bad debts. The ratio of debtors to net sales per day would assist management in judging the effectiveness of its debt collection department and/or its credit policy, as compared to others in the same line of business. It indicates the rate at which the cash is likely to flow in, and the quality of receivables.

(f) $\frac{\text{Debtors}}{\text{Total Sales}}$

This ratio is similar to ratio 2 (e) above. It is more realistic where credit is allowed for the sales value inclusive of excise duty or where commission, discount, rebate and allowances are adjusted at the time outstandings are actually received from customers.

The holding of current assets in the form of stocks of raw materials, spare parts, etc., much in excess of normal requirements may be warranted during certain periods, and the ratio of net sales to current assets would, under such circumstances, show a deterioration though productivity may have increased during the same period.

### 3. Assets 'Mix' Ratios

The assets 'mix' ratios are valuable for inter-firm comparisons, and serve as a measure of productivity. The correct mixture of assets, which would yield maximum results, is provided by the following ratios:

(a) $\frac{\text{Average Current Assets}}{\text{Average Current Liabilities}}$

If it is assumed that in the short period it is desirable to have more current assets than current liabilities, this ratio serves its purpose. Current ratio indicates the ability of the firm to pay its debts as they become due. It is, therefore, a test of short-term solvency, and indicates the net working capital available to the management to carry on effective operations. The net working capital also represents the margin of protection to current creditors. The ratio, however, gives no clue to the quality of the current assets and, therefore, it should be considered in conjunction with the composition of the current assets.

(b) $\frac{\text{Current Assets}}{\text{Total Capital Employed (Total Assets)}}$

The manner in which the funds available to the management are deployed in different groups of assets affects the firm's financial condition and earning capacity. This ratio relates a part to the whole and indicates the proportion of current assets to the total assets. The composition of various assets is an important factor in financial success.

(c) $\frac{\text{Net Worth}}{\text{Total Capital Employed (Total Assets)}}$

The ratio indicates the proportion of the total assets financed by the owner's funds. The difference between the percentage indicated by the ratio and 100 per cent is the percentage of funds contributed by banks and others who have provided part of the finance for carrying on the business. It reflects the relative importance of the sources of funds, viz., owner's equity and creditors' finance and indicates the margin of safety available to creditors. It is also a measure of long-term financial strength.

### 4. Growth Ratios

In a developing country an adequately accelerated rate of growth is vital. Other things being equal, growth is a measure of progress. The following growth ratios provide useful inter-firm comparison.

(a) $\frac{\text{Profit Retained in Business}}{\text{Net Trading Profits}}$

The ratio indicates the percentage of net profit that is not distributed as dividend and is available for the purpose of building up reserves and for rehabilitation and expansion. The difference between the percentage shown by the ratio and 100 per cent is the percentage of net profits after tax distributed to the shareholders as dividend and/or utilised for payment of Super Profits Tax.

(b) $\frac{\text{Total Assets (Current Year)—Total Assets (Previous Year)}}{\text{Total Assets (Previous Year)}}$

The growth of the firm as compared to other firms can be measured by this ratio.

### 5. Cost Ratios

Owing to the sheltered market due to import controls and duties imposed by the Government in implementation of the Five-Year Plans, certain sectors of Indian industry have tended to pay insufficient attention to cost control. However, the acute and chronic foreign exchange shortage which the country has been experiencing in

recent years has highlighted the need to maximise exports.

**This, in turn, implies that management must become extremely cost-conscious, as Indian products will have to be able to compete with those from other countries, not only as regards quality and other attributes, but also in price. Cost ratios are, therefore, of the utmost importance, aiming as they do at breaking up the components of cost so that attention may be drawn to areas where costs are high.**

For the measurement of productivity also, cost ratios are valuable. However, cost ratios are affected by factors which are independent of productivity. Subject to these limitations, the following ratios are given by way of illustration for measuring productivity:

(1) $\frac{\text{Wages}}{\text{Quantity produced}}$

(2) $\frac{\text{Wages}}{\text{Man-hours}}$

(3) $\frac{\text{Wages}}{\text{Cost of Materials consumed}}$

(4) $\frac{\text{Wages}}{\text{Total Manufacturing Cost}}$

(5) $\frac{\text{Wages}}{\text{Fixed Assets}}$

(6) $\frac{\text{Quantity of Raw Materials consumed}}{\text{Man-hours or Machine-hours}}$

(7) $\frac{\text{Cost of Raw Materials consumed}}{\text{Man-hours or Machine-hours}}$

(8) $\frac{\text{Cost of Raw Materials consumed}}{\text{Quantity produced}}$

(9) $\frac{\text{Cost of Raw Materials consumed}}{\text{Fixed Assets}}$

## Productivity Comes to State Government

*The Uttar Pradesh Government has asked the Public Administration Department of Lucknow University to study the various types of State Government forms, and to make suggestions to simplify their use.*

*Nearly 5,000 types of forms are now in use in the State, and most of them are too complicated for the common man to fill in all the details.*

(10) $\frac{\text{Quantity of Raw Materials consumed}}{\text{Fixed Assets}}$

(11) $\frac{\text{Cost of Raw Materials consumed}}{\text{Total Manufacturing Cost}}$

(12) $\frac{\text{Quantity produced}}{\text{Total Capital Employed (Total Assets)}}$

(13) $\frac{\text{Rated Production Capacity}}{\text{Fixed Assets}}$

(14) $\frac{\text{Quantity produced}}{\text{Rated Capacity}}$

(15) $\frac{\text{Quantity produced}}{\text{Fixed Assets}}$

(16) $\frac{\text{Quantity produced}}{\text{Man-hours or Machine-hours}}$

(17) $\frac{\text{Fixed Assets}}{\text{Man-hours or Machine-hours}}$

(18) $\frac{\text{Power Units consumed}}{\text{Man-hours or Machine-hours}}$

(19) $\frac{\text{Total Manufacturing Cost}}{\text{Man-hours}}$

(20) $\frac{\text{Value added}}{\text{Man-hours}}$

Keeping in mind local factors and special characteristics of various industries, productivity ratios relating to cost could be devised which would be of considerable assistance to member-firms. For example, for the cement industry, the following examples of cost/productivity ratios would be helpful:

(a) $\frac{\text{Power Units consumed}}{\text{Quantity of Raw Materials used}}$

(b) $\frac{\text{Power Units consumed}}{\text{Quantity of Cement produced}}$

(c) $\frac{\text{Quantity of Cement produced}}{\text{Man-hours}}$

(d) $\frac{\text{Output of each shovel, dumper, crusher, ropeway, flotation plant, raw mill, coal mill, kiln, cement mill and packer}}{\text{Available Working-hours of each}}$

(e) $\frac{\text{Calories of Coal consumed in each kiln}}{\text{Quantity of Clinker produced in each kiln}}$

(f) $\frac{\text{Quantity of Steam produced}}{\text{Quantity of Coal consumed}}$

(g) $\frac{\text{Calories of Coal consumed}}{\text{Power Units generated}}$

(h) $\frac{\text{Quantity of grinding balls/cylpebs used}}{\text{Quantity of Cement produced}}$

(i) $\frac{\text{Quantity of Firebricks used}}{\text{Quantity of Clinker produced}}$

(j) $\frac{\text{Quantity of Oils and Greases used}}{\text{Quantity of Clinker produced}}$

(k) $\frac{\text{Quantity of Lining Plates used}}{\text{Quantity of Materials ground}}$

### 6. Inventory Ratios

In these days of shortages, and the consequent inducement to pile up stocks of stores and spare parts required for the manufacture of the product, the size of the inventory assumes considerable importance. Non-availability of stores and spare parts may lead to curtailment of production, and this encourages stock-piling of such stores and spare parts. Stock-piling results in capital being locked up. Excessive inventories may be regarded as an enemy of good management, inasmuch as heavy inventories cast a burden of unproductive capital, which ultimately reduces the profitability of the organisation. Inventories, therefore, need to be controlled.

### 7. Value Added Ratios

(a) $\frac{\text{Net Sales}}{\text{Net Value added}}$

This ratio represents the proportion of sales obtained utilising a firm's own resources, as compared to sales contributed employing outside resources. It reflects the relative importance of the sources available to the firm and the degree of dependence on outside parties *vis-a-vis* other firms.

(b) $\frac{\text{Production Cost (before depreciation)}}{\text{Net Value added}}$

This ratio shows the relationship between production cost before depreciation to net value added. It indicates the proportions of cost contributed internally and by outside agencies.

'Value added' is an economic concept, which indicates the firm's contribution to

the value of production. It should be noted that a firm may decide to produce certain components instead of buying them, and thus increase its productive contribution per unit of finished product. The value added ratios cannot be used for measuring productivity between firms where the practice between the various firms of manufacturing/buying components varies.

It would not be out of place to point out some of the difficulties encountered in measuring productivity based on inter-firm comparison of various ratios. For example, consumer satisfaction and improved quality of the product must enter in the price which a customer is prepared to pay for the product. Such elements would have to be included in the output index for measuring productivity. Similarly, several types of goods may be sold on which profit margins differ widely. This aspect of output must also be taken into account in measuring productivity.

At the input end, a firm may have at its command men, machines, services and materials, which may not be fully utilised for production. Such idle resources must be adjusted at the input end, as resources thus unutilised are a 'loss'. Such 'loss' cannot be regarded as part of 'cost'.

Common factors appearing in input as well as output must be eliminated. For example, materials used for production appear in the input as well as in the output. Such constant factors must be eliminated to arrive at the true index of productivity. For example:

Output 120 (out of which 60 represents materials).

Input 100 (out of which 60 represents materials).

Productivity Index $\frac{120}{100} = 1.20$

However, if the materials are excluded, the productivity index would be $\frac{60}{40} = 1.5$

The quantity of materials used may not always be a reliable input factor for measuring productivity. For example, the same quantity may be used, but a substitute low-priced material may reduce the cost. Similarly, materials costing less may be used in slightly larger quantities. These factors would not be reflected if materials input is considered only in quantities.

The number of workers cannot always be treated as the input to measure productivity. For example, a certain work may be done by 10 skilled workers, and as a result of standardisation the same work can be done by five skilled and five unskilled workers. The productivity index per worker remains the same. However, from the angle of input of workers in terms of money values, the position naturally is different.

Men and materials can't be independently used in all cases for the input index. For example, 10 workers may use 50 tonnes of a new material to produce a given output, whereas originally nine workers used 55 tonnes to produce the same output. If the materials cost varies, it would be necessary to combine both men and materials in quantities and prices before working out a reliable input index.

**Output per man-hour:** The output per man-hour method of measuring productivity,

## The Productivity of a Modern Office

*The office is becoming a kind of stage, from which one projects both a personal and a corporate image. . . The idea is to get everyone concerned—owners, managers, officials, clients, customers—into a pleasantly receptive frame of mind.*—ELAINE KENDALL in **The New York Times Magazine.**

though very popular, has its limitations. Wider connotations are attached to productivity, and isolated measurement in terms of labour can neither be a universal method nor a satisfactory measure of input, since an input factor assessed in isolation from other important factors which impinge on it can hardly form an appropriate yardstick. It is for this reason that when labour units are being substituted for total input factors, great care has to be exercised to ascertain that all the labour units applied consist of uniform combinations of skills and the units produced are also entirely comparable; unless this is done, the results can be misleading. This point can be elaborated by the following simple example:

| Name of Firm | Man-hours applied | Output in units | Average per unit |
|---|---|---|---|
| A | 25,000 | 1,000 | 25 |
| B | 30,000 | 2,000 | 15 |

The above table reveals that the productivity of labour in Firm *B* is higher than in Firm *A*. However, a closer examination may reveal that workers of Firm *A* are operating on an old type of unit which is now obsolete, and this naturally affects their productivity. If a common factor can be found by which the extra time taken by workers of Firm *A* can be brought on the same plane as the time of workers of Firm *B*, the productivity will become more comparable. These matters require a detailed study of various factors.

Mr Irving H Siegel, in his book *Concepts and Measurement of Production and Productivity*, says: "Labour productivity indices do not reveal changes in the intrinsic efficiency of labour, but rather, the changing effectiveness with which labour was utilised in conjunction with other factors."

It must be recognised that output per man-hour may affect wages as well as prices. An increase in output per man-hour or decrease in man-hours per unit would normally result in reduction in cost. The saving may be passed on in whole or in part to labour or to consumers or higher profits may be earned.

**Change in production techniques also affects the measurement of productivity. The introduction of a new product may first require larger input factors to start with. Later, as a result of technological innovations, the input factor may be decreased. Such changes must affect the productivity indices over a long period.**

Thus, in measuring productivity, adjustments may be called for, due to changes in—

1. The design of the product and the product composition of output;
2. The nature and the extent of the production process;
3. The productive capacity and the production;
4. The rate of production; and
5. The quality of labour, materials, machines, etc.

Inter-firm comparisons may be meaningful, from the viewpoint of homogeneity of products, in industries like cement and sugar. But comparisons in industries which produce a wide variety of articles of varying qualities, as in the engineering goods industries, are bound to be difficult. For example, the product cost of an electrical fan manufactured by two firms may not be comparable, since considerations of quality play an important part. Also, the question of allocation of overhead cost product-wise in itself presents another serious hurdle which can be overcome only if sufficiently analysed statistical data are available. Lack of suitable statistical data for such inter-firm comparisons is the most important factor which hinders proper comparisons.

Mr Hiram S Davies, Director of the Department of Industrial Research, University of Pennsylvania, has devised a method

to measure productivity of a business by the ratio of goods and services produced to total economic costs incurred after revaluing both product and costs to bring them to a selected scale of constant prices. This is known as 'Constant Dollar' technique. However, some simple method suitable to Indian conditions should be devised in order to make a start. The task should commence with collection of suitable analytical data. Once this is done a simple formula may be devised for each industry taking into account its peculiar requirements. However, such formula must take into account all input factors converted into rupees, by a standard method of valuation. If the output factors are not constant, suitable adjustments will have to be made to bring them on the same plane.

In conclusion, it may be stated that the normal inter-firm financial cost ratios involving profits, capital, fixed assets, current assets, cost, etc., though useful to business managers, cannot be directly used for the measuring of productivity.

**It is, therefore, necessary for trade associations and other bodies to undertake a study of productivity in each industry, and after careful evaluation of input and output factors, work out productivity indices for each firm so as to facilitate comparison with other firms. This suggestion, if implemented, would, apart from assisting management in increasing productivity, also assist in ironing out differences between labour and management which, to a considerable extent, are aggravated by the absence of productivity statistics. Scientific measurement of productivity must, therefore, be taken in hand to assist and accelerate our economic advancement.**

*Even in the best of industries there is scope for improvement of efficiency, says the author of this paper who asserts that introduction of IFC will undoubtedly ensure all-round satisfaction which is one of the aims of a business venture. It is his view that the technique can be applied, with advantage, not only to manufacturing firms, but also to all types of trade activities.*

JN Bose

# Efficient Aid to Management

INTER-FIRM COMPARISON is useful as an incentive to productivity by furnishing information to the firms of similar trade with regard to unit cost, productive efficiency and performance efficiency in comparison with standards, comparative sales value and profit, etc. Its object is to find out reasons for variances. It is now universally recognised by all progressive industrialists and commercial firms that the success of a business is very closely linked up with the best utilisation of the resources and facilities at their disposal and with the results obtained, i.e., relationship between the capital employed and profit earned, man and machine-hours worked, and output and sales turnover. All these different aspects of activities are expressed in terms of ratios which throw light on the weak spots of a business.

Methods of comparison vary in different industries and countries. There are various bases of inter-firm comparisons in different countries in order to suit the particular requirements of the management of each nation, i.e., capital paid-up, working capital, stock, total output, total sales, expenses in respect of various units under comparison or direct labour only.

**United States of America**: They generally compare as percentages on capital invested, net capital subscribed, total capital.

**United Kingdom**: Comparison is normally made on per ton of output, per pound of sale, per pound of direct labour.

**Germany, Holland, etc.**: They also compare either percentage of turnover on capital or per pound of capital employed.

Comparison should be made of different elements of cost, percentage of finished

output to input of raw materials, ratio of wastage to finished output, and ratio of rejection to the completed articles which pass inspection. The important thing which should always be borne in mind is that only the weak points are to be brought to prominent notice of the top management. An example is given below:

**Removal of Defects**

The forwarding note to the management should indicate only the points of defects with the remark—for example:

> "Details have been incorporated in the statement—it will be seen that the *ratio of your direct Labour* is very high, or the *purchase cost of your material* is very high, or the *percentage of rejection* is abnormal, etc."

While pointing out the important sources of losses and leakages, suggestions for remedial action to be adopted in this connexion should also be incorporated in these reports.

Thus presentation of these types of statements, focussing only on important defects, will assuredly make top management conscious of the loose ends of their business. As an inevitable consequence they would adopt remedial action to improve their business position as suggested, and base their future plans on expected relationships between such items as costs, profits, and investment of capitals.

There is enough scope for applicability of IFC. It may be made applicable with advantage to all types of trade activities—commerce, industries, *distribution business*, wholesale and even retail dealers, different types of shopkeepers, say, even butchers, meat sellers, and printers, provision of services such as transport, agricultural operations and the like, public utility concerns like gas and electricity undertakings, or national development works like river valley projects.

Some might be under an impression that this technique is applicable only to manufacturing firms. But this is a very limited view of the scope for its applicability. This technique of IFC may, with advantage, be made applicable to all types of industries of the same trade. Sometimes one may argue that difficulties will arise in some industries—for example, for a chemical industry due to the multiplicity of its products, variations in formulae, or of constituents from one firm to another. But it may be asserted that even in such complex industries there is enough scope for improvement of efficiency in productivity with the help of IFC without disclosing the secrets amongst the firms themselves as indicated below:

(a) Technical ratios in particular departments.

(b) Comparison of cost rates of common stages in technical aspects of products without revealing formulae or composition of a particular article.

(c) Ratio of direct labour cost to the total unit cost.

(d) Ratio of cost of material to the total unit cost.

(e) Cost of fuel per production unit.

(f) Cost of steam raising in comparison to cost of steam consumed, and so on.

All these items of comparison might be possible only through a common trade association which should be formed on the principle of mutual benefit and comparative advantage. This association will be responsible for co-ordinating and disseminating the above types of information obtained by research and personal investigation through the agency of the technical specialist employed by the association.

One is bound to face various obstacles in the way of initiating IFC in industrial and commercial circles. For example:

(a) Difficulty in convincing industrialists or businessmen of the utility of such comparisons.

(b) Suspicion about disclosure of business secrets makes business people reluctant to adopt such measures.

(c) Profit shown in the balance-sheet results in creating such complacency in the minds of industrialists that they do not care to think about or probe into the existence of any possible defects or leakages in their business which might have prevented earning of larger amounts of profits. Such ignorance might result in disastrous consequence to the business some day.

(d) In many firms a proper system of costing might not have been introduced, and as such,

the costing figures supplied by them are not reliable for effective comparison.

(e) All firms may not agree to the adopting of a uniform or scientific method of costing in their organisations.

(f) Determination of a suitable base for comparison.

## Ways to Solve Difficulties

To overcome the difficulties, the following steps are recommended:

(a) Literary articles on the advantages of such inter-firm comparisons should be published as widely as possible in professional journals and periodicals.

(b) Occasional lectures may be delivered and personal discussion held amongst top businessmen at luncheon or dinner meetings.

(c) Strict maintenance of business secrets or names of firms. The preservation of secrecy and anonymity is a fundamental requirement for success of any scheme of IFC.

(d) The trade association or federation would function in these cases as a clearing house for passing on useful information and research findings on a particular industry for guidance and improvement of the business position of the member firms.

(e) In the event of all the firms coming under an association and agreeing to the introduction of the scientific costing system, a central costing department will be organised *to be run by an experienced cost accountant* under the control of the association at the headquarters of the association.

(f) Confidential exchange of experience and ideas in every type of management problems between the member-firms through the association.

(g) Promotion of efficiency in management by cooperative study of management problems through the channel of the association.

(h) As far as possible, member firms should adopt similar method of pricing materials, classifications, allocation and levy of overheads in respect of expenses relating to factory, sales and distribution and administration. But this is not absolutely necessary; only a uniform system of analysis and presentation of information by a member-firm is needed. For this purpose, the member-firms should be provided with the necessary instructions for the use of similar costing terminology, so that member-firms would stand on the same comparable basis.

(i) Action should be taken on the results of time and methods study by a specialist employed by the trade association concerned which reveal sources of losses, leakages. and weaknesses, as reported by the experts of the central cost department engaged by the association. These reports are initially sent to the member-firm which has been studied and then circulated to other member-firms, safeguarding anonymity of the firm studied, so that these other firms may conduct investigations of their own organisations to remedy similar defects, if any. On receipt of copies of such reports, all other member-firms should try to put their houses in order, where necessary, by taking lessons from the condition of another firm which has been studied.

(j) Suggestions for improvement of efficiency, where necessary, should be offered. The main objective of IFC will be achieved if improvements and betterment of a firm's operation are attained on the basis of information received.

It is well known that the success of a business depends on the relationship between the capital lay-out, profit, man-hours worked and output, selling area and turnover, relationship between assets and liabilities, and the various constituents thereof. The first thing that can be derived from the ratios is knowledge of the relative efficiency of an individual firm, the quantum of profit earned, and that which has actually been achieved by other efficient firms under comparable sets of conditions. This is very important.

## Management Ratios

Management ratios are those important ones expressing these key figures. The main uses are: (a) When compared from one period to another, they throw light on changes in the health of business: (b) When compared between similar firms, they assist the management concerned to establish whether, and for what reasons, the efficiency of their business is lagging behind that of competitors; (c) Whether they realise or not, managers are bound to base future plans on expected relationship between such items as sales, costs, profits, assets and liabilities; and (d) The significance of

comparative return on the capital employed will prove to be the acid test of success of the top management of a business.

Selection of the set ratios is to be made with reference to the best suitability of the situation, and their use made to diagnose, and remedy weaknesses and sources of leakages. The principle of selection of ratios is illustrated, say, with regard to the case of a managing director who wants to establish whether the success of his business compares favourably with that of earlier periods, or with similar other firms, and if not, why not.

**Return on Capital Ratio**

Use of the capital ratio proves to be a guide in planning and control—particularly in comparing the performance of one firm with that of another. It relates concisely the resources used in a business to the results achieved. These will result in the reduction of the unit cost of labour. Such studies will disclose all the sources of inefficiencies. Thereafter a report suggesting the following ways, among others, to improve efficiency may be submitted:

(a) Elimination of unnecessary movement of materials, men, components, finished stock, etc.

(b) Articles to be manufactured must be on the floor of the operations without avoidable movement, say, preferably by a belt conveyer.

(c) Idle time and idle facilities—avoidable and unavoidable—which remain concealed or untraced in the organisation.

(d) Estimation of success or otherwise of productive efforts.

(e) Assessment of potentiality of profitableness or otherwise of each item of product manufactured by a particular firm, or a particular type of service rendered by an individual organisation belonging to the same trade.

(f) In case standard costs are assessed for the member-firms of the association, a report with analysis of variances, showing the reasons for such variances, should be submitted to the member-firms.

(g) Another example may be added. In a river valley project we may compare (i) the unit cost of earth-moving, (ii) the unit cost of concreting per 1,000 cubic feet, (iii) the unit cost of earth excavation per 1,000 c. ft. in different soils, and (iv) the unit cost of reclamation of land per acre.

(h) In case of public transport service, (i) unit cost of running a fleet of buses per passenger mile, (ii) unit cost, in case of trucks, per ton mile, (iii) consumption of petrol or lubricants per mile run, etc., and (iv) maintenance and repair cost per vehicle per year. In such comparisons, due regard will have to be given for vehicles of different makes, age, condition of road, etc.

These will assuredly reveal operating inefficiency in different industries or businesses under similar circumstances.

Thus, it is clear that the system of inter-firm comparison has been established as one of the most efficient and important aids to management in the modern days. Research into and investigation of the defects and sources of leakages and weaknesses as revealed by the useful reports and comparative statements of key figures submitted to the member-firms are sure to spotlight concealed weakness, and thereby would result in improvement of better working and management of a business and consequent (a) profitability on the capital invested, so far as the investors are concerned, and (b) reduction in the sale prices so far as the consumers are concerned.

Thus, all-round satisfaction, which is one of the aims of a business venture, will undoubtedly be ensured by the introduction of this technique. The IFC system should be introduced, where necessary, in the most scientific way, as in the USA and Western countries, to ensure efficiency and success in business enterprises.

*In the face of India's growing population, productivity is the "key to survival," and the approach to it has to be "many-pronged," says the Deputy Chairman of the Planning Commission who makes a vigorous plea here for concerted efforts to bring about a "far-reaching, technological, social, and cultural transformation within the next 10 or 15 years."*

Asoka Mehta

# Productivity, the Key to Survival

PRODUCTIVITY, it has been often said, is the key to progress or prosperity. I think in India it is something more: Productivity is *the key to survival.* Where population is growing and resources are limited, it is really the meaningful deployment of resources and it is an appropriate combination of the factors of production that can give us the ability to survive and progress.

If we study the history of civilisations —Professor Toynbee has listed about 20 civilisations, of which 17 have disappeared— we shall find that many of these civilisations disappeared because they were just unable to maintain production. Perhaps, the concept of productivity was not known to them. But unless one constantly tries to expand production, there is always the danger of production dwindling and disappearing. It is not that through stationary production we can remain where we are. Like the Red Queen in Alice in Wonderland we have to run faster and faster even to stay at the same spot. If we try to remain at the same spot, we will fall back and that is really the morphology of civilisations and cultures. *The price of survival is to move forward and this makes the concept of productivity central and crucial.*

Perhaps, it was no accident that one of the things that Lenin did, almost on the morrow of his seizure of power, was to get a book on Taylorism translated into Russian. Whatever one may now think of Taylor's practices—crude and outdated as they may be—it is significant that in 1918, even before they had made an impact in the USA, Lenin was shrewd enough to recognise the need for productivity as an integral part of the process of revolutionary transformation.

In more developed countries, particularly in the USA, the productive efforts are

**Sri Asoka Mehta inaugurating the conference of LPCs and Productivity Personnel at New Delhi, on July 28**

homogeneous to an enormous extent. But, in a country like India, levels of production are different and the heterogeneous elements are far too great. I believe that in a somewhat homogeneous economy—and no economy can be wholly homogeneous—the study of productivity is simpler. But in a society where different sets of characteristics are operating simultaneously, the position is more difficult. Technologically, we are operating at different levels and constantly we have to raise these levels of techniques. What is the meaning of productivity except that on the escalator we are constantly moving up all the time? In the Indian situation the approach to productivity becomes much more difficult; it has to be many-pronged and has to have a sense of orchestration. This is far beyond what the productivity experts are called upon to do in highly developed countries.

I was, therefore, interested in the ideas put forward by Dr Lokanathan at the LPC Conference with reference to small-scale industries. In India, we are being constantly called upon to make various choices—firstly, to decide on the investment priorities, and, secondly, to choose the appropriate technology to be adopted. These choices must ultimately be related to improved productivity, otherwise they are irrational choices. Investment priorities ultimately are determined by the obvious constraints from which we suffer. The most important constraint—one that we can forget only at our peril—is that imposed upon us by a shortage of foreign exchange. The other constraint is the availability of capital, and the third is the abundance of labour. These are the three constraints which determine our investment priorities, and they, in turn, decide our choice of techniques.

Technologically, we cannot live at one level alone. We cannot say that a developed country can live at a homogeneous zone of technology, with a relatively high rating of productivity, and India will live at another homogeneous zone of technology with a low productivity rating. If this is not possible, then how do we go about our work?

Many of us are familiar with what has been happening in Japan. I have been going through some data on capital intensity and wage levels in Japanese industry in

*... traditional agriculture has very definite limits of productivity, and at many places these limits have been reached...*

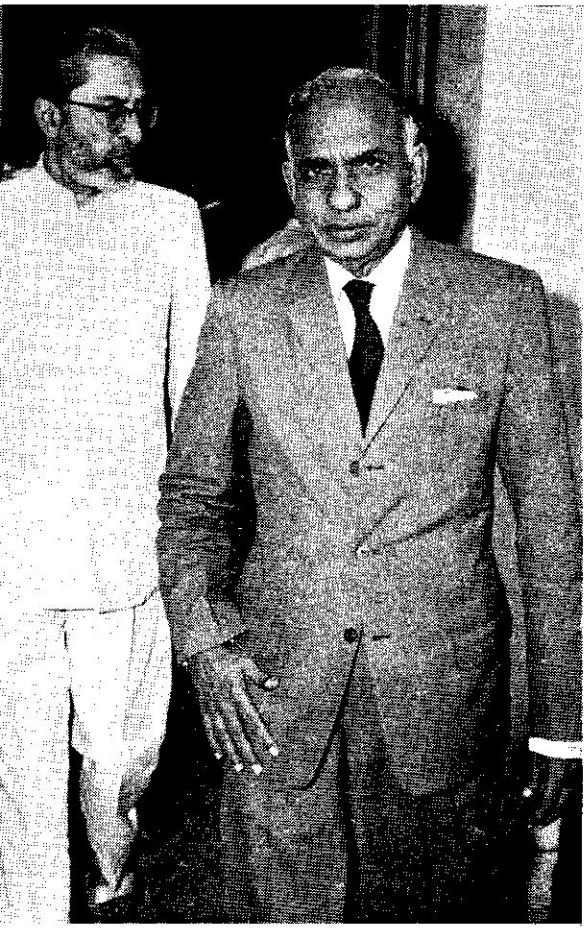
relation to the size of plants. The Japanese experience would suggest that there is a certain optimum plant size where the productivity of capital is the highest though the wages are comparatively low. But where one of the scarce resources is capital, we have to take large masses of people from a low level of productivity to a somewhat higher level, step by step. The process is like moving along an escalator, and there is no hope of jumping from one level to the other. This is where I would very much welcome the close cooperation and friendly advice from the members of the Productivity Councils at the various levels. The important thing is to identify the areas in which we could achieve maximum productivity of capital—which, as I said, is a scarce resource in India—its implications for total output, employment, and wages.

