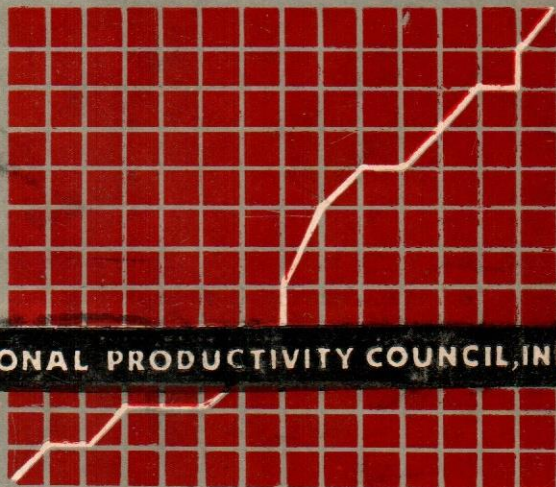
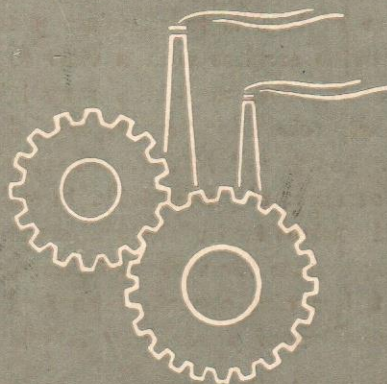


PRODUCTIVITY

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NATIONAL PRODUCTIVITY COUNCIL, INDIA

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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. Local Productivity Councils have been and are being established in industrial centres.

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.

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. 1.50 per issue and is available at all NPC offices. Annual subscription (Rs. 9.00 to be sent by cheque in favour of National Productivity Council, New Delhi) is inclusive of postage !

Opinions expressed in signed articles are those of the authors and do not necessarily reflect the views of NPC.

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“... In the final analysis, the level of productivity of a country determines its national wealth and per capita income and the standard of living of the people....”

Second Five Year Plan

“... A socialist pattern of society has to be based on increased production realised through the use of modern science and technology... for the manner in which productive activity is organised itself determines to an extent the relative distribution of incomes and the benefits reaching different sections of the community... ”

... Among the aspects of retarded development to which planning has to address itself are low levels of productivity... the dependence on more advanced countries for equipment and technical knowledge, and inadequate rate of economic growth.

... Small improvements in productivity which affect the work of millions of persons have enormous significance in terms of overall production and should therefore receive special attention in each phase of development.... ”

... A principal aim of the Third Plan is to secure a marked advance towards self-sustaining growth.... An important aspect of this problem is that of creating within the country the capacity — including the development of the designing and operational skills required.... ”

Draft Outline of the Third Five Year Plan

Productivity and the Third Plan

THE excerpts (printed on the page opposite) from the remarkable documents on economic development—known as the Five Year Plans—place Productivity as the centre of the piece. This really needs no elucidation in the context of an almost universal experience covering not only the USA and the Soviet Union and modern China, but Germany and Japan too, with all the handicaps with which they emerged from the war. It is only by means of productivity that they have risen to top-ranking positions in the world economy. The Prime Minister has been emphasizing, by now for more than a decade, this basic aspect of economic development. Productivity constitutes the lever to effect “the take-off” which is the main general target of the Third Plan.

It is by now sufficiently realised that the main hurdle in the way of the take-off process is the extreme danger of inflation, consequent upon the implementation of a large investment programme, financed out of obviously inadequate resources. In this context, the value of Productivity as an anti-inflationary technique does not appear to have been sufficiently realised. This is rather surprising in the general context of an almost all pervasive realisation of the importance of productivity throughout the whole texture of the economy; yet the very nature of productivity means that we secure a larger output without increased financial outlay. Thus productivity attacks the monster of inflation from both sides: making a larger volume of goods available without increasing the supply of money. The cake becomes larger but there is not that scramble for mere monetary gains associated with inflationary financing.

Productivity is, therefore, the principal instrument that we need, to clear the ground for the take-off, and at the same time to reduce the ballast of excessive money that would render the take-off difficult.

As an experienced industrialist (HKS Lindsay) has put it in an article appearing elsewhere in this Journal: “... a highly urgent problem facing the country is inflation: an insidious and ever-present menace to the country’s long term planning for forcing the growth of the economy. It is equally a menace in the short term as it constantly threatens the success of current fiscal operations... increased productivity (is the) means for reducing prices or at least keeping them stable... the economy must somehow take-off into an atmosphere of self-sustaining growth. This ‘somehow’ is increased productivity through which we make the most of the country’s existing resources of men, machines and materials...”

Let us look at the facts. The Third Plan envisages a total investment of about Rs 102 billion* compared to an estimated investment of Rs 67.5

* Thousand million

billion during the Second Plan period: an increase of over 50 per cent. The level of prices is now more than 20% what it was at the commencement of the Second Plan. The money supply with the public exceeds Rs 26 billion. To this we shall add nearly Rs 10 billion during the Third Plan.

The external assistance required for the Plan is of the order of Rs 32 billion, over 30% of Rs 102 billion investment programme for the Third Plan. External assistance will, of course, be anti-inflationary but the Planning Commission has in its Third Plan Draft itself pointed out: "...It is a basic objective in the strategy of development to create the conditions in which the dependence on external assistance will disappear as early as may be possible...from now on, the pattern of investment has to be so chosen that within the shortest period feasible, there should be no need to rely on special assistance..."

The Planning Commission itself furnishes the answer in the chapter on Resources for the Plan: "To sum up, the question, basically, is how the investment effort in the economy can be maximised. This depends on how efficiently the production effort is organised..." Productivity is thus among the Resources of the Plan.

Inflation, however, is not the only danger to the programme of economic development. With courage and wisdom it need not become an unmanageable proposition. The more sinister danger arises from the increase in population. Among the social objectives laid down by the Planning Commission, it is stated that "the primary aim of the Plans" is "to provide the basic necessities to all persons within the community."* If any