**Farm Output**

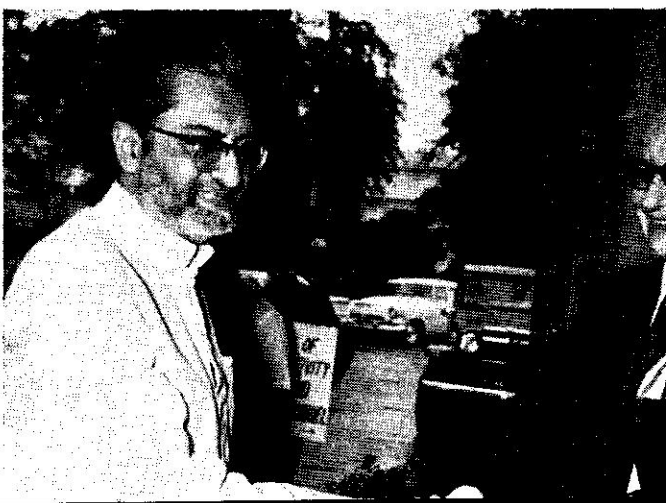
Dr Lokanathan has referred to NPC's intention (see pages 503 to 507) of taking interest in agricultural production, and studying the problem of agricultural productivity. I think this decision has been taken at the right time. It is now being realised that increased agricultural production and improvements in agricultural productivity are directly related to the industrial inputs that we are able to provide. For instance, if we achieve or surpass the targets of fertiliser production, we shall simultaneously have to increase the willingness of the agriculturists to use these fertilisers. The same is the case with pesticides, power and irrigation facilities. There is another area where a lot remains to be done—the use of power tillers and tractors. At a recent meeting of Development Commissioners and Directors of Agriculture from different States, there was a proposal for an ambitious programme of soil conservation to be carried out in the next few years. But this would require us to make available the right kind of machinery.

Agriculture can no longer be thought of in traditional terms. Traditional agriculture has very definite limits of productivity, and at many places these limits have been reached. Higher agricultural productivity must be secured through a technological revolution and this will involve a far-reaching socio-cultural transformation. We cannot increase agricultural productivity on a continuous basis, unless we bring about the technological revolution. We cannot put through this technological revolution in agriculture, unless socio-cultural transformation takes place. That is why I said recently that it is wrong to demand that the community development movement should concentrate exclusively on agriculture. It cannot, because of the whole process in which we are engaged. If one is thinking in terms of a specific time span—10 to 15 years in which limited targets are to be achieved—that is a different matter. During the first 10 to 12 years of planning we were able to take advantage of the natural slack that existed in the traditional economy. There is still a certain amount of slack which we have to make constant efforts to remove. But *our future growth depends upon a more basic and fundamental transformation.* It is from this point of view that the next 10 to 15 years become years of fundamental and crucial transformation.

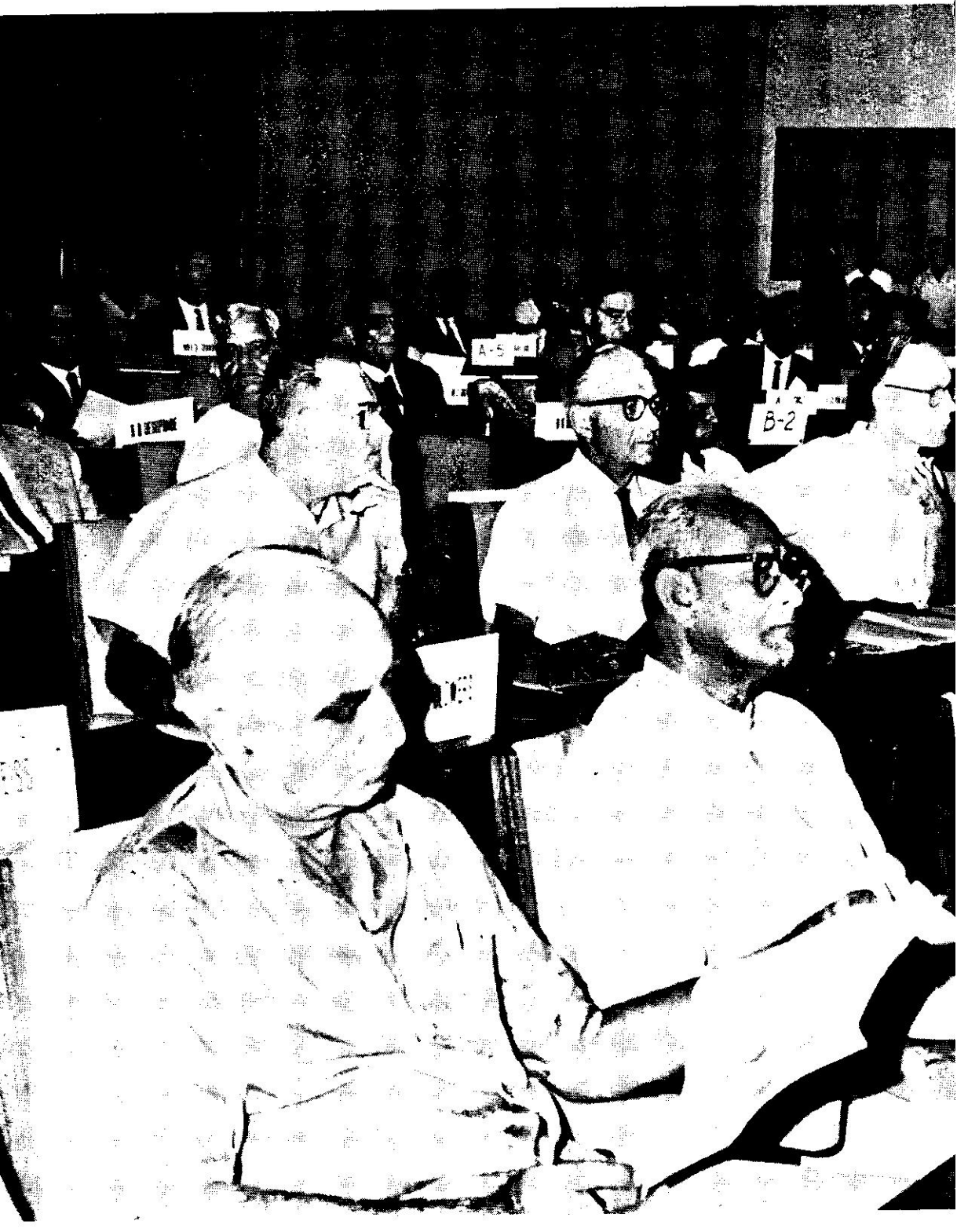
We are seated near the dynamo from which a new force has to be generated and diffused throughout the economy. This reminds me of the play of Gurudev Tagore, *Tasher Desh*, wherein the citizens had lost their vitality and elan, and their capacity to respond to the rythm of life. And then a magic flute was played, and the vitality flowed back. What we need today is a similar transformation so that the vitality may surge back into our lives, and the people can move forward in the most creative manner. In this context it is a point to consider whether the people in the productivity movement feel a sense of joy, pride, and responsibility in bringing about this transformation. If they do, they have a tremendous history-making role to play which, through their own efforts, they have deserved to assume.



# *Conference of LPCs & Productivity Personnel*



*Above:* **Sri Asoka Mehta, Deputy Chairman, Planning Commission, who inaugurated the Conference of LPCs at New Delhi on July 28, entering the Conference Room with the Chairman of NPC, Dr PS Lokanathan.** *Right:* **Sri Asoka Mehta being received by Sri NK Bhojwani, NPC Executive Director**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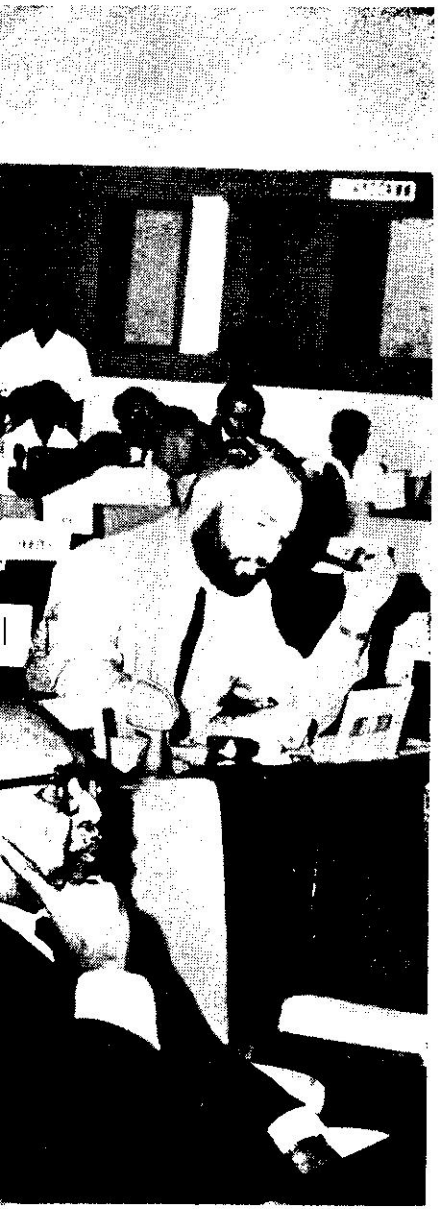
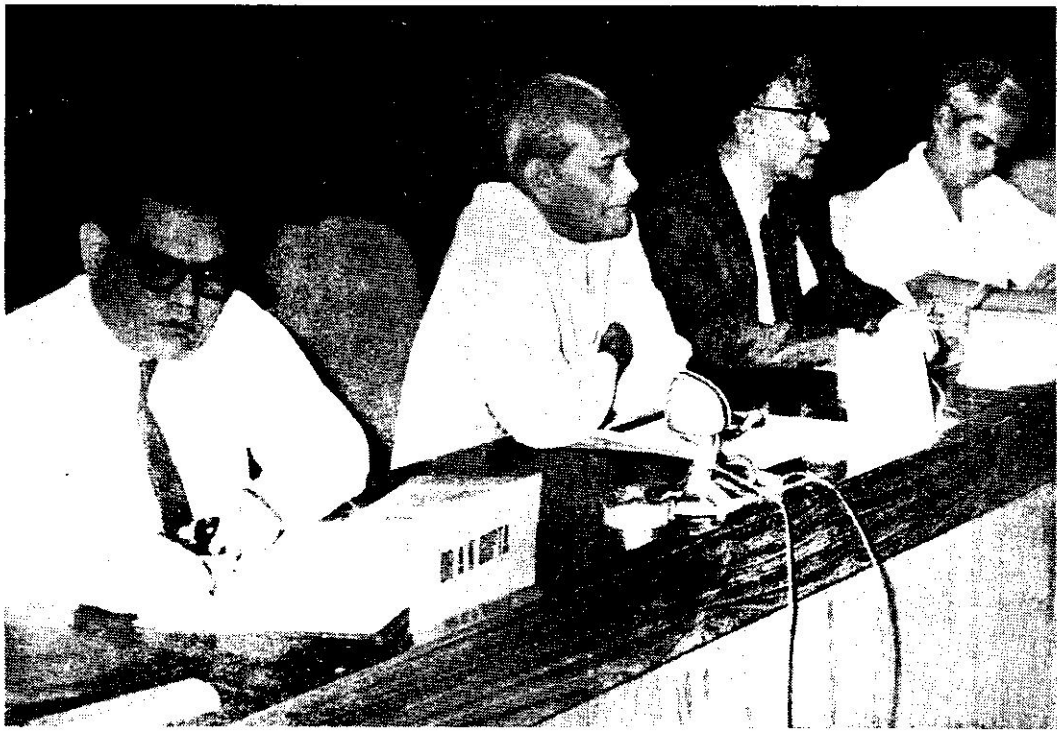
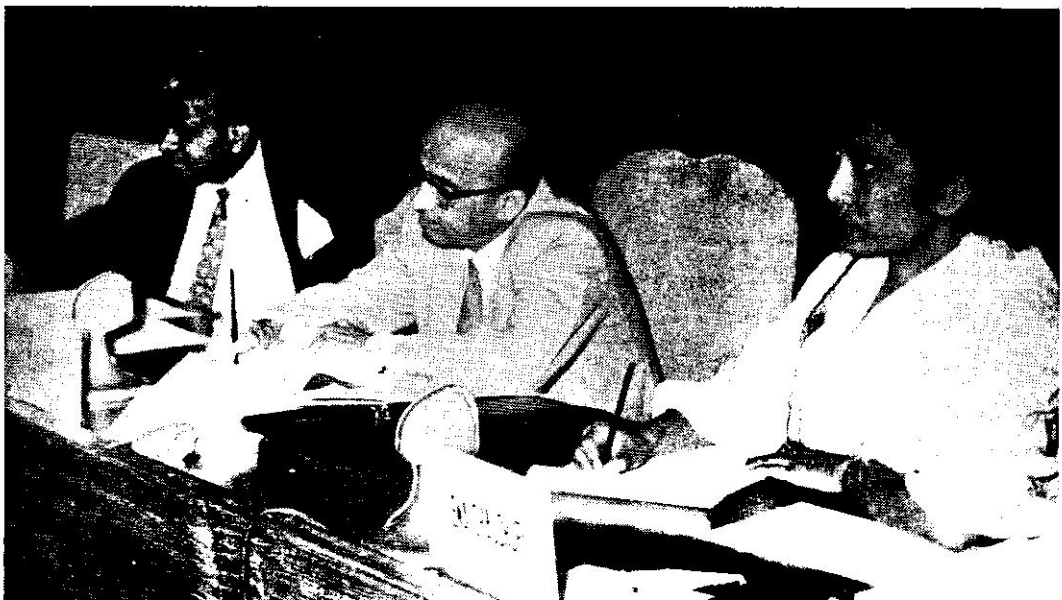


A view of the delegates who included representatives of LPCs, trade and industry associations, professional organisations, trade unions, training and research institutions, and industrial management consultants, besides observers from State Governments, and US-AID and other foreign agencies connected with NPC

*ABOVE: Dr Lokanathan and Sri Bhojwani at the meeting of the General Council of NPC at India International Centre on July 27. BELOW: Two members of the Council, Sri Bharat Ram and Sri NK Krishnan, intently listening to the discussion on NPC activities*



*The conference of productivity personnel split itself into four groups and discussed a number of problems bearing on productivity. ABOVE: Left to right, Dr AK Gupta, Dr SC Sen (Chairman), Sri M Gopal Rao (Secretary), and Sri GK Nayar (Rapporteur), of the group which discussed the evaluation of productivity programmes. BELOW: Sri MS Dighe, Chairman (centre), Sri RN Warriar, Secretary (left), and Kumari Ena Chaudhuri, Rapporteur, of the group which discussed the mechanics of co-ordination, and means of collaboration, in productivity activities.*



*The Chairman of the National Productivity Council here outlines the task ahead of the organisation, and makes a pointed reference to the urgent need for doing something, in a "small but significant" way, in the field of agricultural productivity.*

PS Lokanathan

# A New Deal for Productivity

WELCOMING the All-India Conference of Local Productivity Councils and Productivity Personnel, held at New Delhi on July 28, 1964, Dr PS Lokanathan, Chairman of NPC, outlined new programmes designed to carry productivity into the very heart of industry through organisation of Industry-wise Productivity Councils, Productivity Cells, etc.; mobilisation of the services of management consultants; establishment of research facilities within the NPC; a study in some depth of the basic causes of low productivity in India's major industry, viz., agriculture and the capacity of the large institutional and bureaucratic set-up to upgrade agricultural productivity, which now holds up a massive advance on the economic front. Above all, an attempt will be made in the coming years to integrate productivity into the general development policy of the State, and to so organise the productivity movement that productivity works as an effective lever to raise the growth-rate of Indian Economy.

Since its establishment in 1958, NPC has sought to make as deep an impact as possible upon the industrial sector in India, and we can, without undue modesty, claim a fair measure of success. It is evidenced by the fact that productivity is almost everywhere talked of and practically in every context whether it is municipal, Government, hospital administration, or education. In the field of industry, there is not a single section which has not been exposed in one way or another to the productivity programmes organised by NPC. The fact that during the last six years more than 1,000 training programmes have been organised and 17,000 persons have participated in these training programmes, not to mention over 33,000 persons who have participated in our seminars and conferences,

is enough to show the widespread interest which productivity has created in the country. These programmes have been conducted in every State in India, and the participants belong to different levels of management and workers. The progress achieved is by no means insignificant.

This is not to say that we are wholly satisfied with our achievements, nor can we afford to rest on our oars. On the contrary, we are aware of the limitations of our work and of the large areas which are calling out to be covered. I think, there is danger that unless we deliberately move forward the productivity movement may continue to operate in narrow grooves. There is also the danger of measuring the usefulness of our work by the number of training programmes and the number of seminars and conferences, the number of fellows we send abroad, the number of in-country teams which we send round, without our constantly examining whether we are not sacrificing quality to quantity and whether the results are commensurate with the efforts. There is further a danger of regarding techniques and methods as ends in themselves, and as substitutes for the economic growth which is our goal. Techniques and methods are only tools.

### The Approach

What is needed is rather a deep study of the problems of each industry, and see why costs are high while productivity and efficiency are so low. Our approach should, therefore, become increasingly problem-oriented. Different problems will need different techniques and different solutions. Hence it is necessary from time to time to examine whether the work of NPC is organised along sound lines; whether there is need and room for change and, if so, in what direction; whether NPC is fully abreast of the technological, social, economic and other changes that are taking place in the country and elsewhere; and whether it is able to adapt itself to the needs of the changing situation.

We must review our work seriously and see in what directions improvements are to be made. Experience all the world over has shown that it is not so much the material inputs that have brought about rapid rates of growth of the economies of the developed countries, but rather immaterial inputs and

## *The Secret of Russia's High Productivity*

**The preparation, publication and dissemination of scientific and technical information are considered of such major importance in the USSR, that they are the direct concern of the USSR State Committee for the Coordination of Scientific Research. A study of this aspect of Russian economy is contained in a report of a delegation which visited Moscow and Leningrad as part of the Anglo-Soviet agreement on cultural exchanges.**

**The report covers a sample of the whole of the Soviet technical information service, and discusses the relevance of the Soviet Union's experience to the needs of Britain. A valuable lesson to which the report draws attention is the close relationship which exists in the USSR between economic planning and the application of science to industrial development and production, coupled with the insistence on a network of technical information services reaching all levels of industry.**

**A measure of the importance which Russia attaches to the dissemination of technical information is shown by the fact that 60,000 people are employed in 84 all-union and central information establishments, 94 central technical information bureaux of the Regional Councils of the National Economy (Sovnarkhozy), 4,000 technical information bureaux, 3,000 technical offices, and 16,000 technical libraries.**

investments in what may broadly be called education and research. The attitudes and motivations of workers as well as of top management are more significant to productivity than formal training in techniques and methods. It is now recognised that the most effective techniques are useless if management is not up to the mark and if it is not attuned to productivity. The mentality of the management rather than the size of the units is the basic factor affecting productivity. It is thus obvious that NPC cannot divest itself of its functions in the field of management development and management attitudes. It is not enough if new techniques and processes are evolved. It is much more important that we should know how new techniques and processes can be usefully introduced and how to motivate industry, trade, and agriculture to the quick adaptation of these advanced methods and techniques. Hence more and more attention should be given to evolving processes which would be most effective to introduction of desirable changes.

The problem is not to give training in technical and commercial fields—although that is important—but in organisational and attitudinal adjustments. We have in our country some industrial units which are now sold to the idea of productivity, but there still remains a very large percentage of businesses which are yet to be exposed to management productivity. We should ask ourselves whether we should not devise new and more effective approaches to this problem, and whether better results could be secured by meetings, discussion groups, and reaching firms individually and demonstrating to them the results of our productivity methods. It is because of this I feel that the time has come when NPC should take special pains to stimulate industries to establish their own productivity committees or industrial engineering units or productivity cells or whatever we may call them. For, not until each unit is permeated with the philosophy and gospel of productivity can our movement succeed.

*. . . productivity movement in India should be more broad-based . . . the country should recognise that productivity is the major factor affecting economic growth . . .*

We have so far carried on our productivity activities in a functional way by organising training programmes to suit the requirements of different levels of management both through general and specialist programmes. Only recently have we experimented with the idea of dealing specially with the productivity problems in two selected industries, namely, sugar and textiles. This burden cannot be carried by NPC all the time. *Problems of productivity in each industry must be studied by the industry itself* and hence the time is opportune for each major industry to establish its own productivity council which will work in close collaboration both with NPC and LPCs. From all that I have heard, the idea is acceptable to industry and we may expect some industrial productivity councils to be established in the coming years.

In all this activity, we must bring together all individuals and organisations concerned with promoting productivity, and mobilise their talents and resources in serving the productivity movement. We must also establish some arrangements by which the industrial and management consultants, whose number is steadily growing, may assist in supplementing the efforts of NPC and LPCs in the service to industry. The Productivity Survey and Implementation Service, which we organised in 1963, has met with such a response that we literally are unable to cope with the demands. We are also aware that these demands can be met equally efficiently by the industrial and management consultants, if only they and the industrial units are brought into touch with each other.

Indian industry has been taking advantage of management consultancy, which has developed as an important service to industry in recent years. It is time that we think of the methods by which not only larger firms, but also middle and sometimes even small firms, may take advantage of the management consultancy service. We might examine closely how to associate management consultants in LPC activities, and how to provide management consultancy services to as many industrial units as possible. We may also have to develop a special training programme for management consultancy, as has been developed in certain other centres to enable the consultants to render the kind of service appropriate to small industries in particular.

**Forum for Cooperation**

NPC occupies a very special position among the organisations which have, directly or indirectly, the promotion of productivity as their real objective. Management organisations, industrial and management consultancy firms, various professional bodies and many others are doing an excellent job in the productivity field. But NPC enjoys this great advantage of being, like the ILO, a tripartite organisation (of course, on a national scale) composed of trade union representatives, management representatives and the Government and other neutral persons. Hence in every country in the world it is the national productivity centre that has become the meeting point, and provides the forum for cooperation. All are brought together to work in collaboration with these national productivity centres. Special measures have been adopted to enable small and medium firms to have recourse to consultancy services.

In Denmark, the home of small and medium-size industries, the emphasis is on improving the efficiency of small firms. There is a consultancy law in Denmark which provides for the setting up of advisory services which are organised by various industrial organisations, and the Government meets half the cost of such services. Another interesting development in Denmark is that trade unions themselves have established productivity centres. This is also the case in France. These trade unions and labour productivity centres provide educational facilities for managers, shopkeepers and trade union representatives. Both in Denmark and France management education is organised by productivity centres. Trade union productivity centres have progressed fast in France. These centres engage themselves in matters relating to safety conditions, noise, fatigue, etc., in addition to activities in promoting industrial relations. It may be of interest to know that the employers have, in several instances, requested trade union productivity centres to carry out research and analyse the factors which are responsible for the low productivity in their plants and make recommendations.

Of late there has been growing comment upon the failure of NPC and LPCs to make a contribution to the growth of productivity in the field of agriculture, which is the major industry of the country. Some pointed criticism of this position was made at the last session of Parliament. It is not that we of the NPC are unmindful of the need to bring the productivity movement into the field of agriculture. Some years ago, the late Sri Govind Vallabh Pant when inaugurating the annual meeting of the NPC made a pointed reference to the failure of NPC in not having done anything to promote productivity in agriculture, and urged that we do try to make some contribution to it. Since then we have been giving constant and earnest consideration to this matter. If our response has been tardy, it is not because our intentions are feeble or our understanding of the importance of agricultural productivity is poor, but rather because of a combination of two circumstances. In the first place, the problem of agricultural productivity is too complex and too difficult for the exiguous resources of the NPC to make any real impression. Frankly, we are not too well-equipped for the immense responsibility which would fall upon us if we were to attempt the task. But the second circumstance has been equally decisive.

In the field of agricultural productivity, several agencies are already at work in one way or another. The entire community development programmes have been designed to undertake this task. We now have the Panchayat Raj entrusted with similar responsibilities.

Nevertheless, we feel that the time has come for NPC to enter this field in a small but significant way. But our immediate task is to find out after carefully studying all the activities in this field, the nature of the need and the scope for further work in productivity which we of the NPC and of LPCs can usefully undertake. We shall have to know what gaps, if any, exist in the various programmes already organised by the community development organisation and whether NPC can find a special niche in the machinery for promoting agricultural productivity. Towards this end, we propose to establish a working group of NPC which will consult individuals and organisations conversant with agricultural problems, make a good study, and present a report on the need and extent to which the NPC can supplement existing efforts. There is no use of rushing into the matter without making sure not only that there are problems needing attention, but that we of NPC are qualified and have the resources to deal with them.

**Behavioural Studies**

One of the reasons why agricultural productivity is low in our country is the slow response of the farmer to the adoption of improved methods of cultivation, use of improved seeds and fertilisers, and use of irrigation water. This needs patient inquiry, particularly into the techniques for bringing about changes in the farmers' attitudes and responses to these most essential adjustments.

In this connexion I may point out that the NCAER's study of factors affecting fertiliser consumption has thrown interesting light upon the relationship between the positive, progressive and achievement oriented persons and the level and extent of fertiliser users, irrespective of the size of the farms or the financial capacity. For that, we need to know the farmers' motivations and beliefs and their system of valuation. Thus behavioural studies will do a lot of good, but so far little has been done in this regard. Perhaps, the NPC can do some useful work in this direction. I am convinced that the minimum that we should aim at is a study of the subject in some depth.

**Productivity Policy**

I think that the productivity movement in India should be more broad-based, and that NPC should understand more clearly its own role in the rapid development of the Indian economy and the areas where it can make a serious contribution. It should keep closely in touch with all activities designed to bring about rapid economic development without sacrificing, however, its own technical work. The country should recognise that productivity is the major factor affecting economic growth and, therefore, NPC should be involved in one way or the other with the national efforts in promoting development. While it should not be the function of the NPC to attempt to do everything by itself, (indeed, it would not be practicable), it should maintain close relationship with all agencies and organisations which, in some way or the other, contribute to rapid development.

Productivity policy is a part of general development policy. We should, therefore, concern ourselves not only with productivity problems in industry, but also with the efficiency and improvement of administrative and Government machinery, with the functioning of Government departments including public utility services, because if productivity means anything, it means that existing and available resources can be much more effectively utilised than has been the case so far, and there is vast scope for reducing costs all round and for increasing national output.

*Cement continues to be in very short supply throughout India owing to the more rapidly increasing demand, and the slower rate of growth of the industry. A Study Group of NPC has examined the factors affecting cement productivity, and suggested measures not only to reduce manufacturing costs, but also to pave the way for the growth of the industry on rational lines.*

# NPC Xray of Cement Industry

THE introduction of SQC, mechanisation in the quarries wherever feasible, improvement of working conditions, and provision of social incentives, are among the 39 recommendations of the NPC Study Group[1] to increase productivity in the cement industry. This Study Group was appointed, along with four other Study Groups, to Xray the factors affecting the productivity of cement industry.

The Group made an intensive study of all aspects of the industry, and has suggested measures that will lead to reduction in manufacturing cost, increase in productivity, and pave the way for the growth of the industry on more rational lines. Very particularly, it has come to the conclusion that, even while using the existing machinery and raw materials, cement productivity can be increased by SQC.

The raw materials used in cement industry are extremely variable in their quality, and further variability is introduced as a result of various makings and machine operations, conditions of temperature, etc. However, with the help of the SQC technique, a constant cause system can be discerned in the pattern of production, and if any production process goes out of control, plant engineers, chemists, and other concerned technologists can easily locate the causes. Costs will thus be reduced and productivity increased by hunting for trouble only when there is a real trouble, and allowing the system to work undisturbed when there is no real trouble.

SQC, based on the theory of probability, is simple in operation and can be easily understood and applied by plant management.

[1] The Productivity Study Group on the Cement Industry was appointed by NPC on Sept. 6, 1961, with Mr RV Raman, Joint Secretary, Ministry of Steel and Heavy Industries, Government of India, as Chairman.

The upper and the lower limits of the charts will show the process capability of the plants, and if these limits do not satisfy the specifications, some basic changes are to be made by the technicians. Though it is a fact that without the help of the SQC method technicians have been making improvements by experience, only by the help of this method are the technicians guarded against being alarmed at the variations due to chance causes and running here and there to trace out the cause which in fact may be a normal thing in that particular process.

### SQC Charts

To begin with, SQC charts can be maintained for compressive strength, fineness, initial setting time, final setting time, soundness, sulphur trioxide content, and weight of packed cement bags. These charts will be helpful not only in maintaining and improving quality, but also in locating the sources of defects and difficulties in the manufacturing processes. To be on the safe side, there is sometimes a tendency to over-fulfil the specifications and standards set for the industry by the Indian Standards Institution. This will no longer be necessary if control charts are maintained, and productivity consistent with desired quality can thus be increased.

It may also be useful to maintain SQC charts at the clinker and slurry stages. Underburnt clinker is high in free lime and is lighter in weight, whereas over-burnt clinker is heavier and hard to grind, and both give lower strength to cement. It is well known that the percentage of free lime present is correlated with the weight of clinker. Optimum litre weights and control limits in the case of each factory can, therefore, be found and the requisite degree of burning can be maintained efficiently. The uniformity of slurry in the wet process, or raw meal in the dry process, can also be maintained with the help of a control chart especially in regard to fineness of the slurry, calcium carbonate content, and moisture in the slurry.

Both on the part of the management, and also on the part of the labour unions, there appears to be a growing realisation that maintenance of good relationship is in their mutual interest. Training courses conducted by the Productivity Councils at various levels, specially in the local languages, have contributed to substantial improvement of labour-management relations. However, a few of the factories visited by the Plant Study Sub-Committee of the Study Group, complained about the unsatisfactory state of labour relations. This may point to greater need for worker-oriented training courses.

Absenteeism in the cement industry varies from 10 per cent to 15 per cent. The Study Group has drawn pointed attention to the increase in absenteeism consequent on the implementation of the ESI (Medical) scheme in most cement factories. Under the ESI regulations, if a worker "is given leave only for two days, he will not be entitled for the wages contributed by ESI. Hence, the tendency for a worker is to take at least one week's leave." Further, according to the current practice, "a worker need not report of his sickness to the management."

So, certain provisions in the ESI Act (like 56 days' leave with full wages) appear to have contributed, in the opinion of the Study Group, to the increase in absenteeism.

The Plant Study Sub-Committee of the Study Group visited most of the cement factories and found that while amenities like rest-sheds, canteens, hospitals, and cooperative societies, had been provided, the working conditions cannot in general be said to be satisfactory. Productivity is bound to increase with an improvement in the working conditions.

### Incentive System

It is apparent that any steps taken to increase productivity will always interest the industrialists, because higher productivity means more goods produced at the same cost, or the same amount of goods produced at lower cost. In either case "*only the industrialists seem to benefit.* Under such conditions

*...social incentives, like honouring distinguished workers with titles, receptions, displaying their photographs, and allotting them better type of quarters, can be tried to increase productivity...*

why should the worker take part in raising productivity?" In this context, the Group has suggested linking wages to productivity.

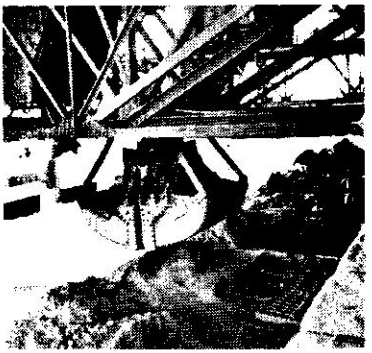
While the consensus among the representatives of the various cement factories was that the incentive system might increase productivity, it is feared that it would not be possible to introduce the incentive system in all the departments of a cement factory except (as is actually the case in almost all cement factories) in the manually-operated limestone quarries and the packing section. In one or two factories a kind of incentive system was tried by giving extra remuneration for higher production to some of the employees. *This had created ill-feelings* among those workers who were not benefited by the incentive system. Shri Digvijay Cement Works reported that *maintenance was neglected after introducing the incentive system*, and that as a result they had to abolish it. Even in the manually-operated limestone quarries and the packing departments, the system is not working successfully because the workers are afraid to give more output owing to their fear that the minimum workload may be increased afterwards on the basis of higher output. The Group has suggested that efforts may be made to dispel such fears from the minds of the workers.

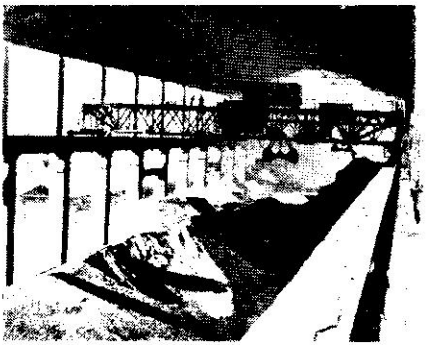
The Group has drawn attention to the Dalmia Cement (Bharat) incentive scheme, by linking annual bonus to production: this has helped it to increase output. The Labour Appellate Tribunal formula gave rise to controversies as regards the quantum to be provided for prior charges such as depreciation, rehabilitation, taxation, dividend on ordinary shares, and dividend for working capital. After protracted negotiations with the union, it was agreed in 1961 that as the profits of the company *inter-alia* depended upon production, relating bonus to the level of production would afford a simpler and more expedient method of determining the bonus to be paid in the future years. The parties accordingly decided that for the period 1962-65 the bonus would be determined on the basis of clinker output. The position, however, would be reviewed from time to time.

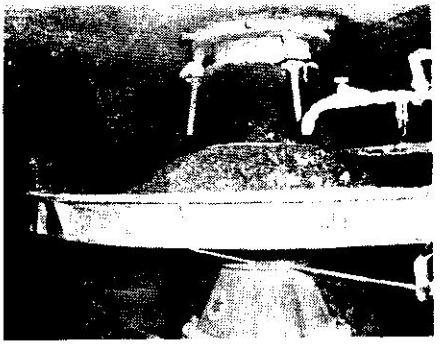
The clinker production for 1962 was known on Jan. 1, 1963, and as per the above formula the bonus payable was immediately calculated and actually paid within 10 days! And there was no need for any negotiation, conciliation, or adjudication. The workers are now evincing a keen interest in the monthly production of clinker, and are making every effort to see that relining of the kilns is done in the shortest possible time so that the kilns may be stopped for the least number of days. A master notice board gives monthly clinker production. In short, the bonus agreement has motivated them to such an extent that if they find any laxity either on the workers' side or on the management side, they promptly take it up. The monthly production committee meetings at which both labour and management are represented are helping to solve problems and establishing better relations: in fact any one attending these meetings would find that participation in management is in this case a reality. The Group has suggested this arrangement for consideration by cement factories.

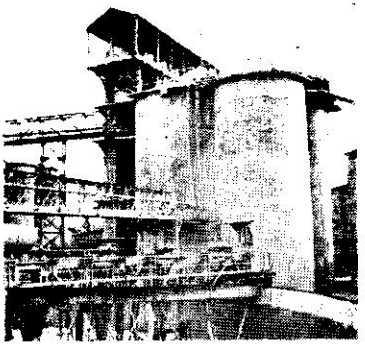
# CEMENT INDUSTRY IN PICTURES

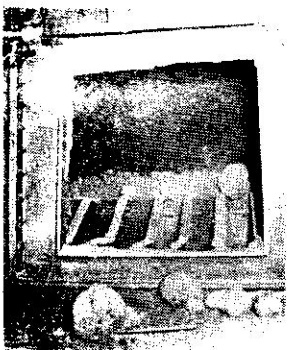
*Cement has come to be regarded as a key material for India's economic growth. It has a vital role to play in development projects and other nation-building activities, and no small efforts are being made to increase its output.*





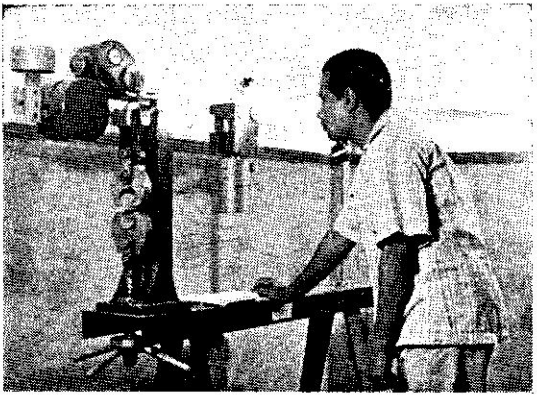




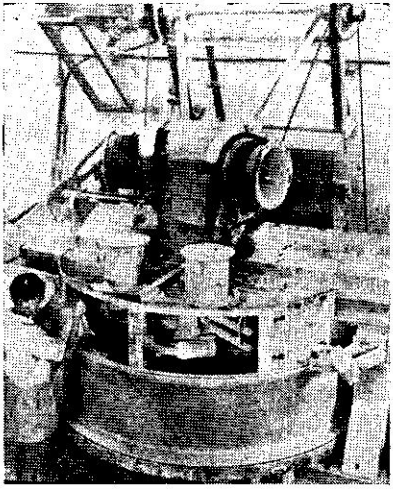


Photographs published on this page and the next one illustrate various stages of cement production. The four on the *Left* (top to bottom) show—Overhead crane feeding the raw material hopper; A view of the table feeder; A view of the slurry elevator, slurry silos, and slurry basin; and Clinker in Folax Cooler; and the three on the *Right* (top to bottom) - Clinker storage hall and the overhead crane; A view of the Central Worksh and The Slur Mill.

PLEASE TURN OVER



## *TESTING OF CEMENT*



*Top left:* **Testing the fineness of cement with sieve;** *Right:* **Examination of the tensile strength of cement.**

*Bottom left:* **Making moulds for determination of setting time of cement;** *Right:* **Preparation of different brick mixtures.**

*There are three articles relating to the cement industry in India, and these appear on pages 465-466, 467-476, and 508-513.*

Monetary benefits need not be the only incentive to the workers. Social incentives, like honouring distinguished workers with titles, receptions, displaying their photographs, and allotting them better type of quarters can also be tried.

The Study Group has further recommended the introduction and improvement of preventive maintenance schedules in all the cement factories. Machinery in the cement industry is 10 to 15 years old; the output is, therefore, much below the rated average. A programme of rehabilitation of such machinery should be pushed through as quickly as possible, with Government assistance, so that productivity of these units may increase. Wherever feasible, mechanisation should be introduced in the quarries.

The Group has drawn attention to a loss of as much as eight per cent (in 1961) in the output of cement factories (excluding ACC) due to shortage of essential spare parts. It is suggested that a list of such spare parts may be prepared, and foreign exchange allocation provided. The Group has also suggested the standardisation of machinery, including physical dimensions, and design. The size of kilns, for instance, should be restricted to 550/600 tonnes capacities. For the next five years or so, the optimum size of a cement plant should be of 1,800 tonnes per day capacity. Some Government Departments like the Directorate General and Technical Development might examine the proposal to standardise other machinery units like crushers, saw mills, cement mills, and coal mills.

Raw material deposit (limeshell) of Travancore Cements is expected to last for 10 years only. The Fisheries Department of the Government of Kerala may be requested to start research on limeshell culture, to ensure a continuous supply of this valuable raw material. The majority of our known deposits are not of high quality, and until better quality deposits are discovered floatation plants also may be installed as a long-term measure. The use of the blast furnace slag fly ash and burnt clay could increase the availability of cementing materials particularly from the factories having low reserves of limestone.

Attention has been drawn to the fact that factories of recent origin have lower man-hours per tonne of cement when compared to older plants, due to the adoption of the latest techniques of plant lay-out and materials handling.

**Power Consumption**

Power consumption per tonne of cement should not exceed 115-120 units in case of factories having their own power generation and electrification of quarry.

A few calcinator and dry process kilns are collecting and feeding chimney dust. This should be introduced also in wet process kilns, unless factors like high alkali content come in the way of utilisation of dust. The kilns to be erected in future should have adequate space between the back-end of the kiln and exhaust fan to accommodate dust collecting and feeding arrangement at a later date, if necessary.

It is the considered opinion of the Study Group that the labour cost of producing cement, in terms of man-hours required for making a ton of cement, is much higher than the same in Japan and the West, and that in terms of productivity the industry bears an unnecessary cost on account of redundant labour. The Group has suggested that the industry be permitted to work off redundant labour through natural wastage.

# productivity abroad

**That increased productivity is crucial to stable growth has not only particular relevance to the developing economy, which is more urgently concerned with increasing its production at minimum cost, but is also true of advanced countries. Presented in the following pages are sidelights on productivity not only in the USA, UK, and France, but also in both China and Russia, besides some new facts on training and industry in Chile, a country under development.**

## America: "the Sick Giant"

Paul Johnson

AMERICA has never been so prosperous. Every index of economic activity is reaching record levels. The Gross National Product is now the highest of any nation in history. Although prices are steady, there is more money in circulation than ever before. Industrial production is 30 points up on 1957-59, and retail trade eight per cent up on last year. The level of personal incomes has broken all records. On the eastern seaboard, the three-car, two-house family is now a common phenomenon, even among what we would term the lower middle class. In New York, you can see long queues of men and women in evening dress lining up outside night-clubs.

Corporation profits have increased by 22 per cent over 1963—in many cases by 30 per cent or even 50 per cent. The tax-cut alone has so far poured another $1,500 million into corporate profits . . . Yet, on the Administration's own admission, one-fifth of the nation—nearly 40 million people—live below the poverty line. Many economists and union leaders would put this proportion at much nearer two-fifths. Unemployment is higher than in any other advanced industrial country. The figures are more eloquent than words—1948-49: 2.6 per cent; 1953-54: 3.9 per cent; 1957-58: 5.0 per cent; and 1960-61: 5.3 per cent. Last year it stood at 6.1 per cent.

Since the business boom got under way, the figure has fallen slightly, but on the available evidence it seems almost inevitable that it will surge forward again when activity levels out—perhaps to a figure of seven per cent or more. "If present trends continue, we must face up to 10 per cent unemployment", one union leader said.

The cause of this rising unemployment is, of course, America's slow growth-rate—itself the product of a decade of Eisenhower rule. The rate slipped from an average of four per cent in the years 1947-57 to 2.9 per cent in the last six years, meaning that the economy is creating an average of only 175,000 new jobs a year, instead of 700,000.

**Progress of Automation**

But an increasingly important factor is the progress of automation, which is now beginning to disturb even Capitol Hill. The final report of the special Senate Sub-Committee on Employment and Manpower, published in April, warned that the "scientific and technological revolution has shaken our social and economic foundations to the roots."

We, in Britain, accustomed to the slow erosion of economic forces in such areas as Scotland and the North-East, can have no conception of the speed and devastation wrought in America by technical change. The vast Chicago stockyards, once one of the horror-sights of America, have become in the last decade a desolate husk, black and smouldering with the wreckers' fires. Ten years ago, 30,000 men worked here; now only a handful. What happened to these men? Nobody knows.

In agriculture, ruin has been catastrophic. No industry has increased its productivity faster since the war—by 135 per cent in 15 years. But during this period over 40 per cent of its workers were eliminated. The machines have moved in—huge, shuddering monsters, some of them bigger than a house, which not only pick the cotton but process it and bale it, not only seize the fruit and vegetable delicately from the earth, but sort and can them in the fields . . . This year, a new machine for picking asparagus; next year—they hope—for strawberries. Many of the labourers 'released' by these advances never find another job. Semi-skilled at best, their talent, such as it is, lies exclusively within the agricultural sphere. Though agriculture is an extreme case, the same principle operates throughout industry: automation eliminates precisely those who are least able to find any alternative employment.

The greatest weakness in the American economic structure is the absence of a nation-wide system to train or retrain such people. Washington is at last making efforts to fill this gap; but in doing so officials are discovering a more fundamental weakness in the compulsory education system itself. It is easy to find many young men of 25 or over who have never held a regular job of any kind since leaving school a decade before. Among young men of 18 or 19, the unemployment rate is well over twice as high as among the labour force as a whole; and among men of 20-25 it is nearly twice as high. A good many of these spend their entire lives without regular employment, and their children are, as likely as not, doomed to the same fate. There is a phenomenon in America which, outside parts of southern Italy, is unique among advanced nations: the third generation unemployed.

**"Dante's Inferno"**

These built-in weaknesses in the American social and economic system have produced a Dante's Inferno of submerged classes, each worse off and less protected than the last. The Appalachian region, stretching over eight States, contains what was once the greatest virgin temperate forest in the world: huge poplars, called Goliaths, 175 feet high and often eight feet in girth, white oak, hickory, beech, maple, basswood, and many others. In the sub-soil are vast deposits of coal and other minerals.

These hills were settled by poor, often criminal, English immigrants who, from first

to last, have remained an undiluted rural proletariat, exploited by outside interests who invested little and carried all that they extracted elsewhere. The trees were the first to be ravished, hacked down for a dollar or less apiece, or burnt by the acre to clear the ground. Then came the Eastern speculators, who persuaded the settlers to part with the sub-soil rights for a few dollars. These deeds were often signed by illiterate men in the mid-19th century, long before the railways came to make the coal exploitable. But they are just as valid in 1964 as the day on which they were signed, and permit huge, impersonal mining companies to remove houses and farming land, without compensation, in order to get at the coal beneath.

World War I brought the railway system to Appalachia, and with it a brief period—less than a generation—of comparative prosperity. But deep-mining is now finished, as uneconomic, and has been succeeded, in turn, by strip-mining, which can only be described as a crime against nature and mankind. Huge machines chew off the outer integument of the mountain, allowing shallow holes to be pierced and the coal extracted. The economic disadvantage is that only 20 per cent of the deposits are within range of the operation, and the remainder is, literally, locked in the mountain for all eternity, for the strip-mine holes preclude safe working by any methods.

Nor is this all. In the process, the forests are blasted, wild life dispersed; the topsoil is scraped off, and hurled down the side of the mountain; there, impregnated with corrosive chemicals, it slides slowly down, carrying with it yet more of the forest cover, until it sags into the rivers and streams, killing the fish and rendering the water undrinkable. The natural drainage system of the countryside, as well as the ecology, is upset, and the area is now imperilled by savage, unpredictable winter floods. As for the human beings who live there, they are conscripted by the companies, work for non-union wages in conditions which make enforcement of the safety regulations difficult, and are then cast aside like the debris of their hills.

## Paper Productivity

*Central Ministries, it is reported, have weeded out a million files in the last three years, but 3.3 million files still lie on the shelf. The files would stretch to 30 miles if laid end to end. Together with the records of all departments and agencies, nearly 125 miles of shelves would be needed to accommodate the files, according to O & M Methods.*

### New Phase

Harry Caudle, author of a remarkable book describing their plight, *Night Comes to the Cumberlands*, told me that he believes that, within a decade, all except the aged will have fled. And, indeed, why should they remain? For here, unrestricted free enterprise is engaged in the systematic destruction of a countryside—trees and fields, rivers and fish, land and sub-soil, animals, birds, men, women and children.

By massive increase in federal welfare benefits and by the construction of federal housing, hospitals, schools, city rapid-transit systems, roads, and power networks, the Administration cannot only eliminate the worst features of American poverty but, by creating new reservoirs of consumer purchasing-power, ensure a sustained annual growth-rate of 4 per cent to 5 per cent. There is nothing wrong with America that a sharp dose of socialist planning cannot cure.

It is possible that America is entering an entirely new and thoughtful phase in its historical development. For nearly quarter of a century, its immense national energies have been devoted almost exclusively to its new responsibilities as the paramount power in world affairs. The universal provider of aid, the global policeman, the custodian of democracy, the arbiter of nuclear war—all these tasks America has discharged, on the whole,

with wisdom, generosity and success. But a price had to be paid. In the effort to become outward-looking, America has averted its eyes from the need for change within its own frontiers. Domestic problems have been treated with palliatives or neglected altogether. One consequence is poverty.

But Russia is turning aside from visions of world conquest and devoting itself to fertilisers and consumer goods. The world is still a turbulent place, but American policy-makers now realise that there is a limit to their ability to reform it, and that they must rest satisfied with an uneasy thermonuclear peace. America is moving, not so much towards isolation, as towards self-scrutiny, and in the process a number of ancient shibboleths will be scrapped as ruthlessly as last year's car.

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# Why Productivity is Stagnant in UK

WORLD manufacturing trade as a whole is expanding—and at a much faster rate. Whereas America, Germany, and even France have managed to improve their share of trade in manufactures, that of Britain has fallen yet again, to below 14.5 per cent (at the end of the last Labour Government it was 21.5 per cent).

The key to this progressive declension, which is central to Britain's economic troubles, is her apparent inability to develop a steady rise in productivity. After a brisk spurt of some 16 per cent over the last three years, productivity has remained stagnant since January 1964. This suggests the gloomy thought that the recent improvement was due more to the re-employment of idle resources, especially labour, than to technical progress.

**Productivity depends in the last resort on the willingness of managements to invest shrewdly and with foresight. They are unlikely to do this without some system of incentives (and disincentives).**

At present the levers with which Mr Maudling operates the economy—chiefly the Bank Rate and Purchase Tax—make no distinction between 'soft consumer' industries and those which are vital to the export trade, still less between go-ahead and inefficient firms within each industry. Even on a regional basis, the blunt instruments of Tory economics strike the rich and poor alike. When Maudling increases the Bank Rate to counter over-employment and wage-inflation in the South, he automatically cuts investment in Scotland and the North-East, where there is still heavy unemployment. The most important contribution a Labour Government can make to the well-being of Britain's economy is to introduce the principle of selectivity into the machinery of economic control. This can partly be done by positive fiscal inducements and forfeits, by concessions to firms interested in mechanisation and automation, and forfeits for the indifferent. It can be done in the inefficient and labour-competitive building industry, for example, by encouraging firms both to form consortia to carry out regional plans and to employ novel techniques.

These are not abstract economic arguments. They affect the living standards of British workers and their families. Both the previous Tory "booms" of 1955 and 1959 ended in three years of stagnation, inevitably depriving the workers of potential increases in real wages. If present trends continue, it looks as if the Maudling "boom" will follow the same pattern. The contrast with Germany, where the unions are now able to extract their share of productivity rises, is striking. Last week-end, for instance, 3,500,000 German engineering workers got an average 7.3 per cent wage increase, a 30 per cent increase in holiday money,

and 2 to 3 days of extra paid holidays a year. This is only one example of the way in which higher German productivity is raising living standards. For the first time since before the Reformation, the Germans now receive higher wages and work shorter hours than their British counterparts.—From *New Statesman*, July 3, 1964.

# Productivity Orientation of French Economy

Two recent developments point afresh to the difficulties besieging France's heavy equipment industry, and show that serious attempts are under way to find a cure.

The *Societe des Forges et Ateliers du Creusot*, the industrial basis of the Schneider group, has severely reduced manpower at its Saint-Etienne factory, and transferred part of its production to other factories within the group. This follows close on the announcement of the permanent closure by *L'Alsacienne de Constructions* Mecaniques of its Rhenameca boiler works.

The progress achieved in France in recent years is owing to the development by individual firms of their research and manufacturing facilities in isolation. These were helped by the favourable economic climate of past years, which brought in orders, and permitted the utilisation of industrial units and manpower. But the recession which has made itself felt in the past two years has drained order books, and shown a chronic excess of capacity. Now that the backlog of orders received before 1962 is becoming exhausted, French capital equipment manufacturers are compelled to lay off manpower, close factories, or reduce working hours.

Certain firms, however, particularly Schneider and *L'Alsacienne*, are using the period of recession to carry out a thorough structural revision, and to adapt themselves to the tougher technical and economic conditions of international competition. For the past 15 years, the Schneider group has been implementing a series of rationalisation and specialisation agreements entered into with French and foreign undertakings, some of which it has itself absorbed. It has added new products, such as light machine tools and nuclear plant, to its traditional range of heavy engineering products. Moreover, it has fortified its position on the French market through agreements with former competitors in the field of heavy engineering. Along with other firms in the Schneider group, the *Societe des Forges et Ateliers du Creusot* has developed into a diversified business capable of supplying the widest range of equipment.

However, to translate this technical and commercial reorganisation into financial returns and competitive prices, reorganisation at industrial level is needed. This process has now started with the dismemberment of the Saint-Etienne works. Besides manufacturing heavy machine tools, this factory produces compressors, which are being transferred to one of the group's Batignolles factories at Nantes, which has similar products. Its Vannes boiler factory will be amalgamated with the former military boiler works at Chalon, together with those of another company in the group. Schneider's example will soon be followed by other French groups in this field.—From *The Economist*, May 2, 1964.

## The Productivity of the P.M.

**". . . the country's chief executive will be called upon to take decisions which will please some and hurt others. 'Hurt' is the word. It is an essential condition of assuming and exercising power: you've got to be ready to strike and injure forces and men that are in your view enemies of the people and the country."**—From *A Ditcher's Diary* in **Capital.**

# Training in Chile

Wolfgang Englander

Training is an instruction process by which knowledges, skills, or abilities and attitudes are transmitted through appropriate methods from one person to another or group of others, all to an immediate and practical

end. This end is, in general, a better performance on job of the person or persons receiving the training, in order to improve the overall efficiency of the organisation in which the trainees are working.

Through the transmission of knowledges, abilities or skills, training produces an improvement in the capacity of people to do a better job, and through the transmission of adequate attitudes, we obtain an increase in the desire or will to work. Mr Earl G Planty, in his book *Training Employees and Managers*, enumerates among the results of training: increase in production, improvement of quality, waste-reduction, methods-improvement, turnover and absenteeism reduction, decrease of grievances, and lessening of learning time.

**This article by Wolfgang Englander explains what the Servicio de Cooperacion Tecnica in Chile has accomplished in a decade in training in all fields of technology and of scientific management. It also gives a short description of the institution, and of the training job that has been done in respect of executives, middle management specialists, supervisors, and workers.**

In a developing country, training acquires particular importance. The immediate action that such a country can take to increase its output of goods and services is to act on the factor it has more on hand—its human resources. A more skilled work force means higher wages and salaries, which, in turn, point to greater internal savings and formation of capital for future investments.

In Chile, a South American country, with a population of eight million and an area of 740,000 sq. kms., industry is fast developing. The main industries in Chile are the metallurgical, textiles, food, pulp and paper, wine, leather and tanning, and chemicals. Chile has large deposits of coal and saltpeter, plenty of hydro-electric power, and oil resources. It has a 10-year development plan, and in its implementation the Servicio de Cooperacion Tecnica[1] has rendered invaluable services. The Servicio practically has worked on all types of training, starting with supervisory training, going through middle management and specialists training, and now lately in worker training. The work has been done by the Servicio itself, in cooperation with private enterprises, and together with the Chilean Management Association.

Managers of industries felt that a basic deficiency in their personnel was the weakness of the supervisory force, which was supposed to be the link between top management and the workers. This weakness was not so much in the field of technical knowledge, but in the field of their new duties as supervisors, specially in human relations. There was the idea that the supervisor was not a good instructor, and that due to this, production was not as good as it should have been. Finally, the supervisor was not conscious of his duty of method improvements or work simplification. These were the main reasons which the Servicio had in mind when it started its first training programme in 1953 for supervisors. The first programmes were experimental, and were conducted by Chilean instructors, who had been trained by an American expert. Later, as the training programme gained acceptance, the Servicio

[1] The Servicio was created as the Chilean Productivity Institute following an agreement signed in 1952 by the Chilean Development Corporation with the United States Operation Mission (Point Four). In 1960, the agreement expired, the Mission withdrew its support, and the Servicio became affiliated to the Development Corporation.

charged fees for the courses, enough to cover the expenses.

**Adaptation of TWI Course**

Most of the courses given were an adaptation of the TWI course developed in the USA. It had three parts—Job Instruction, Methods Improvement, and Human Relations—and totalled 15 sessions of two hours each. Typical of the course is the method, a type of planned conference, with active participation of the members. All references to 'class', 'teacher', 'student', were carefully avoided, and, instead, terms such as session or meeting, instructor or conductor, participant or member, were used. Each person had to present a case in each of the three parts, to be sure that he had learnt the subject. At the end of the course, a certificate was given to each member with acceptable participation. Groups were always around 12 persons, never over 15, so as to ensure maximum participation.

During the years 1954-56 a great effort was made to spread this type of training throughout the country. By the end of 1956, 228 courses had been given to 2,408 supervisors, coming from 128 companies. Later, as the Servicio broadened its field of action, supervisory training lost its intensity, and some companies went on alone in this area on the basis of the experience gained from the courses conducted by the Servicio.

As the supervisory training did not try to increase knowledge, we should review the other two objectives of training, viz., changes in behaviour in the learner and changes in the organisation. These, of course, are most difficult to evaluate, as there are no direct indications of results. We have only one systematic study conducted on the results of training—a thesis prepared by a business administration graduate who was guided by the writer. In it, a careful research was made in a small company after a training course was given to all of its first line supervisors. The results were: A great number of method improvement proposals were made to management, and there arose a great consciousness of work simplification. On the other hand, the '*human relations index*' went up from 35 per cent to 70 per cent, and if it did not go higher, it was due to organisational changes made by the company after the course, which affected negatively the morale of the people. In general, there were many examples of work simplification proposals, which produced thousands of dollars in savings of materials or labour, or were able to increase production of goods and services from 10 per cent to 500 per cent.

Some time after starting supervisory training, it was felt that this was not enough. This type of course could not be given to the higher echelons of supervision, because these managers asked for and needed a more comprehensive approach. On the other hand, these levels asked for training not only in human relations and methods, but also in costing, sales and industrial engineering. Therefore, we started a type of training directed to the area of department, division and section heads, with broader content but with similar methods to those used in supervisory training.

**Training Method**

Most of the courses had between 10 and 20 sessions of two hours each, and were devoted to one or more of the following subjects: human relations, personnel administration, cost accounting, production planning and control, marketing and sales, methods improvement, wage and salary administration, purchasing, quality control, training, hiring, safety, etc. Instructors of these courses were Chilean engineers specialised in one or more of these areas.

The training method was similar to the one used for supervisors—a planned conference with discussion, cases and examples, according to the subject. The number of participants was limited to 20, to ensure maximum

participation in the discussion. This type of course has been given since 1954.

Some of the courses listed above have been conducted in foreign countries such as Venezuela, Honduras and Ecuador. In total, the Servicio has conducted 250 courses for 4,923 participants, which belonged to over 1,000 companies.

A third type of training which the Servicio started in Chile was the preparation of specialists in two basic fields: personnel administration and industrial engineering. Up to 1955, the personnel manager in private companies had mostly an administrative job, mainly in the area of records, services for personnel, and union relations, but had little knowledge on the more technical aspects such as staffing, wages, and merit-rating. On the other hand, practically there did not exist industrial engineering specialists in Chilean industry, and the production managers did not use the modern techniques of this field.

In 1957, the Servicio started a comprehensive Personnel Management Training Programme for personnel managers—a 200-hour course covering basic aspects of personnel administration. In 1958, it started a special programme to prepare industrial engineering specialists.

As a part of its development programme for Chilean handicraft and small industry, the Servicio is giving technical assistance in the field of technology and administration. As there are over 80,000 owners of small industries and artisans, having small shops, it is impossible to give direct and individual assistance to all of them. So, the Servicio has started this year its first courses for owners of small industries and handicraft shops.

Since 1960, the Servicio has engaged itself in a completely new field of training, that of preparation of specialised workers. In that year the Chilean Government started the Ten-Year National Plan for Economic Development. The Servicio was given the responsibility of preparing a programme that would train enough skilled workers for the Chilean economy. The courses for the preparation of new workers, called formation, are given to young men who know nothing about the trade that is being taught, while the training of semi-skilled workers, called capacitation, is given to men who already have some knowledge or experience in their trades, but need more perfection in it. The former take about three months with a full-time programme of eight hours a day, and five days a week, while the latter, though of same duration, is held for two hours daily.

The general philosophy behind these training programmes is *the French concept of accelerated manpower training*, which tries to give the maximum amount of experience in the shortest time, and the theoretical knowledge strictly necessary to the fulfilment of the job. The Servicio receives technical assistance from a mission of the International Labour Office, and financial assistance from the Special Fund of the United Nations. The skills in which training has been given are 1. Construction trades: carpenters, masons, plumbers, plasterers (in gypsum, stucco, and others), and electricians; 2. Metallurgical trades: lathe operators, electrical welding, and general mechanics; 3. Electrical trades: high and low voltage operators; 4. Fishing trades; 5. Agricultural machines repairing; and 6. Technological skills. The methods employed are basically three, viz., centre-training, in-plant training, and training with public institutions.

# Peeps into Productivity in Mao's Land

PICK your step cat-carefully across a marble hall polished like glass into a high, cool, creamy room where a long net

filters the hot Peking sunlight. Green tea in gold-rimmed white porcelain beakers, chinoiserie in strategic places, a lacquer screen 10 feet wide, and in front of it the well-tailored figure of Marshal Chen Yi, Foreign Minister, cutting the air with his hands as he says: "*Do not imagine that our people do not know how to eat better and dress better and live better than they do.*" The Marshal ranges over China's lamentably low standard of living...

His China is both undeveloped and civilised, much like (if the Chinese will forgive the phrase) an aristocrat down on his luck. *There are inborn skills in China* that other undeveloped countries do not possess, and a sense of discipline more often found in highly industrialised countries. It is a discipline that can mobilise the whole population to kill flies and sparrows until tracts of China have become a birdless silence beyond the worst dreams of the late Rachel Carson; a discipline that makes it possible to lay a jet runway in four months!

*. . . China, once free of its debt to Russia, intends to flood African markets with cheap goods . . . With a growing steel industry, she is an obvious potential exporter of cheap capital goods . . .*

To complete in 10 months a building like the People's Palace in Peking, with processional stairs and an auditorium seating 10,000, is *not merely a question of flinging in more manpower*; it calls for much more expertly co-ordinated planning than one might expect of a country in which one can drive for four hours through the intensively cultivated country around Peking and see precisely two tractors... But, though the Chinese may till the land with oxen, ponies, mules, asses, and—when all else fails—with hand-wielded long-handled hoes, *the crops when they grow stand weedless right up to the road's edge like the pictures in a seed catalogue.*

**Low Wages**

An efficiently run commune, the kind shown to foreign visitors, supports 6,500 families on 9,000 acres, and manages to sell roughly half its crops. The peasants are hardly living in clover, but they are *tolerably well-housed, even splendidly housed by earlier, mud hovel standards.* They live on a tiny monthly wage supplemented by twice-yearly share-outs of profits. To support 26,000 people on 9,000 acres is not bad going. What one cannot say is how many other farm communes have reached this standard.

The backstreet markets of Peking suggest that some of them may not be doing too badly. Peking is a very different city from graceless, bustling Shanghai. Behind Peking's huge main streets, which are almost empty of traffic, the country slips back a thousand years. The bakers bake and the tailors sew in dark dwellings, while the children spill into the streets outside. High wooden doors open into courts that conceal further, inner courts. One wonders what is missing, and then realises the absence not only of birds, but also of cats and dogs.

China's standard of living may be low, but it is not at the rock-bottom depths plumbed in the recent years of famine. The Chinese appear to be covered rather than dressed in a predominantly blue uniform of tunic and trousers for men and women alike, relieved occasionally by permutations of beige and grey. With a few exceptions, like waitresses and air hostesses, the women

wear skirts only in high summer, and then complain loudly of the cold. No crowd is so faceless as a Chinese crowd, dressed alike, and apparently thinking all alike.

Marshal Chen Yi was largely right when he said that the Chinese had little interest in developing internal air services when their principal transport came either on two wheels or on four legs, and so few of them could afford to fly. The domestic airline, with its immaculate aircraft (some British, some Russian), and its bewitchingly farm-fresh stewardesses, does give the impression of being a civilian sub-division of the Air Force's transport command, organised for the flying of VIPs. Industrialisation must take, a very long time.

**Government Policy**

Meanwhile, how does one keep up the morale of a nation which, in the Marshal's own words, has already had to tighten its belt too hard and too long? The Government's policy apparently has been to offer public splendour as an antidote to private misery, thus giving pleasure, however ephemeral, to the largest possible number of people—much as Catholic churches in poor countries sometimes reach almost unbelievable splendour.

Whether life gets appreciably better for the Chinese may now largely depend on what the Government decides to do after it has repaid all the $ 1,500 million to $ 1,600 million borrowed from the Soviet Union. The last $ 20 million will have been paid off by the end of next year. The effort of crying "Take back your mink" must have put great strain on the economy. When it is finished, there should be a substantial volume of output available for disposal. Disposal where? Marshal Chen Yi said it would not be exported, which suggests the more would be available for the home market. But in another breath he said China would be willing to export to "friendly" countries the needed goods; this fits in with the rumours that China, once free of its debt to Russia, intends to flood African markets with cheap goods. These need not necessarily be the traditional textiles and light industrial products. China, with a growing steel industry, is an obvious potential exporter of cheap capital goods. Passable machine-tools are on display in Shanghai; so are automatic looms and a variety of electronic bits and pieces. This *cannot be dismissed as window dressing*. The Pakistan jets, trying to keep to a narrow three-mile-wide air corridor as they fly over China with inadequate beacons to navigate by, find themselves being accurately monitored by nameless Chinese radar stations.

The masters of China are dealing with a country that has a long tradition of literacy, and also a long one of complacency. They are deliberately breaking the last barrier to communication by introducing Roman script into the schools so that children (and foreigners) can learn to read and write in phonetic Chinese before they move on to the traditional lettering. Nobody who has seen the new 1,400-character Chinese typewriter would blame them.—From *The Economist*, May 9 1964.

# Productivity in Moscow

Anthony Howard

'WELL,' they all ask, 'did you enjoy it?' I suppose there's only one answer to that—and it's 'Yes'. But even a Moscow that nowadays has neon-lighted advertisements announcing 'It's quicker by taxi' takes its toll in terms of wear and tear.

For journalists the telephone, in particular, soon becomes an instrument of refined torture. You pick up the mouthpiece, say 'Godrod' firmly (for the city exchange) and then dial the international operator's number. After a certain amount of buzzing you eventually get through—but your troubles are only then beginning. Booking the call may not be too difficult; actually getting it is an entirely different matter. If you reckon on a two-hour vigil after the appointed time you've at least insured against the working of your irritation coefficient. (The Moscow girl operators' favourite phrase is

'One moment please'—which, as a general rule, means you cling on impotently for half an hour.) Nervously and gingerly the *Daily Worker* correspondent could be seen approaching the intourist guide. She regarded him indulgently and encouragingly—was there, perhaps, something special he wanted to see? No—he had a complaint to make. He alone of Western correspondents, despite two calls booked for him, had been unable to get through to his office the previous night. That there isn't any justice in this world most of us knew already; but it seems hard that a Communist should have to go to Moscow to discover it.

For days I wondered why the Soviet capital felt so different—and then suddenly I twigged it. The contrast with Western cities lies in the pace of life. No one dashes or rushes about it doesn't matter if you're an hour late for an appointment, they'll still be there; *the clock has not yet established any domination over the Muscovites.* Of course it has its inconvenient side. A lingering dinner may be all right, but an hour taken ordering breakfast tends to be bad for the blood pressure. Yet that in itself may be merely a failure of adjustment: living there, you would obviously settle down to a new tempo or run the risk of a coronary.

In any case it's hardly visitors who should complain. The worst part of being an official tourist in Moscow is all the privileges conferred on you: any Englishman with a romantic nostalgia to be treated as 'milord' should get there straight away. Whisked about in large, black Cheika cars you automatically go to the head of all queues (except the four-hour one for Lenin's tomb where you're slotted in about 20 minutes from the end); and you get in at an hour's notice to the theatre or the ballet, while the local citizen would be lucky to achieve the same result (even for the cinema) after a whole month of effort. Perhaps, however, one need not feel too uncomfortable about it. The Russians, even when brusquely brushed aside by your intourist guide, appear in no way to resent it. 'But', they say when asked, 'you are here only for a short time and it is right—and we are happy—that you should see as much as you can.'

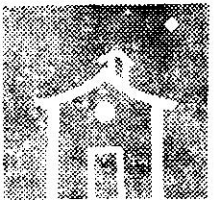
In Gorky Park, to the accompaniment of icecream and champagne (the young Russian's daring treat for his girl-friend), neither inhibitions nor sanctions apply. Until a month or so ago there used to be a restaurant just off Red Square which the combined forces of university students and *stilyagi* (the Teds) had succeeded in turning into something like a Soho coffee bar. One week-end, after the race demonstrations at the university, authority struck. What had been a cheerful coffee bar on Friday was an austere savings bank on Monday. Not yet, sons and daughters of the Revolution, in front of the tourists!

In one practical respect, however, Soviet society is way ahead of ours. Abortions, having been permitted after the Revolution and then firmly banned, are now once again legal. They are, in fact, part of the health service—though like drugs and medicines, as opposed to medical attention, they are not free. Soviet girls will talk about having had abortions as freely as their counterparts in the Western world will mention that they have been to the dentist. The normal procedure is to apply to a special medical board, and having had the pregnancy established, to be taken into hospital for three or four days to have it terminated. Curiously (unless it is to discourage a habit) neither local nor general anaesthetics are used —though foreigners (those privileges again) can have local ones if they want them.

There are two Moscows: the shopwindow one of Red Square, the central department stores and the hotels for the foreign observer; and the other—of the shop-floor, of the Black-hole-of-Calcutta buses, of flats with four in a room and of food shortages—for the actual inhabitants. Is it, though, entirely farfetched to suggest that Soviet citizens put up with it all for one simple reason? Very much the same intensely solemn national spirit which Churchill gave Britain during the war—stopping people from laughing even at the most absurd exhortatory posters—still seems to survive in Russia today. Admittedly it involves sending a number of pathetic, shivering black marketers from the people's courts to the labour camps.—From *New Statesman,* June 12, 1964.

## *What Hampers Productivity*

**Those who wonder why AIR programmes are often so poor have only to look at the salary scales of staff artistes. Says *Times of India:* Some draw no more than Rs. 300 a month after more than 20 years of service. A *tanpura* player, who has been serving AIR for 22 years, gets only Rs. 200 a month, though he is among the finest of his class of artistes, and has taken part in almost all national programmes of vocal music. During this period some men in the administrative cadre who joined AIR on Rs. 60 a month have risen to the highest positions in the organisation, and are drawing salaries of over Rs. 1,000.**



# PRODUCTIVITY AT HOME

**The most significant evidence of a pervasive productivity consciousness is that the language of productivity now permeates the speeches of not only ministers, educationists, and organisers of conferences, but also of practically all chairmen of companies. Even in a period of inflation, it is rather significant that industrialists are becoming cost conscious as would be clear from Sri JRD Tata's speech at the TISCO annual meeting held on Sept. 3, 1964 (extracts published in this feature).**

**There is talk of introducing productivity in banking! As from Aug. 1, 1964, the Government of India has introduced a country-wide "Suggestions Scheme." Photographs of workers, and even of their babies, are now being prominently exhibited in house magazines (see page 561). An attempt has been made below to show how productivity pervades the news of today.**

## IISCO's Productivity Approach

THE speech of Sir Biren Mukerji, Chairman of the Indian Iron and Steel Company (Burnpur), at the company's annual meeting, is *full of productivity*. In fact, Sir Biren made it clear that while their plant is making the fullest use of its capacity, *additional output would depend upon the adoption of productivity techniques*. In fact, the Indian Iron has been adopting a productivity approach in respect of the difficulties experienced by the firm with regard to the quality of raw materials, availability of machinery, etc.

The following extracts from Sir Biren's speech are significant:

"Production of steel during the year under review has again approximated to the rated capacity of the plant. It is hoped to maintain this position barring untoward events, but having reached the plant capacity as it stands under present working conditions no improvement in production of any magnitude can be looked for *except to such extent as the introduction of new techniques may render possible*. To this end intensive research continues to be carried out by the company's technical staff . . .

The steady deterioration during the last 10 years in the quality of the primary raw materials, particularly coking coal and limestone for pig iron production, has presented a serious challenge to the company's technical staff, but thanks to the operational research carried out by them capacity production from its blast furnaces has been achieved and is being maintained . . .The ash content of our coking coal currently averages about 19 per cent compared with 16 per cent

10 years ago, but what is worse is the wide range between the maximum and minimum ash content at 24 per cent and 14 per cent respectively. Similarly, the effective lime content of the present-day limestone varies between 30 per cent and 45 per cent. The quality of our iron ore, too, has been adversely affected by increasing demand and mechanisation of the iron ore mines. *Nevertheless, these are the raw materials with which our country is endowed and we have to learn, and learn quickly, how to use them to better advantage to enable us to produce iron and steel efficiently, both from a productive and economic point of view.*

A large part of the solution lies in raw material preparation which, if we are to *avoid merely blindly copying what others have done* or are doing, calls for more and more expenditure on operational research. To take a specific case—raw material preparation includes crushing to an optimum maximum size and restricting the minimum size to give an aggregate best acceptable to the process. From this procedure in the case of iron ore, a large quantity of undersize material will accrue to become an expensive discard unless steps are taken to convert it into a useful material.

The most well-known, long-standing and orthodox way of doing this is by sintering, a process which has resulted in improved blast furnace practice. We, ourselves, however, have never accepted that this expensive process is necessarily the best solution to the problem in relation to Indian iron ore, and have consequently refrained from any hasty decision that would commit us to the very heavy capital expenditure involved. That this has been the prudent course is borne out by modern research which has suggested that other forms of agglomeration could be capable of producing better results with Indian iron ore than the sintering process.

## Extensive Research

Over the past few years the company has accordingly been carrying out extensive research with its own iron ore in an effort to find the best way of utilising the undersize ore which as a result of crushing and screening is accruing at our ore mines. I am happy to say that this research has shown much promise so much so that our own findings involving a combination of direct reduction, magnetic separation and agglomeration have been confirmed on reference by us for test by an independent overseas research organisation. The product obtained in our pilot plant is of high purity, and is likely to have in the future a great influence on the operation and efficiency of Indian blast furnaces. Sufficient information has now been obtained to enable the engineers to design the appropriate plant.

We have investigated the questions of humidity control and fuel injection in relation to the operation of the blast furnaces, the increased use of oxygen in the steel-making processes and the possibility of future production of such a standard grade of iron as would enable us eventually to eliminate the rather costly and wasteful intermediate Bessemerising process that, under present conditions, is necessary for purification of the hot metal before charge to the melting shop furnaces. Suitable inclusion towards this ultimate latter end has in consequence been made in the collieries development and balancing of plant schemes.

*. . . Import restrictions on engineering spares have forced us into developing manufacturing techniques for which we, more often than not, are ill-equipped . . .*

The utilisation of waste products has also been engaging our attention. For instance, we have been producing for a number of years building bricks and mortar manufactured from waste blast furnace slag.

Import restrictions on engineering spares have forced us into developing manufacturing techniques for which we more often than not are ill-equipped. The recurring expense on importing rolls for our rolling mills, for instance, is a serious drain on the country's foreign exchange resources. Here, although not having been granted a licence to manufacture rolls for the purpose of selling, we have, as a result of experiments carried out at our Kulti foundries and with the help of the British Rollmakers Corporation, been *able successfully to manufacture rolls for our 18" mill which have proved to be equal to, if not better than, those imported.* For this size of roll we can now support ourselves, saving approximately Rs. 13 lakhs per annum in foreign exchange. The factor limiting our ability to produce rolls in greater numbers and in larger sizes is the capacity of our existing foundry and machine shop at Kulti, which we hope to enlarge in course of time, so that we may be able to cover also the roll requirements of the merchant mill and sheet bar and billet mill.

Miscellaneous engineering spares previously imported are now regularly being produced by our associated companies within the Martin Burn organisation for consumption at Burnpur resulting in a

considerable and recurring foreign exchange saving. We have also been able within this organisation to secure the manufacture to our specifications of items of capital plant for which we had previously to look to foreign suppliers. As examples, these cover such diverse items as hot metal ladles, ingot casting cars, ladle cranes, Bessemer converter shells, hot metal transfer cars and bogies, ground charges, slag ladle carriages, special type discharge wagons, coke quenching cars, acid tanks and acid vats, the total value over the past nine years approximating to Rs. 50 lakhs.

Modernisation and expansion has been carried out of the non-ferrous foundry and the steel foundry at the Kulti works and an additional annealing furnace for the latter installed. New machine shops have been attached to these two foundries and the pressure on the main machine shops relieved to this extent . . ."

## Cost Factor in TISCO

Presenting the annual account of the Tata Iron and Steel Co., Jamshedpur, Sri Tata drew attention to the continuous increase in costs which inhibits the productive potential of the economy. With regard to TISCO's accounts, the major announcement made by him, despite the many complicated minuses and pluses in the accounts of the country's biggest steel enterprise, was the increase of Re 1 in the dividend on ordinary shares. This, in the language of the Stock Market, is a Big Plus, and should be broadly taken as evidence of increased productivity, because simultaneously TISCO, like other industrial concerns, has been able to bear up with a substantial increase in payments to the States through taxation, and at the same time reaching the production target of 1.5 million tons of finished steel.

It is the references to the cost factor in Sri Tata's speech that are really indicative of productivity consciousness in the industrial mind. "A matter of much concern to us, as to all engaged in industry, has been the continuous increase in costs, year after year, not only in steel, but in almost every single product made or grown in India... Steel provides a striking example of the marked deterioration in the country's cost/price structure. Whereas until 1955 Indian steel was amongst the cheapest in the world, it has become one of the costliest, although the basic elements which make up the total manufacturing costs have not materially changed in relation to those of other countries ..."

The damage caused by rising costs to the economy and to the country's long-term plans of development cannot be exaggerated. Not only does the resulting decline in the purchasing power of the rupee cause severe hardship to every family in the country, but increases in costs have a number of other dire consequences. For instance, they have already rendered uncompetitive in world markets almost every exportable Indian product other than tea and jute, thus severely restricting our earnings in foreign exchange.

## New Incentive

The Press Trust of India reported that as from Aug. 1, 1964, the Government of India had introduced a "Suggestions Scheme" in its offices all over the country. The report says:

"Under the scheme, Government servants can make suggestions to tone up the administration, effect improvements in organisation, job methods, and administrative procedure . . . Suggestions accepted by the Government will be suitably rewarded . . . The reward may take the form of cash payments, advance increments, National Savings Certificates, Prize Bonds, or gifts of useful articles such as watches, and fountain-pens. The ceiling on the value of an award in an individual case has been placed at 5 per cent of the annual savings likely to result from the implementation of the suggestion made by an employee, or Rs. 1,500, whichever is less ... As an added incentive all particulars of the grant of an award would be recorded in the character roll of the author ... Out-of-turn promotions and awards for superior performance will not be covered by the scheme ... A Central Committee presided over by the Cabinet Secretary, and departmental committees by the respective secretaries, and consisting of other senior officials are being constituted to evaluate the suggestions."

## Electric Locomotives

A decision has been taken to replace the Chittaranjan production capacity for manufacture of steam-engines by increased facilities for the manufacture of electric and diesel locomotives. By 1970, steam-engines will be on the way to join the category of horse-carriages and tramways.

The facilities at Heavy Electricals, Bhopal, are being expanded to enable Chittaranjan to switch over to large-scale manufacture of electric locomotives. In fact, HEL has begun the manufacture of the first India-made Traction Transformer. This factory will also supply electric traction equipment for the units being manufactured by the Integral Coach Factory at Perambur (Madras State).

—♦♦—

## Productivity Consciousness

**"THE company's management philosophy is that of having a compact organisation of minimum personnel of fine calibre capable of maximum work output."—This was the concluding sentence in an advertisement for an Assistant Marketing Manager, inserted by an American company marketing an internationally popular consumer product, in *The Statesman* of Aug. 10, 1964. A high degree of productivity consciousness is shown in practically all advertisements now inserted in newspapers.**

*Even cartoonists are becoming productivity conscious! The following cartoon appeared in* **The Statesman** *of Aug. 10:*

# PRODUCTIVITY IN AGRICULTURE

**Indian economy is based primarily on agriculture. Despite this fact, agricultural productivity in the country continues to be at a very low level. In recent years, numerous suggestions have been made on ways to increase food output: among these is a valuable scheme recently suggested by Mr Chester Bowles calls for the setting up of a model district in each State.**

## Bowles' Scheme to Raise Farm Output

MR CHESTER BOWLES, the distinguished US Ambassador in India, has recommended to the Planning Commission a scheme to which he refers as "the second stage in India's rural development." In this he envisages the improvement of all existing rural programmes such as agriculture, community development, irrigation, and rural electric power.

In a letter to the late Prime Minister, to whom Mr Bowles had submitted this scheme, he had said *inter alia* that "a sound and enduring increase in agricultural output cannot be achieved by pushing buttons labelled 'fertilisers', 'better seeds', and 'rural credit'." He has recommended that a model district be set up in each State with a comprehensive, intensified, and integrated programme of development, and he has expressed the readiness of his Government to assign technical assistance in setting up the model districts.

### •Fourth Plan Target

THE foodgrain target for the Fourth Plan, commencing April 1966, may be fixed at 120 million tons per annum. Besides, the agricultural economy is expected to yield per year during the Fourth Plan period, 8.5 million bales of cotton, 32.5 million tons of milk and milk-products, etc.

**While additional irrigation supplies, fertilisers, improved seeds, and mechanisation will certainly help, the significant marginal rise that would raise the level of output to the target level of 120 million tons can only be attained through productivity.**

It is through productivity techniques that the USA has become the world's granary. PL 480 is really a reflection of the high productivity of American agriculture.

### •Making Desert Productive

GUJARAT, a deficit State in foodgrains, has drawn up a plan to become a surplus State by reclaiming the 9,000-sq. mile desert

of the Rann of Kutch at a cost of over Rs. 250 million.

While the practicability of such a colossal scheme is still under investigation, an experiment in an area in Bhavnagar district is expected to help the State Government to reach a decision before long. Much will also depend on the success achieved in the reclamation of *khar* (saline) land along the coastline of Gujarat, which is now in progress.

## •Scientific Farming

INAUGURATING the symposium on Science and Food and Agriculture, at New Delhi in July, Sri C Subramaniam, India's Minister for Food and Agriculture, said that he was very optimistic about increasing the food production in the country by five per cent (compound annual rate), by using modern technology and science. ". . . A revolution in agriculture can be brought about if the benefits of science and technology are made available to the farmers. If we follow the latest scientific methods, the target of increasing food production by five per cent annually would not be impossible. . .," he declared.

**Speaking at a meeting at Coimbatore, earlier, he assured that sufficient incentives would be provided to everybody to move forward in the field of agricultural production. ". . . In the next few months, it will be possible to evolve an agricultural development policy and distribution-cum-price policy, which will take a coordinated picture of the entire economy of the country . . ."**

To ensure that officers engaged in the agricultural production campaign are not slack in their work, the Punjab Government proposes to offer continuous incentives to those who are enthusiastic, and to penalise those who are not. In fact, it has issued job-cum-score cards for officials of the Agriculture Department in order to enforce a system of appreciation or punishment on the performance of each official. Those obtaining more than 90 per cent marks will be recommended for advance increments, those with 70 per cent to 89 per cent will be awarded letters of appreciation, and those getting between 50 per cent and 59 per cent will be warned that they should improve their work. Stoppage of increments will be recommended in the case of those obtaining less than 40 per cent marks, who will also be liable for reversion or removal from service. Score cards will be marked at the end of each harvest. It is understood that evaluation has actually started from July.

### MARXIAN ECONOMICS, TOO, IS PRODUCTIVITY

**. . . Mr Oskar Lange, even in this relatively abstract and elementary context (Political Economy, Volume I) brings in cybernetics and programming. . .only the working class is interested in full scientific knowledge of economic laws. . . The working class and socialist society are free of conservatism, and are interested only in the full and unlimited development of economy and culture.**— *The Economist*, July 11, 1964.

## •Real Productivity

ONE of the major multipurpose projects which will add substantially to irrigation facilities and electricity supply in the Punjab and Rajasthan is the Beas Multipurpose Project estimated to cost Rs. 2,820 million. Work on it has started, and may be completed by 1971. The US Government and the World Bank are understood to have offered loans totalling $56 million to meet the foreign exchange requirements of the project which will irrigate nearly 70 million acres in the Punjab and Rajasthan, and add nearly a million kW of power to the total installed capacity. When the project is completed, the power systems of the Beas and Bhakra will be linked in a common grid with a total installed capacity of over 2.2 million kW. Though it has posed some of the most

intricate and difficult engineering problems, it is being executed almost entirely by Indian engineers. This is Real Productivity.

## •Rural Manpower

PRODUCTIVITY ideas again dominated the conference of the State Ministers for Community Development and Panchayat Raj, as can be seen from the major decisions taken by them—(a) an all-out effort to increase agricultural production by the maximum use of rural manpower, (b) offer of incentives to Panchayat Raj bodies for fulfilling agricultural production targets, etc., (c) reduction of paper work of Panchayat Raj bodies, and (d) removal of bottlenecks.

## •Beetroot Sugar

AFTER five years of experimentation, the Agricultural Research Board has recommended the production in India of beetroot sugar. Incidentally this will lead to a fuller utilisation of land in India, for beetroot flourishes on saline land where practically nothing else grows. It needs very little water and manure, and is, industrially, highly profitable.

*. . . Beetroot sugar will reduce the cost of sugar production by half. Unlike sugarcane which takes eight months to grow, the beetroot crop takes only four months . . .*

Pakistan has established a beetroot sugar factory, at Rawalpindi, which is reported to be working successfully.

Experts point out that beetroot sugar will reduce the cost of sugar production by half. Unlike sugarcane which takes eight months to grow, the beetroot crop takes only four months.

The average recovery of sugar from beetroot is 15 per cent, and it is as sweet as cane sugar. Further, a beetroot crop cannot be destroyed or damaged by frost. It can be grown in the plains in winter, and in the hills in summer. It could, therefore, keep the sugar factories going for a longer run in the year, thus making them more useful from the point of view of capital investment and employment opportunities.

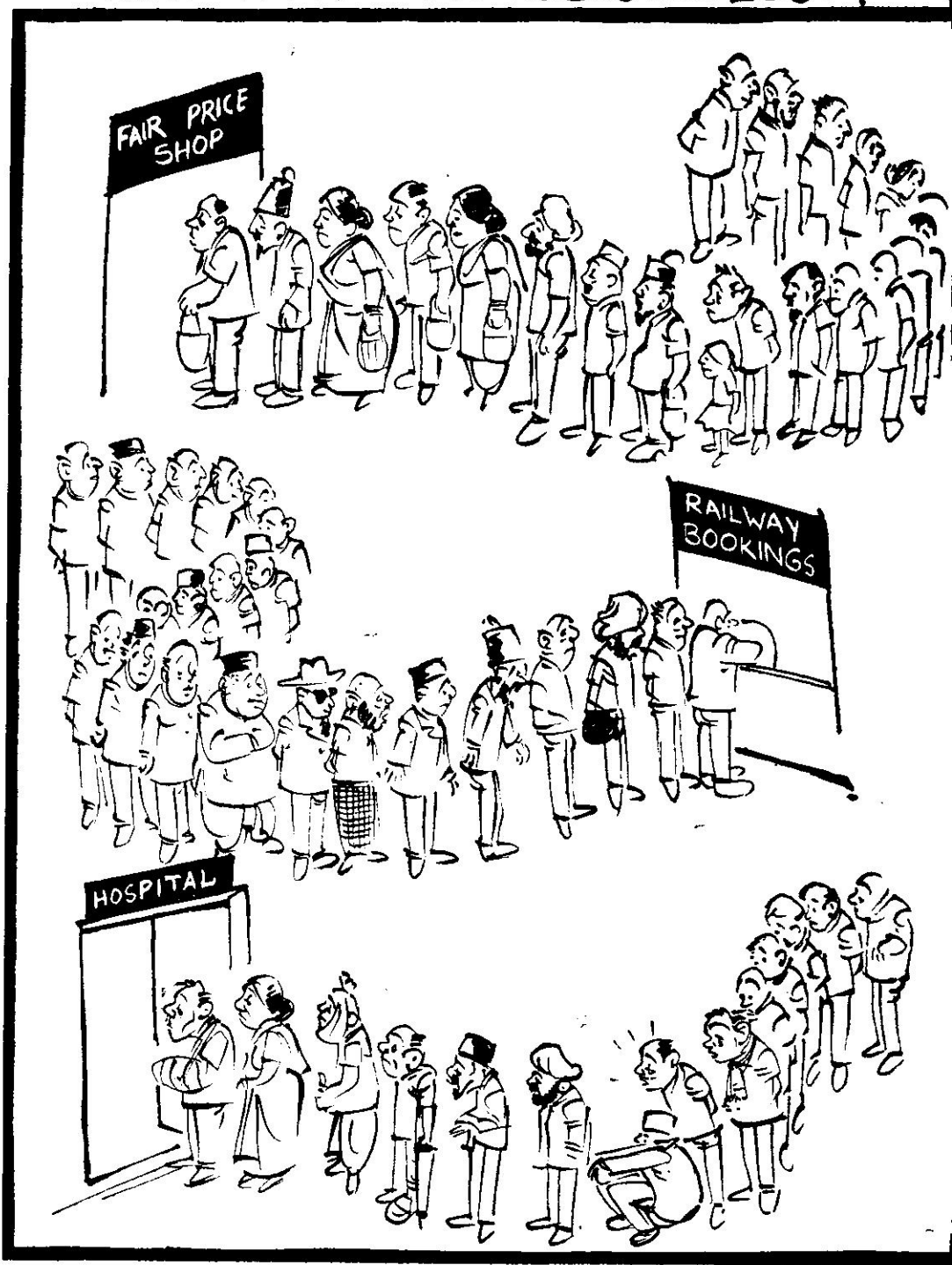
## •Productivity Through Education

DR DS KOTHARI, chairman of the newly-appointed Education Commission, has expressed the view that agriculture should be given much greater importance in Indian education, particularly in the rural areas. This will perhaps involve re-examination of the present concept of agricultural education being a separate field under a different Ministry.

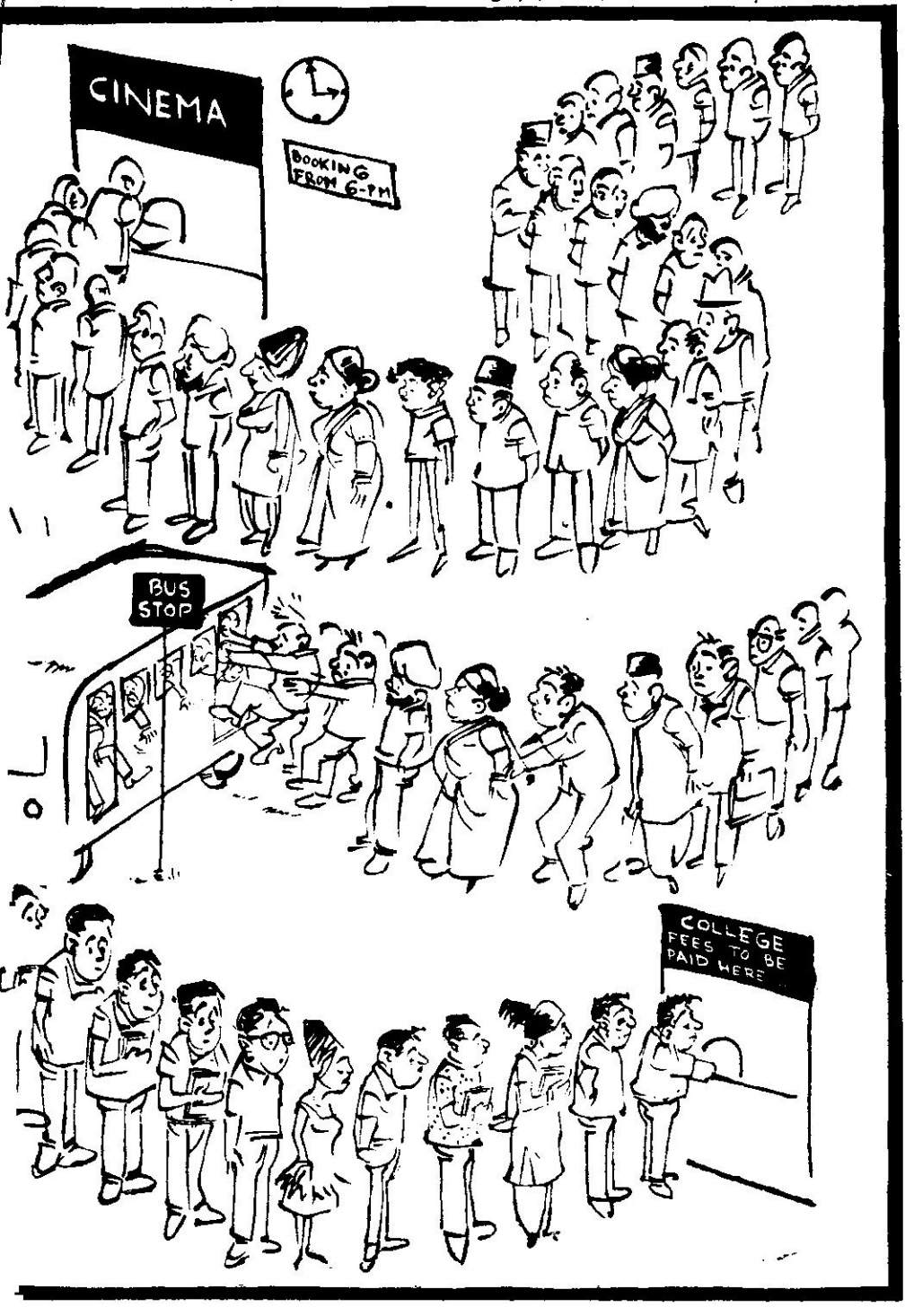
In a recent convocation address which he delivered at the Indian School of International Studies, Dr Kothari stressed the importance of agricultural research and education in the educational system. Care has, therefore, been taken to include leading agricultural experts in the Education Commission, and they include Prof Roger Revelle, Dean of Research, University of California (recently the US President forwarded to President Ayub Khan the report of an expert panel headed by Prof Revelle on the problem of waterlogging in Pakistan). Prof Blackett, another member of the Commission, has also stated that one of the main needs of developing countries is an adequate supply of trained personnel, and, above all, agriculturists.

Dr Kothari feels that the main task before the Commission would be to determine how best to deploy the country's manpower, so that there is no indiscriminate rush to the universities resulting in large-scale educated unemployment. This will involve a major programme to diversify education.

# HOW MANY MAN-HOURS..... LOST?



# HOW MANY BILLION MAN-HOURS?



# PRODUCTIVITY IN THE NEWS

**●Productivity and Corruption ●Time Costs Money ●Even Kairon Claims to Have Been Productive ●TTK on Productivity ●Aircraft Productivity ●Productivity Through Moscow ●Oil Exploration ●Quality Control of Marine Products ●Productivity in Tourism ●Productivity in Plywood ●Productivity in Atomic Energy ●Incentives in District Administration ●SQC in Textiles ●Mediation, Conciliation and Arbitration ●Training of Engineers.**

## Productivity and Corruption

AT a Seminar on Work Study held in Delhi, a year ago, the late Prime Minister expressed the view that inefficiency was at the bottom of administrative corruption.

Practically the same views are being expressed by important persons in the recent controversy regarding this problem—". . . an efficient administrative machinery alone could ultimately end corruption . . . ; inefficiency breeds corruption . . . ; the basis of corruption is patronage and inefficient machinery of administration . . . ; ways should therefore be devised to change the administrative pattern, and to increase its efficiency . . . "

The foreign view, on the other hand, appears to be that the Indian administration is functioning, by and large, with considerable efficiency. This was, in fact, the view expressed by a spokesman of the Federation of British Industries, which has given a very high ranking to India in the list of countries where British industrialists and businessmen want to invest their capital. In their view, it is neither administrative inefficiency nor the socialistic

pattern that stands in the way of a productive utilisation of Indian resources and the attraction of foreign capital. It is the plethora of controls and import restrictions that inhibit the productive potential of the Indian economy.

## Time Costs Money

THE American view regarding Indian administration is different, being coloured by the type of industrial psychology that has evolved in the USA. The American Management Association of New York recently sponsored a Conference on Investing and Operating in India, and the consensus was that American private investment in India would increase if red-tape was eliminated. As Mr Paul Gibson and Mr J Roy Galloway, vice-presidents of a big American company, who participated in this conference, put it in characteristic American style: "... time costs money ..." They, however, expressed the opinion that the "climate in India has changed. There was a time when it took two to three years to get a project off the ground." Now, it is no longer so. They were also conscious of the recent steps taken by the Government to streamline its business procedures. They, therefore, felt reassured that administration in India was conscious of the money value of time.

## Even Kairon Claims to Have Been Productive

IN a statement to the Press (June 24, 1964), Sardar Pratap Singh Kairon, on resignation from the post of Chief Minister of the Punjab, claimed that he had been engaged "in a relentless effort to achieve the maximum in minimum time ..." *The Statesman* special representative reported the general impression in the Punjab that "Kairon is a tough man who had a habit of getting things done ... To the Secretariat staff he was a terror, a martinet who would not tolerate idleness or inefficiency ..."

## *Why Productivity is Low*

**"... a large section of the Indian people have begun to treat the authority of the State with unconcealed contempt; they have, of late, added not only to their wealth, but also grown more powerful..."**
**—From *A Ditcher's Diary* in Capital.**

## TTK on Productivity

SPEAKING at the concluding session of the Conference on Research Promotion organised by the Company Law Board, Sri TT Krishnamachari, India's Finance Minister, criticised the public sector for its high inventories which "provide for a scope for embezzlement and also for low productivity." ... Incidentally, he mentioned that small companies were generally run with greater economy and efficiency than the bigger firms.

## Aircraft Productivity

SIX American aircraft experts have arrived to assist Indian engineers in the Hindustan Aircraft Factory, Bangalore, to improve the performance and rate of production of the India-built HF-24 jet (supersonic) aircraft. They are expected to study the ways to improve the speed and performance of HF-24, by the use of a more powerful engine.

The present thinking of the Defence Ministry appears to be that it should plan full production of HF-24 (Mach-1) with 1.2 speed of sound, while efforts should be made to improve its design, rate of production, and speed. The IAF requires various

types of aircraft, with varying speed, and there is also a phased programme of replacement of the existing aircraft by improved indigenous types like HF-24, with greater speed and manoeuvrability, than Vampires and even Hunters.

## Productivity Through Moscow

AIR INDIA will start a new service between Delhi and London via Moscow in October this year. This will bring London within 12 flight hours. The new service would be *the fastest between Delhi and London.* A flight taking off at 10 P.M. (IST) from Delhi, in winter, would reach London by 4.00 A.M. (London time).

## Oil Exploration

OWING to oil shortage, the Government of India has been investing a good deal on oil exploration in the Punjab, Bihar, Uttar Pradesh, West Bengal, Gujarat, Kerala, and in the Cauveri basin on the east coast. It has now been decided to intensify oil exploration, and a sum of Rs. 2,250 million has been set apart for the purpose during the Fourth Plan period.

What probably is more significant is that the cost of drilling a well in India, ranging between Rs. 0.2 million and Rs. 10 million, compares favourably with the drilling cost in the USA and Europe. On the whole, the results have been satisfactory. Of 60 to 70 wells dug so far, nearly 30 have yielded oil.

## Quality Control of Marine Products

IN recent years, India has become an exporter of marine products—fish, prawns, frogs, etc. The value of these exports has increased from Rs. 39 million in 1961-62 to Rs. 60 million in 1963-64. Some of the European markets, however, have not been quite receptive to the Indian fishery products. It has, therefore, been decided to introduce quality control in the line. Addressing the third annual meeting of the Marine Products Export Promotion Council, Mr MP Alexander, chairman of the Council, said that they would soon be able to introduce a scheme of compulsory quality control and pre-shipment inspection.

## Productivity in Tourism

PRODUCTIVITY ideas dominated the recent meeting of the Tourist Development Council. Sri GM Sadiq, Prime Minister of Kashmir, emphasised the development of 'human relations' in tourism, and said that "... narrow and purely commercial attitude towards tourism should be done away with..." It has been decided to constitute two corporations to undertake commercial enterprises in the field of tourism—one corporation would build hotels, while the other would organise special transport services, produce and distribute tourist publicity material, and make arrangements to entertain tourists. Much would depend, however, upon the quantum of productivity injected into the working out of these corporations.

## Productivity in Plywood

OPENING the second annual meeting of the Federation of Plywood Industry in New Delhi, Sri Shah Nawaz Khan, India's Deputy Minister for Food and Agriculture, called for rationalisation of the plywood industry, and economy in the use of timber. A more rationalised plywood industry would lead to an improvement in the annual production of plywood goods, valued at Rs. 80 million. He wanted the industry to diversify its products, and produce cheaper grades of plywood for the package industry. He suggested that one way of economising the use of timber and plylogs could be to use good logs for producing better quality plywood.

## Productivity in Atomic Energy

PARTICIPATING in a discussion on Science and Irrigation and Power, Dr HJ Bhabha, Chairman, Atomic Energy Commission, said shortage of power for industries

## NPC Study Team at DDT Factory

Members of the NPC Study Team on Role of Labour in Productivity being told of the process of grinding of DDT in the Grinding Section of the factory by the Production Superintendent, Sri Aneja

Participants in the seminar on Mediation, Conciliation, and Arbitration organised at Madras by the Madras Productivity Council, with Dr AV Raman Rao, conference leader (fourth from left, front row).

## Madras Seminar on Mediation

(See News Report on pages 539-540)

# *NPC Crash Induction Programme*

**The Andhra Governor, Sri Pattom Thanu Pillai (left), discussing with Mr Bullock, US-AID Expert (third from left), details of the NPC Crash Induction Programme organised recently at Hyderabad. Second from left is Sri DP Agarwal, General Manager, Allwyns, and fourth from left, Mr HJ Hemmings, Works Manager, Allwyns**

*Mr Bullock, US-AID expert, is explaining a technical intricacy to shop supervision on the grinder at*

would result in 10 per cent loss of national income, while over-production, although it consumed capital, meant the loss of 1/70th of the national income. According to the calculus of productivity, therefore, it was safer to err on the side of over-production of energy. At the same symposium, Sri V Meckoni, of the Atomic Energy Establishment, said the Planning Commission had approved an increase of 680 mW in the atomic power production target so as to make it 1,180 mW by the end of the Fourth Plan.

## Incentives in District Administration

THE Sabarkantha Field Study Project, undertaken by the Planning Commission to study the working of district administration, has revealed that, in the context of the developing economy and the structural changes brought about by Panchayat Raj, much "of the old procedure has become outmoded, and there is imperative need to rationalise administrative procedures."

*. . . Unless good work is appreciated and bad work punished, the standard of efficiency cannot improve . . .*

The report, submitted to the Gujarat Government, has suggested a number of steps to streamline the administrative machinery, and to eliminate procedural defects, bottlenecks, malpractices and difficulties . . . It has suggested the organisation of refresher and reorientation courses for in-service training of Government servants, provision of adequate office accommodation, congenial working conditions, and equitable distribution of work for the smooth working of offices . . . The study team expresses the view that *unless good work is appreciated and bad work punished, the standard of efficiency cannot improve.*

## SQC in Textiles

THE Seminar on the Role of Statistics in the Textile Industry, recently organised by the Bombay Textile Research Association (BTRA), really developed into a full-scale discussion of the potentialities of SQC techniques as applied particularly to textiles. Sri R Doraiswamy, Textile Commissioner, and Prof GD Parikh, Rector, Bombay University, gave the whole problem of statistics a wider perspective. While the former pointed out how the adoption of statistical methods could lead the textile industry to the fullest utilisation of available resources and the attainment of plant targets, the latter referred to the scientific revolution taking place in the textile industry. Prof Parikh commended the excellent cooperation between Bombay University and BTRA.

The seminar was attended by over 150 mill technicians, some of whom read very knowledgeable papers on the application of SQC to the various phases of textile manufacture, and how the adoption of these techniques had resulted in enhanced productivity in the textile industry.

## Mediation, Conciliation and Arbitration

THE NPC has always been interested in labour-management relations as the basis of productivity. Accordingly, from time to time, training courses, seminars, etc., are organised on subjects pertaining to labour-management relations.

An excellent seminar was sponsored by the Coimbatore Productivity Council from June 29 to July 3, under the direction of Dr AVR Rao, an expert with considerable experience in India and the USA. Based on the fine reports of the success of this programme, the Madras Productivity Council, too, sponsored

a similar seminar from July 20 to 25. The areas covered by Dr Rao at these seminars included conceptual ideology, mechanics, voluntarism, public policy, and private methods: all in relation to mediation, conciliation, and arbitration.

Dr Rao's handling of the discussion led to a good deal of provocative thinking of various problems relating to industrial relations. Probably the most interesting conclusion was that, after all, the Indian industrial relations system was not so primitive, nor was it a straight jacket set up by the State. The system, as we have built it up, gives adequate scope to labour and management to come together, and discuss their differences without the need of governmental intervention, which works only like a fire-fighting machine when the parties cannot resolve their differences and the interests of the community are in danger.

## Training of Engineers

DR A LAKSHMANASWAMI MUDALIAR, Vice-Chancellor of Madras University, has urged reduction of the five-year engineering degree course to four or four-and-a-half years, so that at least six months could be devoted for practical training in some approved industrial concern.

Inaugurating a seminar in Madras (June 11, 1964) on "Collaboration between Industries and Institutions", organised by the Institute of Applied Manpower Research, Dr Mudaliar cautioned planners in engineering studies not to drift along complacently. Stereotyped methods of engineering education did not lead to the required efficiency. "I feel it is possible to reduce the theoretical instructions given in engineering colleges, and *do away with much of the chaff that has accumulated over the years . . .*"

On the need for specialisation on the part of engineers and technicians at all levels, he said "technical education should be diverted to the special fields according to the needs of the country. There should be a *halt to quantitative production of engineers*, and stress on qualitative production."

# Women Supervisors

**Do women employees prefer men or women to supervise them?**

*Good Business*, quoting **Miss Pepperell of the Industrial Welfare Society in UK, says that it is often claimed that women prefer to be supervised by men.**

**The reasons given for this preference, according to the same journal, are: It seems right for a man to be the boss; men are easier to work for; it is easier to get concessions from men.**

**Women who prefer supervision by a woman advance the following reasons: women are more understanding than men; they are better at talent-spotting; they are prepared to get down to detailed explanations of the job.**

**The reluctance of women to take on supervisory jobs is largely due to a lack of the sort of education that produces a trained mind, and the gift of self-expression. For these reasons, the journal adds, sessions on effective speaking, how to give instructions, and report writing are always appreciated by women supervisors.**

*Dr Sequeira examines here some of the socio-economic and psychological factors responsible for worker productivity based on the opinions and attitudes of workers of a large engineering shop engaged in the maintenance and overhaul of railway locomotives and the manufacture of its components. Although he has amassed a large amount of data, only those relevant aspects which are related to productivity have been discussed here.*

CE Sequeira

# Productivity and Job Satisfaction

THE health and happiness of industrial workers depend on circumstances which are complex and numerous. Torn off from their natural environment, they no longer follow their own inclinations, but are forced to place themselves within the demands of the group task system. In many cases the larger aims of the organisation in which a worker is employed and his contribution to it are unknown to him.

Job satisfaction is a generalised attitude resulting mainly from many specific attitudes in three areas—specific aspects of his job, individual adjustment, and group relationships.

Research workers have identified such factors as personal adjustment, type of work, attitude of work associates, job status, job security, pay, opportunity for advancement, and working conditions.

Tables I and II show the relationship between job satisfaction and productivity based on a study conducted in an engineering workshop engaged in the maintenance and overhaul of railway locomotives and the manufacture of its components, and having a complement of 12,000 workers.

TABLE I

**Job satisfaction and productivity of supervisors (in %)**

| | High job satisfaction | Low job satisfaction |
|---|---|---|
| Supervisors of high-producing sections | 69 | 83 |
| Supervisors of low-producing sections | 17 | 83 |

TABLE II

**Job satisfaction and worker productivity (in %)**

| | High job satisfaction | Medium job satisfaction | Low job satisfaction |
|---|---|---|---|
| Workers of high-producing sections | 17.3 | 76.6 | 6.7 |
| Workers of low-producing sections | — | 52.0 | 48.0 |

A definite and clear-cut relation is found to exist between supervisory productivity and job satisfaction (Table I). This shows that most of the high-producers have a high job satisfaction, while most of the low-producers have a low job satisfaction.

Table II shows that most of the workers belong to the middle job satisfaction category. There is, however, a distinct trend in that the workers of the high-producing sections show a higher level of job satisfaction. On the other hand, 48 per cent of the low-producers have a low job satisfaction.

## Employee Morale

Like job satisfaction, morale is an important factor in good industrial relations. Morale has been defined as the possession of a feeling on the part of the employees of being accepted, and of belonging to a group through adherence to common goals, and confidence in the desirability of these goals. It mainly involves two factors: the presence of a common goal and the acceptance of socially recognised pathways towards the goal. Job satisfaction contributes to morale, but these two are not identical. Industrial morale may best be considered as a by-product of the group.

In work situations, the workers, consciously and unconsciously, are likely to form a group, or a number of sub-groups. The ideal situation which leads to the formation of the highest morale is the one in which there is a single group which includes the representatives of the employer and the employees. The extent to which management attempts to achieve this is the extent to which morale is likely to be present. Table III shows the relationship between section productivity and worker morale.

TABLE III

**Worker's opinion of the extent of satisfaction he desired by interacting with members of his own work group (in %)**

| | Satisfied | Indifferent | Dissatisfied |
|---|---|---|---|
| Workers of high-producing sections | 54 | 23 | 23 |
| Workers of low-producing sections | 10 | 60 | 30 |

This means that workers of high-producing sections are comparatively more satisfied with their group relationship. They feel that they form a happy and contended group. Considerable pride in their work group was found to exist among them.

The effects of employee morale on productivity were also illustrated in another study conducted by the author in a large Government factory. The management, which experienced a sharp fall in production over the preceding year, wanted such a study undertaken. Other things being almost constant, apparently psychological factors were involved. On investigation it was found that the morale of both the management and the worker was very low. This situation arose as a result of favouritism, corruption, and lack of executive powers at all levels. Apart from the affairs of the factory being controlled by a distant head office, the workers' union, too, was split, and the management was clearly exploiting this split. However, when this situation was tackled satisfactorily, a marked improvement in production was noticed. Employee morale was gradually built up, and confidence instilled in the workers.

It must be noted here that group identification has a marked influence on the productivity of workers. This can operate through three mechanisms: (i) raising the informal group standard which is often established as a protection for group members against management demands; (ii) pride in the

accomplishment of one's group; and (iii) the assumption of group responsibility for a task and the corresponding greater cooperation among group members.

Productivity has been found to be affected by supervisory perceptions, values, practices, and attitudes. A lot of research has been done to stress the importance of effective supervision for increased productivity (Sequeira, 1960). Katz and his associates (1951) have shown that the behaviour of the supervisor is an important factor in determining the productivity of a work group. Usually, the successful supervisor is successful because he has a different concept of his role and responsibilities, a different set of attitudes towards his employees, and a different approach to people and to their motivation on the job. A supervisor is considered to be effective if he is favourably oriented in these aspects. Table IV indicates evaluation of supervisory effectiveness by the workers under their charge.

TABLE IV

**Section productivity and supervisory effectiveness (in %)**

| | High-supervisory effectiveness | Low-supervisory effectiveness |
|---|---|---|
| Workers of high-producing sections | 72.0 | 28.0 |
| Workers of low-producing sections | 28.0 | 72.0 |

A direct relationship is thus found to exist between section productivity and supervisory effectiveness. It appears that the effective supervisors are able to secure a higher production from their men by keeping them happy and contended. To achieve this they should have a thorough understanding of human nature.

**Communication**

Communication in industry represents a fresh viewpoint in labour relations. Effective communication leads to good business as well as good morale, while lack of it creates serious difficulties. The aims and problems of the management should be made known to the workers, who should be enlightened on their salient features. The facts must be frankly and clearly presented to them. The first step in a communication programme is to gain the full support of management. If the programme is to be successful, top managements should also understand the nature of the problems. Attitude and morale surveys should be conducted from time to time to ascertain what information the employees want.

The relation of good communication to worker productivity is illustrated in Table V.

TABLE V

**Section productivity and adequacy of communication**

| | Adequate communication | Poor communication |
|---|---|---|
| Workers of high-producing sections | 50.7 | 49.3 |
| Workers of low-producing sections | 21.3 | 78.7 |

It is clear from this table that about 50 per cent of the high-producers claim to have adequate communication systems in their sections, while only 21 per cent of the low-producers claim so. However, the figures illustrate that the communication system is rather poor in this factory.

Industrialists are conscious of the fact that an organisation has to be flexible in the formulation and execution of policies. This enables them to meet emergencies, and adjust to changes as and when they occur. The same is the case with integration of shop function. Research has shown that there is a positive relationship between each of these aspects and section productivity.

The data in this connexion are shown in Tables VI and VII.

TABLE VI

**Section productivity and organisational flexibility (in %)**

| | Adequate organisation flexibility | Poor organisation flexibility |
|---|---|---|
| Workers of high-producing sections | 76.0 | 24.0 |
| Workers of low-producing sections | 13.3 | 86.7 |

TABLE VII

**Section productivity and integration of shop functions**

| | Good integration | Poor integration |
|---|---|---|
| Workers of high-producing sections | 92.0 | 8.0 |
| Workers of low-producing sections | 52.0 | 48.0 |

From Table VI it is clear that flexibility in the manner of running a section is very conducive to worker productivity. In being flexible the supervisors can be both judicious and effective in attending to the many needs of individual workers. Obviously, this cannot be so if the head of the section is rigid in his views and decisions, irrespective of the need of the moment.

A closely related aspect is that of integration of shop functions. It is seen from Table VII that a high degree of integration of shop functions is characteristic of high-producing sections. In the low-producing sections the workers are divided on whether there is a good integration of functions or not. It appears that the degree of integration is rather poor in these low-producing sections.



## Sociometric Score

The existence of a happy group with healthy group relationships, as indicated earlier, is very conducive to employee morale. In the present study, the amount of organisation shown by the group was gauged by means of a sociometric score. This score was calculated on the basis of choices received in a choice situation. Critical choice situations were selected for this purpose. No direct relationship was found to exist between sociometric status and productivity. However, when related to job satisfaction a trend was observed which is indicated in Table VIII.

TABLE VIII

**Relations between sociometric score and job satisfaction on the criterion of preference for colleagues at work**

| Sociometric score | Frequency | Mean job satisfaction score | Mean difference |
|---|---|---|---|
| 6 | 1 | 28.00 | −6.11 |
| 5 | 2 | 30.00 | −4.11 |
| 4 | — | — | — |
| 3 | — | — | — |
| 2 | 4 | 33.25 | −0.86 |
| 1 | 5 | 34.20 | 0.09 |
| 0 | 7 | 35.11 | 1.00 |

TABLE IX

**Relation between sociometric score and job satisfaction on the criterion of preference on going for advice**

| Sociometric score | Frequency | Mean job satisfaction score | Mean difference |
|---|---|---|---|
| 1 | 7 | 31.14 | −2.87 |
| 0 | 12 | 35.80 | 1.72 |

Table VIII shows an inverse relationship between job satisfaction and sociometric score on the criterion of preference for colleagues at work. Those securing a very high sociometric score of 5 and 6 have a low job satisfaction score falling below the mean. On the other hand, those with a low sociometric score of 0, 1, and 2 are found

to have a comparatively high job satisfaction, the score in this case being above the mean.

On the criterion of going for advice regarding most matters (Table IX), those who had obtained the highest sociometric score of 1 were those with a low job satisfaction of well below the mean (mean difference −2.87), whereas those who had the lower sociometric score of 0 were the ones with a comparatively high job satisfaction.

Considering the effects of job satisfaction on production, the aspect of group formation among workers is of considerable importance.

## Organisational Climate

The existence of, and preference for, four types of organisational climate, viz., autocratic, bureaucratic, ideocratic and democratic, was studied. In the questionnaire, however, these terms were represented by functional aspects in the work situation. The areas covered by these questions were: (i) means of achieving high worker productivity, (ii) evaluation and promotion of supervisors, (iii) selection of new employees and their induction, (iv) departmental discipline, (v) overall progress of organisation, and (vi) employee job satisfaction.

An attempt has been made to relate the workers' perception of the organisational climate in his department with his productivity. The results are presented in Table X. From this table it is seen that there is a difference in the perception of the existing organisational climate by the high and low producers. Perhaps, this perception itself is reflected in their attitude towards their work, and consequently their productivity. The job satisfaction of the workers is likely to be affected in his perceiving his boss as a bureaucrat or autocrat. The high-producing workers in perceiving the former characteristic in their boss, as against the latter, are found to add to their job satisfaction index. In showing their preference, there is a marked tendency to welcome the democratic method. However, it must be noted that 38 per cent of the high producers voice their preference in favour of the autocratic method. According to them, the autocratic climate is more conducive to productivity in view of the present set-up.

TABLE X

**Organisational climate and productivity of workers**

| | Existing | Preferred |
|---|---|---|
| High-producing workers | Bureaucratic (86) | Democratic-Autocratic (52, 38) |
| Low-producing workers | Autocratic (75) | Democratic (67) |

*Note*: The figures in brackets show percentage mentioning each type.

Thus we have seen that the workers' behaviour, and consequently his productivity, are determined by two types of factors—internal or motivational, and external or situational. To raise worker-production, the motivational aspect must be given its due consideration. By providing motivation for work, we attempt to strike at the internal factor or condition that tends to initiate as well as sustain activity. It must be noted here that the needs of the workers form the core of motivation. This applies to all needs, be they the biogenic needs of hunger and thirst, or the sociogenic needs of security, dominance, group identification, acquisitiveness and values. To some extent, human behaviour is also motivated by emotions like fear, love, and anger, which, unlike the needs, are produced by an external stimulus situation.

It, therefore, becomes evident that none of these can be expected to produce a spectacular increase in productivity overnight. It is indeed a slow process calling for a wide measure of cooperation between management and labour.

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*How to minimise scrap is an aspect of productivity which has been engaging the attention of industrialists and others for some time now. The author of this paper, in offering a few suggestions to tackle this question, pleads for a constructive approach by management which should make the workmen understand that "a high percentage of scrap means ultimate loss to the company, and that loss to the company, in turn, means less security of job to them."*

BK Roy Chowdhury

# Suggestions to Minimise Scrap

ACCORDING to available statistics, *nearly five per cent to 10 per cent of the total raw material input is sold as scrap*, and some portion completely thrown off. This huge wastage can be reduced if careful watch is kept from the material ordering stage to the despatch of finished items.

The three most important factors to be taken into account are:

1. **Study:** What we have got and how efficiently the materials could be utilised, and how to reduce spoilage, i.e., more efficient scrap recovery.

2. **Facts necessary:** What work is done, and by whom, personal qualities of the person, theoretical and practical organisational efficiency, how the application is done, and how the work is supervised.

3. **Source of facts:** Organisational chart, merit-rating, job knowledge survey, effectiveness survey, source of supply, storage of raw and finished materials, principles of organisation, and planning (production and material).

What counts is the constructive approach of the management which should make the workmen understand that a high percentage of scrap means ultimate loss to the company, and that loss to the company, in turn, means less security of job to them. Every one of them, besides the foreman and the workshop, stores, purchase and production control departments, should strive equally hard to increase efficiency in material utilisation.

The role to be played by the various departments in the job of scrap minimisation is indicated below:

**Workshop Department:** Once the ideal material has been obtained, it must be used systematically. Tools, exactly as per specifications, should be used, and there should be no deviation at all. Also, there should be tighter supervision on 'short-cuts'. Though these may boost up production for the time being, ultimately the company has to face loss in material.

**Stores Department:** All incoming materials should be properly checked before taking them into stock. If necessary, 100 per cent checking should be carried out, as non-standard and below-standard materials not only increase the unwanted scrap, but cause serious upsets during production. Furthermore, bad storage and inadequate protection of the raw materials, or even the finished product waiting for transit, cause heavy wastage. Protection from dust, rust, and from deterioration due to climatic conditions is highly essential. There should be adequate safeguards against bad packing which is another source of waste. How negligence and lack of farsightedness of the stores officer of a company led to enormous waste can be seen from the example cited below:

> Company *A* placed an order for 300,000 pieces of cans on Company *B*, with delivery schedule as under:
>
> March 30,000 pieces, April 30,000 pieces, May 50,000 pieces, June 50,000 pieces, August 50,000 pieces, October 20,000 pieces, and the balance by December.

Before placing the order, Company *A* took all factors regarding production and storage capacity, etc., but to its surprise, Company *B*, at the end of May, supplied over 200,000 cans. Unwanted pressing of the purchase department on the stores department, resulted in this situation, and to oblige the former, the latter accepted the material which was ahead of schedule. Owing to shortage in storage capacity, the stores department dumped the material in a corner without proper protection. After some time it was observed that about 50,000 cans had become rusty, and they were so bad that over 60 per cent of them had to be treated as scrap, while the rest were sent for re-electroplating. A stores officer should regularly inspect the

materials, find out how far they are protected against climatic conditions, and keep the management posted about deviations, if any, in supply or receipts.

Another matter which deserves notice is that excessive handling is always harmful. If the factory lay-out is poor and there is excessive handling, the risk of a product being dropped, trodden on, banged, or broken is multiplied. Therefore, care should be taken for proper lay-out to ensure efficient handling of materials. There is little use finding fault with raw material in the final inspection stage.

**Production Control Department:** Being the nerve centre of an industry, greater responsibility devolves on the production control department which should ensure unified planning to help the industry concerned to reach its production targets efficiently and economically.

Tight material planning is essential, and three aspects to be noted in this connexion are:

1. The material planner should take proper rejection percentage. Accumulation of portions not utilised during production causes waste. Hence the need to arrive at the proper rejection percentage even while planning for some material.
2. The material planner should consider the various surplus items while planning, and ensure better co-ordination in the work of the concerned departments.
3. The material planner should be accurate and vigilant about the quantity he will be indenting on either the purchase department or overseas supplier.

   Below is an example to show how a big industrial organisation had to bear a heavy loss. While planning for 1 mm. thick aluminium foil, the planner, by mistake, put an extra zero against 20,000 kgs. In other words, against the actual requirement of 20,000 kgs., he placed an order for 200,000 kgs. The mistake was only detected when the full quantity was received.

**Purchase Department:** An efficient, honest, and sincere purchase officer, with a dynamic outlook, is the asset of a company. He can help the organisation in various ways in its plan of scrap minimisation. Proper co-ordination between planning and purchase departments is essential.

On no account should a purchase department stress on management or other departments to accept material relaxing rules laid down regarding quality of material, etc. It should be well-informed about the social and political movements of the country, and guard against unnecessary stocking of essential goods, as sometimes some of the materials may not be used at all owing to technical changes and other factors. A good purchase officer should not be reluctant to negotiate with the supplier about changes in delivery schedules, or in cancelling orders, which may become necessary owing to changes in planning, though this should, however, be kept to the minimum.

**Design Department and Development Laboratory**: These two departments have the responsibility for the supply of correct specifications and correct design backed by accurate drawings. How a drawing with wrong specification can cause loss to a company, by increasing the 'waste', is shown in the following instance: A drawing for a small spindle was supplied by the design department, which, by mistake, mentioned 2 mm.

*. . . Laboratories should be properly equipped and staffed, and in no event should an electronic engineer be concerned with chemical analysis, or a mechanical engineer with chemicals . . .*

instead of 2.5 mm. On the basis of the drawing, the planning department placed an order for 200,000 spindles. These were duly received by the stores department, and passed by the inspection department also. The fault was detected when the material was sent to the fitting department. To avoid the production loss, and at the same time the material loss, which such a case would have entailed, designs should be properly checked by at least two engineers before they leave the design department.

**Equipment for Labs**

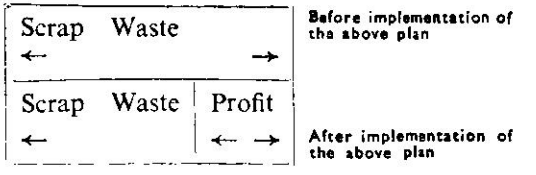
Laboratories should be properly equipped and staffed, and in no event should an electronic engineer be concerned with chemical analysis, or a mechanical engineer with chemicals. Once an electronic engineer was asked to suggest a chemical for use in place of another chemical, the import of which the Government did not allow. After a few so-called experiments, he suggested a chemical which was eventually accepted by everyone concerned, and an order placed for 4,000 kgs. But when it was sent to the concerned section for use, it was found that the chemical chosen was a wrong one. Such cases should always be referred to consulting firms which will be able to give proper guidance.

The design department should always keep in touch with the production control department regarding surplus stock of various materials. Whenever any design is evolved, efforts should be made to utilise the excess stock, if possible. This can definitely help in minimisation of waste.

There are also other ways of scrap minimisation—e.g., education of workmen by planned methods. The best way to inspire them in avoiding or reducing waste is by artistically designed posters which have a psychological effect on them and make them understand the problem quickly.

But to cut the cost of direct scrap or waste, the formation of bonus schemes based on output and material utilisation will be a step in the right direction. The Work Study man can help in the matter by carrying out a cost analysis to determine the scale of 'measuring the waste'. If this plan is implemented, the organisation concerned will benefit to some extent.

It will also be worth-while to have in big organisations a scrap minimisation committee, consisting of various departmental heads, and with the factory manager as chairman. It will be the duty of the committee to help educate the production personnel to appreciate that they should never use new raw material or components when recovered items are available. There should also be a full-time scrap minimisation engineer whose prime duty should be on-the-spot study of various operation cycles, and co-ordination of the work of the various departments in a systematic way. What is the use of a full-time engineer for this work, one may ask. The committee can depute one of the existing engineers as a part-time engineer for this work, but this will not be much helpful. While a specialised engineer will solely concern himself with the utilisation of waste and minimisation of scrap, any other individual, if put on a part-time basis, will not strain himself to see that the utmost is done to achieve savings in waste.




To prove the above, a simple example is given below: Suppose, the total raw material input of an organisation comes to Rs. 50,00,000 annually. Now, if we take 10 per cent as scrap and waste, then it comes to Rs. 5,00,000. Of course, of this 10 per cent some portion is realised through scrap sale, which will be also dealt with. To be more practical let us have it thus;

**BEFORE**

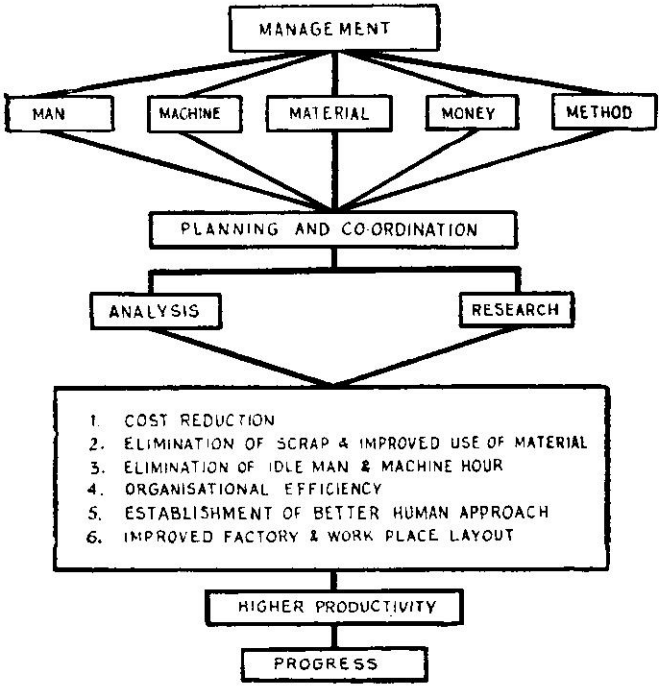
| | | |
|---|---|---|
| Total annual input of raw material | Rs. 50,00,000 | (a) |
| Scrap and waste (say 10%) | Rs. 5,00,000 | (b) |
| Realisation through scrap sale (say 20%) | Rs. 1,00,000 | (c) |
| Hence total loss through scrap and waste=(b—c)= | Rs. 4,00,000 | |

**AFTER**

| | | |
|---|---|---|
| Total annual input of raw material | Rs. 50,00,000 | |
| Scrap and waste (say 6%) | Rs. 3,00,000 | (a) |
| Realisation through scrap sale (say 20%) | Rs. 60,000 | (b) |
| Salary of SM Engineer, @ Rs. 600 p.m. and other facilities comes annually to | Rs. 9,000 | (c) |
| Other miscellaneous expenses | Rs. 4,000 | (d) |
| Hence loss =(a+c+d)—b= | Rs. 2,53,000 | |

Hence, after the implementation of the plan the company will be a gainer by Rs. 1,47,000 (Rs. 4,00,000—Rs. 2,53,000).

Finally, it should be noted that there cannot be a permanent 'one best way'—the best way will differ from year to year. Also, scientific approach can help to increase efficiency, which is the fundamental basis of all types of industrial activities. There are many roads that lead to progress. This is also one of the most straight and sure roads through which it can be hoped that the industries of India in particular can reach the goal, i.e., PROGRESS.



*A writer to this journal, Sri SB Chakraborty (Vol. V, No. 2, pages 339-340), posed a number of problems on the productivity of Pressmen following the introduction of a straight incentive scheme, and subsequently of an indirect incentive scheme, in a small industry consisting of 85 workers. The problem which is facing its management is that after the introduction of the indirect incentive scheme, production had not gone up, nor had absenteeism gone down. Here are the reactions of a number of experts on this situation, and their suggestions to tackle the same.*

Productivity of Pressmen:

# A Problem in Incentives

"THE basic problem is the overcoming of the prevalent limited aspirations of the Indian worker... Management has done little to educate or motivate Indian workers to aspire beyond having just enough food, and the majority of them often are not interested in raising their standard of living beyond the marginal level or creating surplus funds for a 'rainy day'. This is a major national problem which will require the best efforts of top-level managerial and governmental people to overcome . . ."

These views have been expressed in a letter to the Editor by the George Fry and Associates Team Members stationed in Delhi.

The following represents the consensus of the Team Members:

"There are several basic flaws to be found in the plan and its administration—i.e.,

1. It has been widely observed that there is no factual basis on which to expect the output to increase when the non-productive (indirect) personnel participate in the production bonus.

This is due to the fact that there is no direct contribution to the productive effort by this group that will increase the production workers' output. If there is direct impact, then we can measure the effort and impact and set up a direct incentive.

2. The attendance incentive is not a strong incentive, because in itself it allows for a 23 per cent (six-day) absentee factor, i.e., (26—20=6 days=23 per cent).

Attendance incentives are normally applied separately and directly, without regard to the production incentive, to be effective.

3. We rather suspect that the production

incentive is *loose*, and was not determined by time study.

It is quite possible that direct *individual* incentives, rather than a large group or shop incentive, would produce better results. In any event, the rates must be measured by work measurement to be factual.

The greater the number of people participating in a group incentive plan the lesser the amount of individual incentive there is. In fact, with more than 15 people in a group incentive, the incentive practically disappears completely.

4. In our opinion, the basic problem is the overcoming of the prevalent 'limited aspirations' of the Indian worker. In other words, management has done little to educate or motivate Indian workers to aspire beyond having just enough food, and the majority of them often are not interested in raising their standard of living beyond the marginal level or creating surplus funds for a 'rainy day'. This is a major national problem which will require the best efforts of top-level managerial and governmental people to overcome."

## Proper Study Needed

**Sri RN WARRIAR, Regional Director, NPC, Bangalore:** From the facts presented by Sri SB Chakraborty, the situation of the Incentive Scheme at Messrs National Floor (P) Ltd. can be summarised thus:

(i) The industry is a small one with about 85 workers.

(ii) Some time back a straight incentive scheme was introduced direct for production workers, and as a result the average earnings went up by Rs. 35 to Rs. 50 per month. This scheme is in operation since eight years.

(iii) Two years back an indirect incentive scheme was introduced for indirect service workers. As a result of this scheme, the average earnings of such workers went up by Rs. 12 to Rs. 20 a month.

(iv) The problem facing the management is that after the introduction of the indirect incentive scheme for indirect service workers, production has not gone up; also absenteeism has not gone down. The wage bill has gone up with no commensurate increased production.

Before attempting an answer to these problems, one must be clear about certain additional facts such as:

(a) Under what conditions was the original incentive scheme for direct workers introduced eight years back?

(b) What was the basis for fixing the standard then? Was the target fixed as a result of a proper workload study? Was the target fixed based on previous experience?

(c) Why was the management prepared to accept an indirect incentive scheme for indirect workers after six years of the introduction of the direct worker incentive scheme?

(d) Who is the "pace-maker"? Does the direct or indirect worker determine the speed of operation? From the experience of increased production as a result of the incentive scheme for direct workers, even in the absence of any incentive scheme for indirect workers, it appears that the pace-makers are the production workers, and that the level of performance is essentially determined by the effort of the production worker, and not of the indirect worker. In other words, the role of the indirect worker is very much subsidiary, and his effort can hardly reflect on the total output.

I am not very sure whether I could assume that the standards under the original incentive scheme were based on past performance. The subsequent performance record suggests this view. Similarly, I am inclined to assume that the incentive scheme for the indirect workers was accepted under pressure from the union.

It is unrealistic to expect a rise in the level of production because of the introduction of an indirect incentive scheme for service workers, for the obvious reason that the output in this case depends more on the effort of the direct worker and less on the effort of the indirect worker. As long as

the indirect worker can keep the direct worker going, the production will depend upon the effort of the direct worker, and not on the indirect worker. However, it is admitted that a degree of cooperation of the indirect worker must exist for the direct worker to operate effectively.

Through an incentive scheme it is not possible to reduce absenteeism. In fact, often absenteeism may go up as a result of higher earnings through incentive schemes. May be a production-cum-attendance bonus, under which either a separate bonus for attendance is paid, or production bonus is made payable only when a minimum attendance standard is satisfied, could be tried.

My suggestion would be that the entire situation be properly studied, and revised targets or standards decided on for an eight-hour working day. This standard should not be based on past performance, but on the basis of proper work study. On the basis of the findings of this study, the rates for incentive scheme could be modified. Indirectly, this will slightly modify the rates for indirect workers also.

As far as absenteeism is concerned, another study to ascertain the reasons for it must be made, and in the light of the findings suitable action taken.

## Absenteeism

**Sri S VISVESWAR, Industrial Engineer, NPC Regional Directorate, Bangalore:** In the letter of Sri SB Chakraborty (Vol. V, No. 2, pages 339-340), there is a statement which says that "50 indirect workers are exactly required against 24 Pressmen now on roll." It is important to check up the way in which this figure was arrived at.

Regarding the scheme itself: The percentage of production bonus payable on wage or payable to workers other than pressmen as production bonus

$$= (\text{Average } \% \text{ of excess production on which pressmen are paid}) \times \frac{50 \times 208}{\text{Total man-hours by A and B mazdoors and grinders including single hour of overtime worked by A and B mazdoors and grinders}}$$

Further if

X = Average percentage of excess production on which pressmen are paid,

Y = 50 × 208 = Man-hours available, and

Z = Total man-hours by A and B mazdoors and grinders, including single man-hour of overtime worked by A and B mazdoors and grinders.

This ratio, Y/Z = reciprocal of attendance efficiency.

Also, when the number of hours of overtime worked is less than the number of hours lost by absenteeism, the ratio Y/Z is greater than 1, i.e., the more the absenteeism, the greater is the value of the ratio Y/Z. So, the percentage of production bonus payable on wages or payable to workers other than pressmen as production bonus = XY/Z, tends to be constant, irrespective of the attendance of the workers. In other words, it encourages absenteeism.

Unless full details are available of the way in which targets are fixed for payment of incentives, comments, as expressed above, are bound to be of a general nature.

## Two Solutions

**Sri RJ VANKANI, Baroda:** There are two solutions to absenteeism referred to in *Productivity* (Vol. V, No. 2, page 340).

1. The system of attendance bonus. In Jyoti Ltd., Baroda-3, they are having a system as shown in the table on the next page:

| Groups made as per absenteeism in a month | Absenteeism in a given month | Attendance bonus | Remarks |
|---|---|---|---|
| A | Nil | 12½% | The % is of the earned |
| B | ¼ day | 11% | wages (exclusive of |
| C | ½ day | 10% | dearness allowance during |
| D | 1 day | 8% | a given month) |
| E | Above 1 day | Nil | |

NOTE: *Earned and sanctioned leave is considered as presence. Sanctioned and unpaid leave is considered as absence.*

2. The system of quarterly bonus in coal mines. If a worker is present for 66 days in a quarter of a year, he is given one month's salary as bonus for that quarter. Here also, sanctioned and earned leave is considered as presence.

Needless to say local conditions must be taken into consideration before applying any such system. Sometimes, it depends upon the type of labour employed also.

In spite of the above systems, it was observed that the Bhaiyajis of Uttar Pradesh go on leave for one to one and a half months every year, mostly in the summer. Similarly, absenteeism in the rainy season is more where workers come from families belonging to the farmer community.

## Scope of Incentive

**Sri RS GUPTA, Deputy Director, NPC Regional Directorate, Kanpur:** Sri SB Chakraborty says that as a result of the introduction of production bonus, the pressmen have increased their earnings by an extra amount of Rs. 35 to Rs. 50 per month. Obviously, there must be a corresponding increase in output. He further states that by the introduction of the production bonus scheme, workers' earnings have considerably increased whereas productivity or production has not increased substantially. There appears to be some fallacy in this argument.

It has to be realised that incentive has only limited scope to play in increasing output, and the operator's earnings. If the incentive scheme is proper, about 33 per cent to 35 per cent increase in output as well as in earnings is fair enough.

## Production Bonus

**Sri SB CHAKRABORTY, Industrial Relations Adviser, Calcutta:** I have clarified below the points raised by Mr MM Jacob in the NPC *Productivity* Journal (Vol. V, No. 2, page 340):

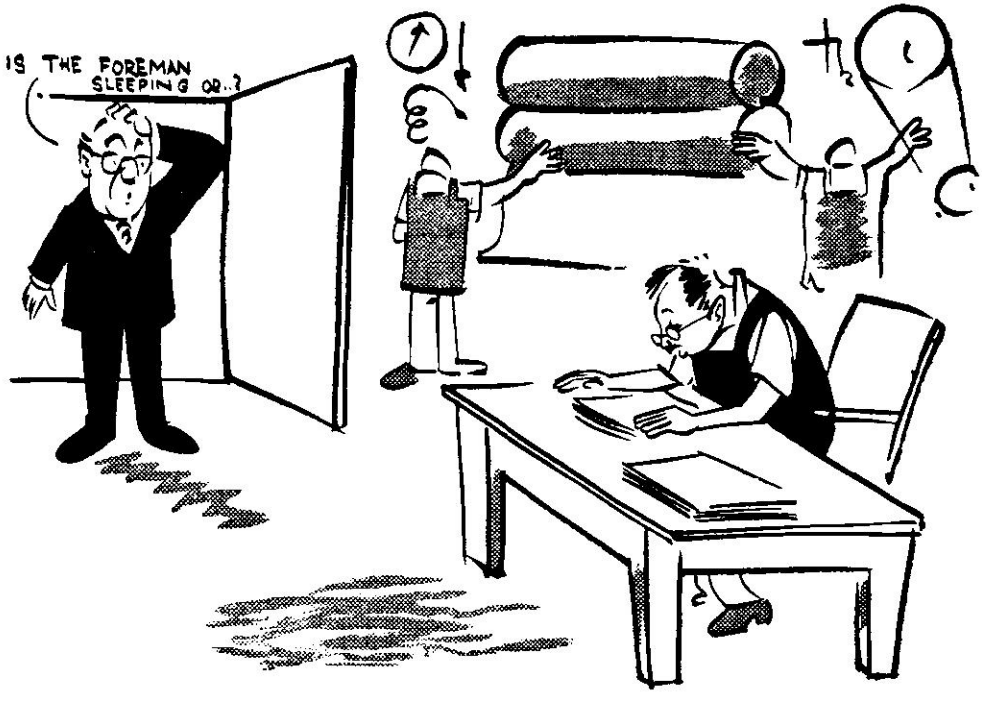
1. The Pressmen numbering 26 are paid premium on pro rata basis on their production of eight hours, over and above the target fixed for eight hours. This practice is prevailing in the particular industry (tile-manufacturing) for the last eight years.

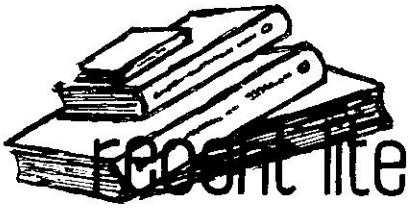
2. In April 1962, the other category of workers, i.e., grinders, fillers, and mazdoors, were covered through a new production bonus scheme. . . The factory at present employs 85 workers in all, of which 26 are Pressmen, and the rest grinders, fillers, and mazdoors. In the scheme covering those other than the Pressmen, the surplus workers numbering nine have not been taken into account which is quite clear from the agreement itself. To arrive at a fair percentage in total man-hours, overtime has

also been included (though practically no overtime is done after the introduction of the new production bonus scheme). The factory works in two shifts, but the Pressmen, i.e., the direct productive workers, work only in one shift. This change has been introduced to save overtime after the introduction of the new production bonus scheme covering the workers other than Pressmen which was not clearly mentioned in my letter dated Apr. 28, 1964, (Vol. V, No. 2, pages 339-340), in clause three, of which it has been rightly said that productivity or total production has not increased after the introduction of the production bonus scheme for the workers other than Pressmen. I do not find any anomaly or contradiction in this as mentioned by Mr Jacob. To be more precise, prior to the introduction of the production bonus scheme in 1962, for workers other than Pressmen, those workers used to get their wages only including a little amount of overtime. But after the introduction of the production bonus scheme their earnings, including premium as per the new scheme, have also increased from Rs. 12 to Rs. 25, but total production has not increased. If the formula for paying production bonus to indirect workers and foreman, etc., is still not clear, it is good to ask for definite information on such points.

To put our problem precisely, does it mean that the introduction of the production bonus scheme for workers other than Pressmen has not created enough incentive to secure more productivity or higher total production? If so, what is the solution, or what are the defects in the scheme?

However, in connexion with the problem of absenteeism, Mr Jacob has suggested that I should better contact some Labour Research Centres in India. May I suggest that you kindly help me in this matter, or, if possible, refer it to some of the experts who are associated with the NPC and are conversant with the problem of absenteeism in industry. In my letter dated Apr. 28, 1964, I have tried to indicate whether cash earnings of workers, where even fair wages are not paid, should be a deterrent to the habit of absenteeism. In the particular case referred to, we have one worker who has an extreme chronic record of absenteeism, obviously owing to his link with the joint family system. But, I do not still know the reason why workers absent themselves even losing their cash wages.





# recent literature on productivity

## PROBLEM OF HOUSING

**HOUSING COOPERATIVES (Studies and Reports—New Series, No. 66), International Labour Office, India Branch, Mandi House, New Delhi, 1964, Rs. 7.88.**

THIS study of housing cooperatives, as found in the Scandinavian and other European countries, in North America, and in developing countries, by Mr SR Lujan of ILO's Cooperation Division, brings out the salient features of well-known cooperative housing schemes in these countries—as to how they were launched, and the lines on which they are run. The major achievements in this important field are described, as well as the reasons for success or failure, to be of guidance to developing countries (like India).

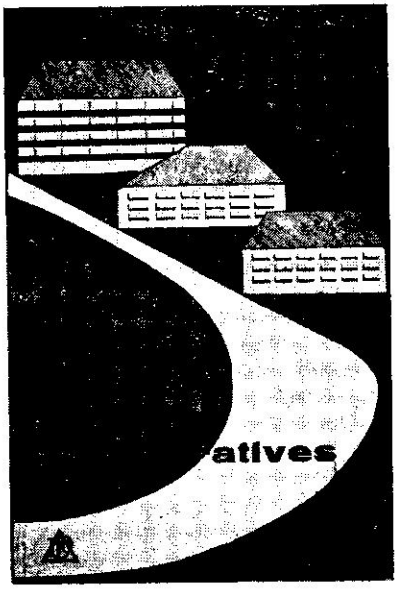
As accepted all over the world, and as laid down recently by the new Indian Prime Minister, food, clothing, and shelter are the three primary, vital needs of humanity. Depending on local conditions, housing is often placed second in importance. As set out in the Introduction,

> ". . . a shortage of housing constitutes a grave problem from two points of view—the one social, and the other economic . . ."

The teeming slums in India, and the recent Negro riots in Harlem (New York City), will come readily to mind to underline the social disability of a serious lack in housing. As for economic drawbacks, the connexion between residence in unhygienic conditions, resulting in loss of health and dignity, and the consequent lowering of efficiency in the out-turn of workers, is easily discernible. Even in a developing country like India, where governmental attention to housing on a large scale commenced only at the end of the First Five-Year Plan, the fact that 50 per cent subsidy is given by the Union Government to industrial housing in the public sector, and 25 per cent in respect of the private sector (cooperatives of workers, and management projects), proves that, with better housing in industry, higher targets of achievements and higher contribution to the Union Income-Tax are expected. These days, in any free country, he who runs can see the vital importance of industrial housing.

The cooperative movement in general has a long history in India, especially in the old, composite Madras State. However, taking India as a whole, cooperative housing is only a small segment of it—about three per cent or four per cent. In this, cooperative industrial housing forms a part. Even in the course of a generation, much headway has not been possible. As is admitted in the

present study, the international answer is in the negative to the question—"From the point of view of workers, and of low-income families in general, is it possible for them, alone and unaided, to acquire decent homes of their own if they set aside a reasonable proportion of their incomes for that purpose?" A series of surveys by the ILO proves this well-known state of affairs, leading to the inescapable conclusion that the only hope lies in housing cooperatives.




The ILO study enables us to have worthwhile peeps into the housing cooperatives of Sweden, Denmark, Norway, France, Germany, Poland, Spain, Canada, the USA, Colombia, India, and the UAR—their background, origin, structure, projects (good aspects, and drawbacks if any), mode of financing, etc. Sweden is the first to be considered, and in detail, because "it is in the vanguard of the countries where cooperatives play a role of great importance in the solution of the housing problem." As in India, the general cooperative movement had its origin earlier, but its adoption for the increase of housing facilities came much later, somewhere between the two world wars. Denmark and Norway seem to have followed quickly. India cannot be said to have lagged behind, as the first housing cooperative was started in Bombay about 50 years ago, though it must be admitted that appreciable progress was achieved only during the last 15 years.

**Raising of Finance**

The ILO study describes the ways in which housing cooperatives are financed in the aforesaid countries. In Sweden, Denmark, and Norway, the cooperatives raised the finance themselves. Similarly, in Canada and the USA. In France and Germany it was the same, but, only after World War II, in view of the obvious difficulties, the Government came to their help with funds, after seeing the good work already turned out by them. As a contrast, in India, cooperatives expect to be spoonfed by the Government, and not one gets going until and unless a loan from public funds is forthcoming!

In the USA, and in Canada, as well as in the above European countries, the movement is more for "collective ownership" of houses and flats, and for "tenants' cooperatives" in the true spirit of cooperation. Construction of houses for individual ownership is undertaken to a less extent more by way of toleration than encouragement. Stringent measures are also taken to prevent commercialisation in the transfer of ownership. Generally speaking, India presents a contrast. Excepting in Bombay, where common ownership of storeyed flats by cooperative house construction societies has made some headway, elsewhere public pressure is mostly for individual ownership.

The ILO report gives some details of the Subsidised Industrial Housing Scheme, and of the Low-Income Group, Middle-Income Group, and Village Housing Scheme in India, under the Plans. But, the efforts of the Union and certain State Governments, to push at least 50 per cent of the dwellings in the first three categories into the public sector, under rental basis, to conform to a socialistic pattern of society, have not been mentioned. Similarly, in the wake of the Chinese aggression and the emergency, the inexplicable diversion by all the States of most of their Plan funds earmarked for housing to other

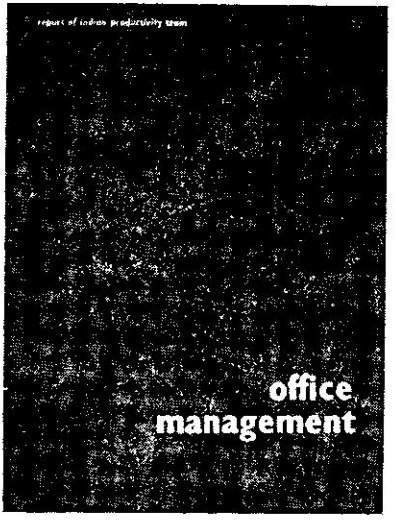
objectives, is not noticed, perhaps because it is an international survey.

In conclusion, straightway it can be said that this study on *housing cooperatives* is sufficiently comprehensive, and quite useful, especially to the younger among the new nations. It is a helpful contribution to spread the current world movement to increase the dovetailed facilities under cooperation and housing. Under Chapter XIV, in Part VI, very concrete suggestions, for adaptation of the cooperative formula in developing countries, have been drawn up. It is good to be told that further studies of other groups of countries in different continents may be forthcoming.—**D Gnanaolivu.**

## Office Standards

**OFFICE MANAGEMENT (NPC Team Report No. 37), National Productivity Council, 38-Golf Links, New Delhi-3, pages 120, 1964, Rs. 3.50.**

THERE is considerable confusion of thought on the nature and scope of office management. The NPC's report on this subject begins by quoting two definitions of office management, which illustrate this. Hicks and Place define office management as "the information-handling and memory function of a company." This would confine the function of the office to a little more than the efficient maintenance, preservation, and presentation of records. According to Wyle and Brescht, however, "office management may be defined as the manipulation and control of men, methods, machines and materials to achieve the best possible results—results of the highest possible quality—with the expenditure of least possible effort and expense in the shortest practicable time, and in a manner acceptable to top management." In this view, office management would cover practically the entire managerial field.




It is important to be clear on the scope and place of office management in the general scheme of business management. Too limited a view, as that of Hicks and Place, would consign office management to a negligible place in the scheme of things, whereas the all-embracing view of Wyle and Brescht, as quoted in the report, would elevate office management to the most important function of an enterprise.

The truth of the matter is that the process of management is devoted to the attainment of enterprise objectives. This process works with several tools and skills. But there is one tool which is basic to the entire process, viz., communication. The office function specialises in the handling of this basic tool. The office is a facility centre devoted to the receipt, processing, issue, preservation, and destruction of communications.

The NPC should be congratulated on having focussed attention on the problem of office management in relation to productivity. The report places office management in a proper perspective as the provider on the one hand of the increasing quantities and varieties of information that a modern business requires, and on the other as a contributor to the profit of the company only to the extent to which it performs this function efficiently and economically. The danger that it may outgrow its own dimensions and cut into profits, rather than create them, is fully recognised.

There is a significant analysis of the motivations which led to improvements in office procedures through mechanisation in a random sampling

of 153 Japanese companies. It is remarkable that only 13 of these give a place of high priority to reduction in the number of employees. The most widely accepted objective was neither reduction of staff nor speeding up the closing of accounts, etc., but improvement in planned control and efficiency in management as such. Although some cases have been cited in which considerable reductions in costs were obtained as a result of improvement in office procedures, it is refreshing to find that this has not been the main or major motivation in this regard. This should set at rest the fear often expressed that the application of techniques, like work study, work simplification, and job analysis, is only designed to achieve reductions in staff. Improvement in office procedures and the attainment of excellence in this field are being recognised as objectives in their own right, and this is reflected in the report.

**Practical Guidance**

The main contribution of this report, however, to office management lies in the abundance of practical guidance it has brought within the covers of a small volume. The meaning and use of tools like job analysis, time and motion applications, systems and procedures, forms design, planning and scheduling of office work, and filling systems have all been described from actual experience abroad, and in sufficient detail for managements to adopt them. The chapter on "Office Standards" describes the achievements in foreign countries in this behalf, and one hopes, will inspire similar effort in this country.

There is an interesting chapter on "Personnel Problems of Office Workers" in which there are the results of a research study of the problems of recruitment, choice of career and job satisfaction of clerks conducted by the University of Liverpool. Although it is based on a small sample and may not be fully applicable to our country, there is one feature which is relevant to the Indian environment. This is the declining attractiveness of clerical work on which the report itself is worth quoting:

> "The decline in attractiveness of clerical work is particularly true in the case of the industrial office; this never enjoyed the social cachet of the banks or insurance companies, but it provided better pay and working conditions, more generous fringe benefits and a higher social status than the factory itself. These differentials are steadily being whittled away by the pressure of the manual workers' unions in an era of full employment, and by national insurance, unemployment legislation, and the extension of paid holidays to manual grades.
>
> "Add to these factors the tedious and uninspiring nature of much of the work done by a junior clerk, the uncertainty of promotion prospects, the existence of salary anomalies arising out of the lack of systematic job grading, and the haphazard or non-existent arrangements for vocational training, and it is not hard to understand the shortage of good quality recruits. The steady stream of intelligent 16-year-olds which flooded industry with applications in the 1930s has been diverted into the sixth form for a further two years, and thence to the university or the technical college for another three or four. The lure of the white coat is greater than that of the white collar."

David Lockwood, also quoted in this book, speaks of the "ambiguous social position of the clerk, sustaining middle class aspirations on little more than the working class income." We do not have corresponding statistics in our country, but it is obvious from general observation that the same tendencies are in action here, and the report under review could help farsighted managements to take heed of these and think of

# Books Received

**THE ECONOMIC THEORY OF MANAGEMENT CAPITALISM: Robin Marris, Macmillan & Co. Ltd., London, pages 346, 1964, 40 sh. net.**

**WORK STUDY IN JUTE & TEXTILES: SK Kar & SK Lahiri, Book Society of India Ltd., Calcutta, pages 184, 1964, Rs. 15.00.**

**EXPERIMENTS IN INDUSTRIAL DEMOCRACY : Nabagopal Das, pages 175, 1964, Rs. 16.00; FOREMANSHIP: A Deb, Asia Publishing House, Bombay, pages 150, 1964, Rs. 6.00.**

restructuring, not only the placement, procedures, and equipment of offices, but also the satisfaction-system for office workers, such as would enthuse them in this increasingly important basic facility for business management. Higher productivity is the key to achieve this without adding to unit costs.

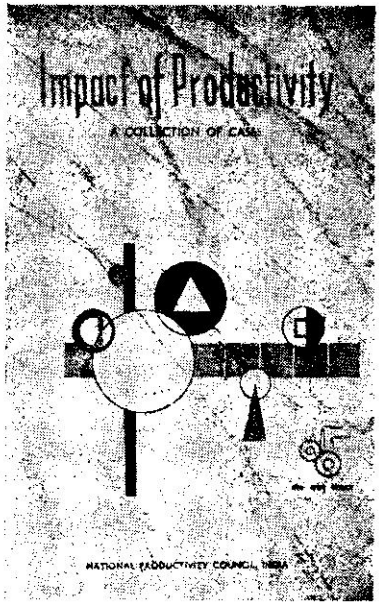
Among the recommendations made in the report for the improvement of office work, one at least has already been carried out. This is the establishment of an Institute of Office Management. It is to be hoped that this institute will serve as a live and catalyst agency which will actively work for and ensure the widespread adaptation of the other recommendations in the report, which will be all to the good of office management in our country.—**Sri Thandaveswara.**

## Case Studies on Productivity

**IMPACT OF PRODUCTIVITY—A Collection of Cases: National Productivity Council, 156 Golf Links, New Delhi-3, pages 70, 1964, Rs. 2.50.**

THIS book is really welcome, for it makes a valuable contribution especially in disseminating the practical utility of productivity techniques and methodologies in achieving concrete results. The cases presented have been effectively depicted, and cover diverse areas among them—being problems relating to office methods, process improvements, fatigue reduction, work simplification, equipment utilisation, releasing locked-up capital in inventories, and effective execution of projects.

The case relating to a Distilling and Chemical Company involving a capital expenditure of Rs 20 lakhs should be of interest especially in the context of effective and timely execution of projects so much discussed and emphasised at all levels in our country's administration. It makes use of a very effective and powerful technique, PERT (Programme Evaluation and Review Technique), which owes its comparatively recent origin to the successful and effective implementation of the Polaris Missile Project in the USA. It has enabled the management of that company to direct its energies towards key events, in order of priority, so as to accomplish the project in time, without unduly crashing any event and making it costly.




The study of inventory control is another instance of useful cases in this book. The practical techniques of inventory control have been briefly given, and they show how by adopting very simple calculations, it is possible to effect sizable economies, and release a large amount of locked-up capital which could be utilised in more needed and productive areas. It is generally contended that inventory control techniques have great potential in application in larger enterprises. This case, however, throws light on how even in small units it is possible to derive considerable economies by this technique which can contribute in consolidating and strengthening the financial stability and liquidity of such units which form a vital backbone of our country's economy and industrial growth. It throws light on a powerful means of productivity utilising one of our scarce and increasingly sought-for resource, viz., 'capital'.

An important factor which has to be overcome in the promotion, launching, and

undertaking of any productivity drive is "resistance to change", which is not uncommon in practice. Knowledge of the results achieved, and effective presentation of actual cases pertaining to industries and organisations located in our country will go a long way to overcome this resistance.—**MR Ramsay.**

## House Journal

**DDT NEWS, April-June 1964 (House Journal of Hindustan Insecticides Ltd.), C-255 Defence Colony, New Delhi-3.**

THOUGH with a rather unattractive title (DDT) and the repugnant mosquito prominently displayed with all its fangs on the title page, DDT NEWS, a house journal of Hindustan Insecticides, is inside of it, an extremely fine magazine of its own kind: really the sort that in the interest of productivity, improved labour-management relations, etc., ought to be brought out by every industrial enterprise.

The very beginning is significant. We have on the second cover page Directors and labour leaders not only speaking but inaugurating a housing colony for the employees of Hindustan Insecticides—quite a substantial contribution in itself to motivate labour towards productivity. Again, on the third art page, we have the new-born children of HIL employees, newly married couples, etc. There is plenty of productivity inside, with the Superintendent of Production explaining techniques to the Minister. The interest of Parliament in the productivity of public enterprises is well illustrated by a number of snapshots of MPs visiting the Delhi Factory. It has also photographs of Japanese workers who came to see HIL under the UNESCO Programme for Study Tour for workers in Asia.

Practically, everybody has been drawn in from inside and outside; and the Editors (one of them Sri Satish Khanna, an old boy of NPC) have shown by facts that HIL is in fact doing very well, with a record level of output during 1963-64. There is another aspect of productivity that needs notice, viz., emotional integration: within two covers the magazine has three language editions—Hindi, Malayalam and English—setting the pattern of the multilingual State that the Indian polity must become in order to attain an optimum level of social productivity.

# New Way to Protect Books

**A new development in industry involving the use of modern materials seems to provide a solution to a problem which had been confronting librarians for many years past. Cockroaches, particularly in hot climates, quickly ruin the bindings of books as they munch away at the glue provided by bookbinders, and the prevention of this damage had exercised the minds of many for long.**

**"In one library," says *Good Business*, "they have taken to coating the covers of their books with a plastic compound which is normally sold for treating floors. The material used is a phenolic varnish... The plastic is brushed on, and a book which takes about a minute to coat is dry enough to handle in about five minutes. The resulting finish is shiny, easy to keep clean, and quite unappetising to cockroaches.**

**This plastic is also very useful for the purpose for which it was originally developed, the protection of wooden floors. It is used in schools, in laboratories, and similar places where it is desired to keep a clean, shiny floor with the minimum of trouble. Although this plastic coating gives a clean and bright finish, it provides an absolutely anti-slip surface.**

# Q You ask... We answer... A

## 1. A CHART FOR GRADING OF SUPERVISORY STAFF

**MR RM AGARWALA of Bhilai has prepared a chart to help in the grading of supervisory personnel according to their performance. The idea behind it, he says, is that "only work and the result of work should determine a man's material and social position."**

**Readers of *Productivity* are welcome to offer their comments.**

The chart for grading supervisory personnel, as designed by Mr Agarwala, is given below:

| Primary division of abilities | Secondary division of abilities | |
|---|---|---|
| | ($\alpha$) In one field | ($\beta$) In more than one field |
| (A) To determine what useful results should be produced: | (i) Without guidance and guiding others | |
| (a) under confused conditions | (ii) Without guidance but not guiding others | |
| (b) under unconfused conditions | (iii) Under guidance, in | |
| (B) To produce such results practically: | (p) 1 year | |
| (a) in a medium of obstructions | (q) 2 years | |
| (b) in a medium of no obstructions | (r) 3 years | |
| | (s) 4 years | |
| | (t) 5 years | |
| | (u) Not even in 5 years | |

Many combinations are possible out of the above divisions and sub-divisions. The combination represented by (A) (a), (B) (a), (β) (i) indicates the highest type whereas the one represented by (B) (b), (α) (iii) (u) indicates the lowest type among the supervisory cadre. (A) denotes research, investigation and formulation of policies, and (B) denotes execution of what is decided under (A).

The chart can be used to: (1) describe a supervisor required for a particular level in the management, (2) denote that the aim of technical education and training is production of certain results, and (3) spot out incompetent supervisors, etc.

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## 2. HANDLING OF BOTTLES

MR P PANDE, Industrial Engineer, Hindustan National Glass Mfg. Co. Ltd., Hooghly, in a letter dated June 23, 1964, addressed to the Editor, NPC *Productivity* Journal, referred to the project work done in a pharmaceutical company through the NPC Regional Directorate at Bombay, as a part of the Industrial Engineering In-plant Training Programme, and the recommendations on handling finished bottles in groups of 10 rather than singly (*Productivity*, Vol. IV, No. 2, Page 347).

"We, manufacturers of bottles", the letter said, "are interested to have details of your recommendations, and want to know whether this method can be used by us for handling the bottles from the production line after sorting out."

The report in Vol. V, No. 2 of the NPC *Productivity* Journal (page 347) referred to a study undertaken by NPC to evolve improved handling and storage of finished goods in a pharmaceutical company manufacturing a variety of pharmaceutical specialities. It said: Two liquid tonics constitute about 60 per cent of the total production. Since they contain alcohol, they are manufactured, bottled, and cartoned under the direct control of the State Excise and Prohibition Department. Repeated additions of new manufacturing equipment in the Bonded Laboratory have made that area an extremely congested section of the works. The sales godown was likewise crowded and there was an excessive amount of handling note'. Sales were running 20 per cent over the previous year. Recommendations have been made to handle the finished bottles in groups of 10 rather than singly, to improve the trolley design for greater capacity, to revamp the storage shelving arrangement, to improve the mode of packing for shipping, and to re-layout the sales godown. Most of these recommendations have been implemented. Savings of the first year are estimated at Rs. 1,13,000, with greater savings thereafter.

**The Editor referred Mr Pande's letter to the NPC Regional Directorate, Bombay, which, in turn, contacted M/s Raptakos, Brett & Co. Pvt. Ltd. whose Productivity Officer, Mr KV Nair, answered the problem raised by Mr Pande. Mr Nair's reply to the NPC Regional Director, Bombay, is reproduced below:**

Sir,—The following are the relevant details of the particular recommendation in which Messrs Hindustan National Glass Mfg. Co. Ltd., Calcutta, are interested:

The recommendation was to have standardised cartons made of corrugated board, into each of which 10 finished bottles of our product could be compactly packed as the last packaging operation, so that during the various subsequent operations (loading on to trolleys, putting into storage racks, taking out of racks, putting on to conveyor, taking from conveyor, to the final shipping case, etc.), this composite unit of 10 bottles

would be the unit of handling, and not the individual bottles.

The unit of 10 bottles was chosen, as it constituted the optimum weight for one man to lift, carry, stock, etc. In a glass factory, where empty bottles are handled, the size of this composite unit should obviously be bigger than that of 10 bottles, depending on their weight. However, the practicability of adopting this idea by them would depend on the potential savings which should justify the expenditure on the boxes. In their situation (i.e., space and material handling facilities available, present methods of working in this and other related areas), the potential savings could be different from those possible in our case.—KV NAIR, Productivity Officer, M/s. Raptakos, Brett & Co. Pvt. Ltd.

Bombay,
July 15, 1964.

## 3. WORKLOAD FOR ACCOUNTS STAFF

**FOUR questions raised by Mr RD Kulkarni, Chief Accountant, Kopargaon Sahkari Sakhar Karkhana, Ahmednagar, relating to fixation of workloads for Accounts staff, etc., were published in *Productivity* (Vol. V, No. 1, page 177) along with the reply sent by Mr KC Jasper, Senior Management Consultant, George Fry Team attached to NPC (page 178).**

**The Editor has since received another reply to these questions from Mr MM Karnik of the Indian Aluminium Co. Ltd., Kalwa, Maharashtra. Mr Karnik's reply is published below along with Mr Kulkarni's questions which are reprinted here for convenience of readers.**

**Question 1:** *What are the preliminary stages for fixation of workload, in case of Accounts staff which performs different types of work, and which is absolutely new to work study methods? (RD Kulkarni)*

**Answer:** It is very difficult, almost impossible, for a Work Study Engineer to fix the workload for Accounts staff, as work measurement in this case (which involves the application of techniques designed to establish the time required for a worker who possesses the required intelligence, education, skill, knowledge, and the physical attributes to carry out a certain amount of work safely, and to satisfactory standards of quality, and quantity) becomes impossible. You cannot measure with a stop-watch in your hand the time taken by an accounts clerk to "agree" his Trial Balance, and then say that every time the Trial Balance must be tallied within that time. A clerk might "agree" the balances of his subsidiary ledgers with the control account in just five minutes' time, but next month the same clerk may not be able to do so even in five days. Even after checking all the postings three or four times, the oversight may go undetected which another colleague of his may trace just in no time.

The only alternative is to fix up the targets of overall performance of each clerk for each particular period. The targets to be

fixed should not be so stiff and unattainable, as they would take non-accomplishment as normal and lose their sense of accountability. These must be reasonable and realistic. It is not enough that the targets must be fair, but they must seem to be fair to them. It is usually best to get the man participate in setting his own target. A man will often suggest tougher targets for himself than his superior might otherwise have set. The performance of the accounts clerk can then be measured against the yardstick of the targets so fixed, and corrective action taken.

**Cost Control**

**Question 2:** *It is said in respect of the sugar industry that its unit of production being only one (viz., sugar) and its process of manufacture being one continuous whole, there arises no question of cost control. Is this statement true? If not, what type of cost control measures can be adopted in the sugar industry? (RD Kulkarni)*

**Answer:** It is not correct to say that in the sugar industry the question of cost control does not arise. It is, no doubt, a fact that 85 per cent of the controlled price of sugar is distributed among the canegrowers and the Government, and thus the controllable cost is only 15 per cent of the price; but that is all the more reason why cost control in the sugar industry should be more stringent than in any other industry. Cost can be controlled from two fronts—(1) by increasing production; and (2) by effecting tangible and intangible economy in spending.

The most effective way to achieve higher production is to raise labour productivity, i.e., to make every man-hour of work result in greater output. Every worker must produce more for every hour of his employment. This does not mean harder work for the labour, but only means adoption of improved work-methods and processes, and more productive work. There should also be an attempt to make the machines and materials yield more through more intelligent and intensive utilisation. Production can also be increased by improvement in plant lay-out, development of skill through education and training, fuller utilisation of these skills and work time on the basis of work study and time and motion study, improvement in management technique, e.g., production control and planning, quality control and cost control, encouraging emulation through systems of individual and group competition, and by improvement in working environment. Similarly, preventive maintenance will reduce production loss through unexpected breakdown of machinery. An incentive bonus scheme will also go a long way to increase production.

Efficient handling of material, and elimination of waste, can also make effective contribution towards cost control. In fact, the sugar industry has the added advantage of by-products, e.g., alcohol and wax from molasses, and paper from the bagasse, to bring down its manufacturing cost.

Last, but not the least, introduction of budgetary control or standard costs will go a long way in controlling the cost. The analysis of cost variance will indicate the danger zone, and pinpoint the responsibility on a particular individual. To cite a few examples, unfavourable volume variance in cost of raw material will indicate that either the sucrose content of the cane was less, in which case the purchase department can be held responsible, or the wastage might be more which the production department will have to explain. In this case, the laboratory will sit in judgment, and pronounce who is "guilty". In the case of labour, volume variance will indicate that the labour is idling, and that the supervisors are not doing their job properly. Price variance in this case will indicate that there is something wrong with the personnel department.

Efforts to control the cost should be continuous rather than sporadic. Sporadic cost-cutting witchhunts introduced by top

management invariably results in the subordinate managers developing a feeling that they have no real responsibility for the profitability of their operations. This is very bad.

**Question 3:** *Are there any standardised workloads for Managerial or Supervisory Personnel working in industrial concerns? If not, what is the yardstick to measure their efficiency?* (*RD Kulkarni*)

**Answer:** A very important requirement of satisfactory performance of the supervisors is the existence of evidence that they and their men are continually seeking ways of widening the cost-return gap. This they can achieve by work simplification, methods improvement, cutting down the wastage, economical utilisation of raw materials and supplies, and reducing idle labour hours. Their performance can also be assessed by introducing the budgetary control device. By this method, the performance of the responsibility centres headed by them can be compared against the targets, and deviations investigated. For this purpose, it is highly essential that some sort of cost accounting must be in operation to supply the cost feedbacks soon enough after occurrence, and to spot and control undesirable trends before they get out of hands.

### Merit-rating

**Question 4:** *What are the accepted methods of merit-rating that can be adopted in the case of clerical employees?* (*RD Kulkarni*)

**Answer:** Merit-rating is a complex psychological process, and in India it is a mere waste of time. Here, wages are fixed according to the scale which is a function of time. As soon as an employee completes a year, he becomes entitled to annual increment. Efficiency bars have lost all their charm. Merit increments, promotions, or transfers based on merit-rating are agitated for by trade unions.

However, if you feel that you can improve the performance of your clerks by merit-rating, which must be followed by the post-merit-rating interview, then observe the following simple rules:

(1) Have the merit-rating done twice a year at an interval of six months—the first one known as "diagnostic-rating", and the second one "administrative-rating". For managerial decisions only the second one should be considered.

(2) Keep an Incidence Diary so that you don't have to rely upon your memory. You have only to refer to this diary before rating the employee.

(3) For subordinate staff-rating the following qualities would be enough: (i) quantity, (ii) quality, (iii) job knowledge, (iv) dependability, (v) aptitude, and (vi) attitude. These can be rated as (a) excellent, (b) good, (c) average, (d) fair, and (e) unsatisfactory.

The rater must know what he expects of the ratee, his role in the department, and must establish a norm to measure his performance along the above lines.

*What will then happen to productivity?*

*"... And nobody seems to realise", says VK Krishna Menon, "that if children are not born every year, this will be a nation of old people ... and they will all then be fit to become Cabinet Ministers ..."*


### Bowles' Interest in NPC

Dear Mr Butani,—Many thanks for your thoughtfulness in sending me the latest issue of the NPC *Productivity* Journal. I will read this, as I have read the other copies, with great interest . . . Sincerely, CHESTER BOWLES, US Ambassador in India.

New Delhi, July 20, 1964.

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### Small Industry

My dear Butani,—Many thanks for sending me a copy of your Special Issue on Training. I have gone through it with great interest.

As you are aware, the Small-Scale Industries Organisation has an extensive programme of training, and it might have made the Special Issue more comprehensive if there had been an article also dealing with it . . . Yours &c., ST MERANI, Development Commissioner, Small-Scale Industries, Government of India.

New Delhi, July 2, 1964.

*Editor's Reply*

Dear Dr Merani,—I must apologise to you for the delay in replying to your kind letter regarding our Special Issue on Training. I agree with you that it is a serious fault that we could not cover the massive arrangements set up for training small industry personnel. We tried to make it up by—what you must have seen in the Special Issue—a series of photographs showing training being imparted at the Prototype Production-cum-Training Centre at Okhla.

Nevertheless, I think we ought to make up for the deficiency in the Special Issue, in respect of small industry. As this journal is a continuing concern, we can easily make it up. I would even be prepared to create a special section for it in the next issue, if you and your colleagues can furnish me first-rate material.

Probably you know we brought out, not very long ago, a whole Special Issue on Small Industry . . . Yours &c., DH BUTANI, Editor of Publications, National Productivity Council.

New Delhi, Aug. 3, 1964.

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### Inventory Control

Sir,—The Special Issue of the NPC *Productivity* Journal on 'Inventory Control' was very much appreciated by all those who went through it in our organisation. After

going through all the articles, I found that there was great scope for the application of this technique in my own department. It will be better if you collect more case-studies on such an important topic from different fields, and publish them in future issues of the journal . . . Yours &c., JP SINGHAL, Lakshmi Vishnu Mills.

Sholapur, June 23, 1964.

### Individual Enterprise

Dear Butani,—By this time I suppose you have concluded that I have no intention of answering your letter of Mar. 31 regarding the NPC *Productivity* Journal, and your request for an article on PERT. The fact is that we just returned this week from a two-month home leave, and your letter awaited me on my return. For this reason it was impossible for me to answer your letter earlier.

I would like to suggest that sending the journal to me through the AID in Delhi is not particularly a "productive" way of doing the job . . . In fact, I think it would be better if you can afford the extra postage and trouble to send it directly to me at this address as above. I got a copy of the journal with the last article I left with you, and was also surprised to see in the journal I just received with your letter the "rambling unfinished piece" I delivered as a talk in Bombay over a year ago. It is flattering, of course, to be so highly regarded, and I appreciate your kindness in continuing to have an interest in such pronouncements as I may choose to make.

When you requested earlier a paper on my reactions to India after having been there a few years, I felt that it would be indiscreet of me to do this. I think, however, that I may be able to get a paper on PERT prepared for you in the near future, although I suppose that it will not be available for any particular deadline you anticipated when you made the request . . .

I enjoy reading the journal—not only for what is *in* the lines, but also for what I can read *between* the lines. I trust my communicational understanding is not too far afield. Your correspondence with the American Professor on socialism was particularly interesting. He said better what I had been trying to tell you all along. Perhaps you will believe it, and just maybe India will soon recognise the potential that lies in individual enterprise, in contrast to having the Government do everything . . . Yours &c., RF BRUCKART, United States Agency for International Development.

Ankara, May 25, 1964.

### A Problem for Educationists

Dear Mr Butani,—I have now read through the Special Issue on Training . . . The articles are exceptionally interesting and informative. But your own article, *What Cannot Be Taught* (pages 382-384) is really first class. I think you are quite right: most of the problems are essentially of a moral character. How to inculcate this is a problem for the educationists. I think the subject is much neglected in our schools—secondary and primary. At the university level, it will be too late. No doubt, poverty plays a part, but I do not think it is a *major* part.

One further observation: on page 386 you have a sketch of the tree of productivity. But the *product* seems to come first. My wife thought that the tree was upside down, and I see what she means. Would it not be better if the varying processes leading to production were shown as the roots of the tree, and just let the branches and leaves represent the products. This is worth thinking over. But the idea is not mine—it is my wife's . . . Yours &c., JW WHITAKER, CSIR Advisers' Office, Indian Institute of Petroleum.

Dehra Dun, July 7, 1964.

### IFC Pilot Project

Dear Mr Butani,— . . . I may state that the Study Group set up by the Bombay Management Association has recently taken on

hand a pilot project for collecting figures relating to some engineering firms in the country. These firms have been approached to provide additional data (beyond what is normally disclosed in published accounts) for developing ratios which would be beneficial to them in the first instance, and later serve as an example to make inter-firm comparison effective on a wider basis. In order to keep the data confidential, arrangements have been made with a firm of Chartered Accountants to collect and collate the information so as to treat the same as confidential . . . Yours &c., SN COOPER, The Associated Cement Cos. Ltd.

Bombay, June 11, 1964.

### IFC in Textile Mills

Dear Sir,—We are glad to learn that you are shortly bringing out a special issue on Inter-firm Comparison. The Ahmedabad Millowners' Association has not made any special study on the subject, and as such we are unable to send any material. We, however, understand that the Ahmedabad Management Association has made a detailed study on the subject, and has brought out a publication titled "A Report on Managerial Study of the Financial Statements from 1956-61 of the Textile Mills in Ahmedabad." You may contact the Secretary, Ahmedabad Management Association, for further particulars.—Yours &c., HG ACHARYA, Secretary, The Ahmedabad Millowners' Association.

Ahmedabad, June 9, 1964.

### Methodology

Dear Mr Butani,—I acknowledge with thanks the receipt of your letter . . . dated June 12. I understand Mr Cooper has already sent you the list of "definitions and ratios".

Regarding methodology, we have not gone far beyond evolving acceptable "definitions and ratios" for this purpose. We also held a seminar to evoke the interest of our members in inter-firm comparisons, and are now approaching firms in certain selected industries to cooperate with us in the venture . . . Yours &c., MR SHROFF, Bombay Management Association.

Bombay, June 17, 1964.

### New Committee

Dear Mr Butani.—Regarding your inquiry about Inter-firm Comparison, my office has contacted the Bombay Management Association. The Association had formed a committee for the purpose of making a study on this subject with Mr MR Shroff as its Chairman. Mr Shroff informs us that he would be happy to provide you with any information that you may require in regard to the work done by them . . . Yours &c., MR MASANI, Personnel and Productivity Services.

Bombay, May 12, 1964.

## SOCIALISM AND VIEWS OF U.S. PROFESSOR

*On Jan. 2, 1964, Dr Louis J Rago, Professor of Management, Duquesne University, Pittsburgh, wrote a letter to the Editor of this journal explaining his views on the progress of socialism, capitalism, and productivity, and a further one on Feb. 22, 1964 (see pages 180-187, Vol. V, No. 1) in which he clarified his arguments in support of his faith in the efficiency of the free play of economic forces in bringing about economic growth. Below is a letter addressed to Prof Rago by Prof AD Puranik, of Maharashtra, who has criticised the views advanced by the American Professor, and sought his clarification on certain points.*

Dear Dr Rago,— . . . On page 185 of *Productivity* (Vol. V, No. 1), you have explicitly identified the role of the Planning Commission with that of State capitalism to be found in the Soviet Union. I personally feel that your identification is not convincing for the following reasons:

Indian economy does not have the features of a hundred per cent State-operated

economy. We are having a mixed economy in which the State wants to play the dominant role in investment decisions. Mr Butani's view that the Planning Commission wants to play the dominant role in investment decisions is to be understood only in this sense. This is more so because the role of the Planning Commission is being redefined in India. Most of the Western economists do not appreciate the exact connotations attached to the term mixed economy by their Indian counterparts. In the context of mixed economy, the role of the State is quite different from that of the State in the USSR. In contrast to the USSR, India wants to channelise the resources in those sectors which are treated as essential for economic growth. If you go through the reports published by the Planning Commission you will easily find a wealth of information regarding the attempts made so far in channelising the resources. Without having 100 per cent ownership of resources, the State in India has been able to effect channelisation of resources through fiscal and monetary techniques. Do you not feel that this experiment is novel enough to merit special attention from professors of your standing?

I gather from your letter that you have strong convictions on the efficiency of the free play of economic forces in bringing about economic growth. I am ready to subscribe to your view on the assumption that the time-element is to be ignored completely. What I mean is that free play of economic forces may tax the patience of the people who are very keen on rapid growth. Do you not feel that your advocacy of free play of economic forces ignores this socio-political element in the situation?

Another point to which I would like to refer is about criticism of the technique of deficit financing employed in India to solve the problem of economic growth. You suggest that deficit financing is applicable only to short-run situations. Deficit financing in India "will cut the overall standard of living of the common man instead of raising it". I personally feel that for lack of adequate trained manpower and equipment, deficit financing does lead to the consequences described by you, because the supply of production remains inelastic. But in the context of a democratic framework and uncertain inflow of foreign aid, what measures can you suggest to enable the State procure resources for developmental purposes? Of course you can answer the question by saying that the State should not interfere with the free play of market forces. But this probable answer of yours emanates from your basic opposition to the very idea of planning.

The last point is about the problem of productivity. I am inclined to hold the view that the *problem of productivity is essentially an engineering problem.* It can be solved both in the context of capitalist and socialist economy with equal satisfaction.

In the light of the above criticism of your views one point emerges very clearly. *We have accepted socialism on the grounds of utility.* It scores a point over capitalism so far as the time element is concerned . . . Yours &c., AD PURANIK.

Karad (Maharashtra), July 27, 1964.

## *Where Things Go Wrong*

**". . . The policies of the Government are not nearly as bad as some critics make out; it is in execution that many things have gone wrong."**—From *A Ditcher's Diary* in **Capital.**

*The application of productivity techniques to transform India's tradition-ridden agriculture into a dynamic instrument for higher farm output was one of the topics which highlighted discussions at the two-day All-India Conference of Local Productivity Councils (LPCs) and productivity personnel held at New Delhi in July. The Conference, sponsored by NPC, decided to set up a working group to suggest how a 'study in depth' of the complex problem of agricultural productivity may be conducted. It endorsed the NPC Governing Body's recommendation to set up Industry Productivity Councils which would be in a better position to identify and tackle productivity problems germane to the particular industry. The most important decision taken was regarding the observance of 1966 as the Productivity Year of India.*

# Focus on NPC Projects

Contributed

THE conference, which met at Vigyan Bhavan on July 28 and 29, was unique in the sense that, for the first time, NPC brought the LPCs, productivity personnel and institutional representatives, on a common platform, "in order to further the productivity movement and to establish some arrangements by which the industrial and management consultants may assist in supplementing the efforts of NPC and LPCs in their service to industry".

Besides the delegates sent by LPCs, participants included representatives of trade and industry associations, professional organisations, trade union organisations, training and research institutions, and last but not the least, industrial management consultants. Observers from the State Governments, and foreign agencies connected with NPC activities, also attended. The agenda was comprehensive enough, and ranged from the identification of productivity needs in various industries, and the assessment of productive activities, to a consideration of the possible extensions of the functions of NPC.

Both Dr PS Lokanathan*, who welcomed the delegates, and Sri Asoka Mehta*, who inaugurated the conference, were of the view that *productivity had become the key to*

*See their special articles in this issue—(i) *Productivity, the Key to Survival* (pages 496-498) by Sri Asoka Mehta, and (ii) *A New Deal for Productivity* (pages 503-507) by Dr PS Lokanathan.

*the nation's survival.* A major factor affecting economic growth, the concept of productivity had become crucial in the face of the country's growing population.

At the outset, the Chairman (Dr Lokanathan) reviewed the working of NPC and referred particularly to the significant impact of its programmes on the industrial sector, the problems to be considered by the conference, and warned against the danger of the productivity movement operating in narrow grooves. He outlined the task ahead of the organisation, making pointed reference to the urgent need for doing something in the field of agricultural productivity. He was of the opinion that agricultural productivity was low primarily because of the slow response of the farmer to the adoption of improved farming methods. The vastness of the agricultural operations was itself perhaps responsible for the poor impact of the productivity movement in this field. NPC resources were of course not adequate to deal with the problem, but it could help in "a small but significant way" by conducting research on the motivations, beliefs, and value systems of the farmers, finding out thereby how a change in the farmers' attitude could be brought about.

The Deputy Chairman of the Planning Commission (Sri Asoka Mehta) welcomed the interest of NPC in setting up a working group to study farming productivity. Agricultural output, he said, was directly related to industrial output, and within the next 10 or 15 years a "far-reaching, technological, social and cultural transformation" would have to be brought about. LPCs could play a vital role in bringing about this transformation on which future growth depended. The willingness of the Indian farmer to adopt modern methods, including the use of fertilisers and tractors, depended on the availability of facilities. Also, as soil conservation measures were dependent on machinery, industry should gear itself to meet the needs of agriculture. NPC should, therefore, help raise the country's production of agricultural aids.

The Industry Minister of the Government of India, Sri HC Dasappa, who is NPC President, could not attend the conference, but in a message he stressed the need of greater cooperation between management and labour to step up production. The Deputy Industry Minister, Sri B Misra, in a brief speech, wanted the conference to pay more attention to the small industry sector's needs. He urged employers to bear in mind that productivity was linked in some way to cooperation of workers, and added: "Unless you give good wages to labour and create better working conditions, the psychological climate for increased productivity will not be created."

Mr C Tyler Wood, Director of the US-AID Mission in India, who presented to Dr Lokanathan two films on Work Study produced in India (see picture on page 422), said his Agency, which had assisted in this job, was proud of the role it had played in NPC's efforts to create a productivity movement in India.

**Reorientation of Activities**

At the plenary session of the conference, Sri NK Bhojwani, Executive Director of NPC, gave a broad perspective picture of the functioning of NPC during 1963-64. He drew attention to a certain reorientation of NPC activities in the matter of training programmes, what LPCs had been doing, etc. He brought to the attention of the conference certain special features of NPC work in recent months:

1. NPC has offered more programmes to individual companies beginning September 1963 than ever before, and in imparting to industrial personnel on the ground floor, certain very fruitful and modern techniques of productivity.

2. NPC has built up a certain amount of expertise and experience as a result of the working of the Productivity Survey and Implementation Service (PSIS), and in the last 13 months it had gone into many enterprises, and "we can claim that improvements in them have been effective . . ."

3. NPC training of its own industrial engineers who can look into a wide area of management, etc., had yielded fruitful results.

4. Experience in the industrial area of Bombay in respect of the Fuel Efficiency Service was

encouraging, and it was proposed to set up another unit in the Madras area.

5. NPC had the additional opportunity of providing expertise to other countries, like Nepal, which was a source of gratification.

6. As demands on NPC resources have been continuously increasing from inside, and to some extent from outside, "we should draw more and more on honorary and voluntary workers to do and to improve our work. Each LPC should have a list of talented men on whom we can draw for this activity." LPCs should also consider how the productivity personnel pool could be expanded.

7. There was increased collaboration with other institutions, and "the more we collaborate the more we will succeed in increasing productivity".

Eighteen representatives of LPCs, besides the delegates of important institutions, took part in the discussions at which numerous suggestions were made as to how NPC and LPCs could play a more useful role in furthering the productivity movement. Delegates' suggestions included: 1. Creation of productivity consciousness should be followed with practical help; 2. The problem of dearth of raw materials should be solved either by collaboration or otherwise; 3. NPC should arrange for resource course material, training kits, etc., as is being done by the British Productivity Council; 4. Impact programmes should not be confined to public utility concerns but also to other spheres, like export promotion, and tourism; 5. Adequate attention should be paid to Human Relations; 6. Fruits of productivity should be taken to the doorsteps of the small-scale industries. NPC may in fact create a small department to look after productivity in the small-scale industry sector; 7. The new Fuel Efficiency Service unit should be located in a coal-consuming area; 8. Productivity literature should be published in regional languages, and made available to trade unions and workers; 9. Training Courses in Work Study, etc., may also be conducted in regional languages; and 10. More training programmes should be organised with the help of specialised bodies.

*...Industries have to make effort themselves to raise their own productivity. Neither NPC nor LPCs have a vested interest in productivity . . .*

**Industrywise Councils**

The proposal to set up Industry Productivity Council excited great interest among the participants at the conference. Dr Lokanathan removed misapprehensions in regard to starting of industrywise councils. He said:

> "The idea is very sound in principle: Industries have to make effort themselves to raise their own productivity. Neither NPC nor LPCs have a vested interest in Productivity. We do not exist for ourselves, but for promoting productivity, and for that purpose, we have to extend the scope of NPC's work . . . The Fuel Efficiency Service would be expanded if the Government gave more financial aid to NPC . . ."

Since the demand for intervention of NPC in labour disputes was on the increase, he said NPC would not be unprepared to go into disputes pertaining to technical matters, provided there were bilateral requests from workers as well as management.

Plenary session over, the conference split itself into four Groups which discussed a number of problems, and made recommendations which were presented to the concluding plenary session on the evening of July 29.

Group A (Chairman: GL Bansal) discussed productivity programmes and needs of industry, and suggested that LPCs should assess the productivity needs of industry by direct approach to their members and the managements of plants located in their areas, and collect detailed statistics of performance

from as many companies as possible (if necessary, with the assistance of NPC specialists). It also favoured more training programmes for workers and their immediate supervisors, and the addition of a few more subjects for trade unions' representatives in consultation with LPCs. The NPC should make available training manuals and training kits to those who had knowledge of the subject, but were not quite conversant with instruction techniques. *PSIS should be continued*, and work in that connexion should be undertaken by LPCs which should make available the results of such work to enthuse other LPCs in undertaking similar work. Since there were a large number of small industries, two or three units in each LPC should be picked up for intensive application of productivity techniques, so that they could be a catalyst in spreading the concept and utility of these techniques. Further, training programmes for small industries should be conducted in local languages, and productivity cells set up in the various small industry Industrial Estates. Large and medium industries should be urged to set up productivity cells in their own organisations.

**Impact Programmes**

The committee also recommended that both NPC and LPCs should take up impact programmes to improve efficiency and productivity in public utility undertakings. In regard to retiring or retired defence officers, it was agreed that they should be encouraged to participate in the various programmes organised by the LPCs.

Group B (Chairman: MS Dighe) discussed the mechanics of coordination, and means of collaboration, in productivity activities, and recommended the setting up of a liaison cell, at NPC Headquarters, to collect information regarding institutions and their programmes, and disseminate this information to all concerned, and also to keep institutions informed about the needs of industry. Another recommendation was that the NPC and LPCs should encourage management consultants to play their part in productivity programmes, and with this in view it was felt that there was a case for helping consultants to increase their numbers, and to improve the quality of their service. Also, NPC should provide facilities to LPCs and small-scale industrial units in obtaining the services of management consultants.

**Industrial Engineers**

Group C (Chairman: RS Pande) which discussed organisational matters, recommended that the proposal to set up Industry Productivity Councils should be discussed with the representative organisations of industries and others concerned, and their cooperation sought for the purpose. Various suggestions were also made to augment the membership of LPCs, and to revitalise weaker LPCs. For the appointment of industrial engineers it was felt that NPC should try to persuade State Governments to pay the salary bills of industrial engineers, as much as possible, or NPC itself may consider subsidising 50 per cent of their salaries. To strengthen LPC activities, the establishment of technical advisory wings in them was favoured.

Group D (Chairman: SC Sen) which evaluated productivity programmes agreed that a study group should be formed to study in detail the line of action to be taken by NPC on the application of productivity techniques to agriculture. The ultimate object of productivity programmes was to raise industrial productivity, and an attempt should be made to arrive at evaluations on a quantitative basis. The Group welcomed NPC's decision to set up a research division: the consensus was that the building up of a research cadre was just as important from the long-range point of view as the successful completion of immediate projects. It welcomed the proposal of productivity awards, and said they should be given not only to industrial units, but also to groups and individuals for worth-while achievements in productivity.

*In view of the momentous decision of the National Productivity Council of India to celebrate 1966 as the National Productivity Year, a brief account of the National Productivity Year (NPY) organised by the British Productivity Council from November 1962 to November 1963, is given here—to give readers of* **Productivity** *an idea of the magnitude of the national involvement in this business of productivity.*

# Productivity Year in Britain

Contributed

PRACTICALLY everybody from the Prime Minister down to the working girl on the shopfloor participated in the National Productivity Year (NPY) organised in Britain from November 1962 to November 1963. Not only was it a time of national celebration, but also an occasion for national dedication. More significant is the fact that it was not for an hour, or for a day, but for a whole year that industrial firms, commercial concerns, insurance companies, and trade unions kept up the productivity drive in the consciousness that Britain's future as a nation depended upon its economy being more productive than the economies of other countries.

Opposition parties, including Labour, participated in the organisation of NPY, realising that labour's stake in the productivity business was in fact higher than that of any other section of the community. Practically every factory set up a NPY Committee which not only streamlined work on the shopfloor, but published booklets, pamphlets, brochures, publicising productivity ideas, organised contests, and debates including the selection of a National Productivity Year Queen. This, however, as her Divisional Manager said, was no gimmick, but "a symbol by which we hope to further the cause of NPY." The seriousness of its significance could only be judged in the words of Lord Netherthorpe who described the British National Productivity Year as 'a *blitzkrieg* on the public conscience.'

Needless to say India needs a National Productivity Council Year as a means of revival of the national consciousness regarding the level of performance necessary in practically every line of social and economic activity as the price for the maintenance of freedom and promise of development. It is a promise

of plenty for all, particularly as *the only means of retrieving the submerged classes from the sub-human standards of existence.* We need Productivity more than Britain does.

To begin with, the British Productivity Council organised a rally in London. This was attended by 600 representatives of various organisations supporting the National Productivity Year. The audience came from manufacturing industries, agriculture, building, mining, distribution, transport, public corporations, local government, etc. The Prime Minister and Opposition leaders addressed the rally. Greeting them, Lord Netherthorpe, Chairman of the British Productivity Council, said: "In this rally is gathered, in microcosm, that working Britain on which our present and future depend."

The point of view of Labour was very well put thus:

"As trade unionists we know that those firms which use modern techniques of production and sales, achieve good quality, the right price, and good delivery dates. These are the people who expand their markets, and they can best provide the type of employment which we require for our members . . . It is for these reasons that we in the TUC have supported the National Productivity Year from the outset."

The Government fully supported the drive. In fact, the Prime Minister (then Mr Macmillan) began his address to the rally saying:

"*We are all in this business of productivity.* There are people who think that more productivity means fewer jobs. It does not. It means more jobs. Think of the increase in productivity since the beginning of the century, yet there are eight million more people at work in this country now than there were then . . . All experience shows that when industrial efficiency is rising rapidly, people, who might otherwise become redundant as a result of labour-saving devices, are, in fact, needed to meet increased demand."

Mr Macmillan then referred to the tremendous challenge in education, and said:

". . . It should however be a ladder, and not an escalator. There must be some effort to climb up . . . The main task of this National Productivity Year is to transmit to others in an ever-widening circle, the attitude of mind and expertise which you possess . . . I saw a survey of a sample of engineering firms which showed that in 1961, 36 per cent had increased their productivity—not their production but their productivity—in that year by five per cent, or more . . ."

Mr James Callaghan, who represented the Labour Party at the NPY Rally (on account of the death of Mr Gaitskell), said that all three political parties were united on the need for increase in productivity, and added:

". . . It is one of the most urgent and vital tasks . . . Top management, including works management, is not of the quality required, and lacks the necessary training . . . I was talking to someone who has been on both sides of industry, as a trade union officer and later on the management side. In his view—and he was generalising—*there is 25 per cent increased productivity to be picked up on the shopfloor.* What a fantastic figure, if it is true! The total national product of our manufacturing industries is £ 8,000 million per annum, so 25 per cent is £ 2,000 million!"

Speaking from the Labour point of view, Mr Callaghan said that it was the official approach of the TUC that its own union members should prod the complacent firms into some sort of activity: "*The trade unionist needs up-to-date efficient firm*".

Mr Jo Grimond, leader of the Liberal Party in the House of Commons, told the rally that if the mixed economy of the United Kingdom was to work, then workers, management, and owners must feel that they had

*. . . No sector of the community can fully succeed as an island of progress in a sea of inefficiency . . .*

direct interest in it. He pleaded for team work in British industry, and said: "... I have been impressed by the way in which industrial designers in some countries on the Continent work very much as members of industrial teams, and not, as is sometimes the case here, as a race spart..." Mr Grimond also emphasised a practical bias to education on the American pattern—mixing an Arts education with definite training for certain professions or in certain skills: "... There seems to be a tendency in this country, or in some parts of to, to suppose that natural qualities are enough..."

Lord Netherthorpe, winding up the rally, gave an idea of what the NPY meant, and the magnitude of programmes to be put through during the year at the local level:

"... Awareness is only the beginning—it must be followed by positive action. Anyone witnessing our achievements can only scorn the suggestion of a decadent Britain, but *the most effective use of our total national resources is the critical requirement of our time.* No sector of the community can fully succeed as an island of progress in a sea of inefficiency... The programmes already planned at local level, some 1,500 events, by the many professional organisations whose support we acknowledge and for which we are gratified and, indeed, the commendable efforts of the individual firms—and I see representatives of those firms here—are the cutting edge of the enterprise on which we are embarked... I have been immensely encouraged and impressed by the enthusiastic interest and support of the trade union leaders in this endeavour. Their statesmanlike attitude merits the support of their members, and is *a real stimulus to management*... But it is, inevitably, to management that we must look for the initiative in sparking off practical measures. There is always a better way—and that is no idle cliche—as long as there is a will to find it... The lessons emerging from National Productivity Year are being assembled and will be reviewed at the end of the Year, so that we can project them into the future, because *productivity today must be compounded for tomorrow*... To ensure economic growth and development, the urgent need is for a new and vital upsurge of determined, unstinted effort in every sphere of endeavour... If indifference produces anything less than that, then our very survival is in jeopardy for, after all, passive pessimism portends penury, but progressive productivity promises plenty for all..."

As indicated by Lord Netherthorpe, NPY did not end with the rally and the big speeches. Speeches, of course, continued throughout the year, but there were NPY Committees in firms sitting continuously, examining capital turnover, paper work, time and materials, and reporting back to senior management how to increase productivity on the shopfloor. Foremen and shop stewards were brought into the picture everywhere at the railways, at the ports, in the insurance offices, in the army, for Lord Mountbatten (now British Chief of Staff) participated actively. The Army exhibited its work study; as, for example, in a job where a crew of three took five hours to complete with simple modifications and better coordination, the time cycle was reduced to a total of 4½ man-hours, thus making an annual saving of £ 46,875 in one small job alone. Thus were the massive possibilities of increased productivity rubbed in at every point of national endeavour.

In terms of their own culture, the firm of Smith and Nephew at Hull organised the selection of a National Productivity Year Queen from 40 candidates. The majority of factory workers in this concern are girls. A 24-year-old production line worker, Miss Anne McIntyre, was selected as NPY Queen, and her first request in winning the prize was to be given the chance during the Year, of moving about the factory and talking to other girl employees about the meaning and objectives of NPY.

We have to organise our National Productivity Year in terms of our own culture, and in the context of our own needs. What is most essential is to tap the national consciousness at all points, and at all levels, so that we make the most of our plentiful manpower (people on the land no less than the workers in the factories), our scarce raw materials and our still scarcer capital resources.

# *Our Contributors . . .*

**BOSE, JN,** President, Institute of Cost and Works Accountants of India, Calcutta.

**COOPER, SN,** Financial Controller, The Associated Cement Cos. Ltd., Bombay.

**ENGLANDER, WOLFGANG,** Head of the Department of Servicio de Cooperacion Tecnica, Instituto Chileno de Productividad, Santiago, Chile.

**HIPPENSTIEL, RICHARD,** Forschungsinstitut für Rationalisierung an der Rheinisch-Westfälischen Technischen Hochschule Aachen, Pontriesch. W. Germany.

**INGHAM, H,** Director, Centre for Inter-firm Comparison Ltd.. London.

**LANKSHEAR, HJW,** National Association of Corn and Agricultural Merchants, London.

**LOKANATHAN, PS,** Chairman, National Productivity Council, New Delhi.

**MEHTA, ASOKA.** Deputy Chairman, Planning Commission, New Delhi.

**NATESAN, LA,** Former Economic Adviser, Ministry of Railways, Government of India, New Delhi.

**NICOL, A,** Productivity Measurement Advisory Service, Organisation for Economic Cooperation and Development, Paris.

**POSSE, F,** Chief Engineer, Société de Recherche Opérationnelle et d'Économie Appliquee, Brussels.

**ROY CHOWDHURY, BK,** M/s Philips India Ltd., Calcutta.

**SEN, N,** Executive Officer, M/s Jyoti Ltd., Baroda.

**SEQUEIRA, CE,** Industrial Psychologist, Office of the Chief Adviser of Factories, Ministry of Labour and Employment, Government of India, New Delhi.

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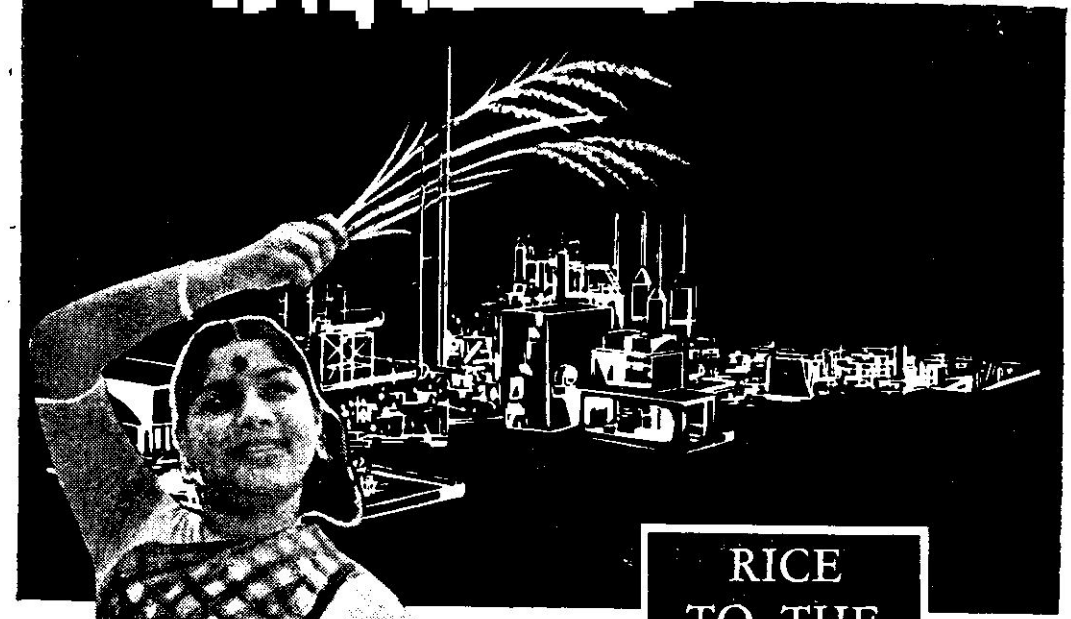

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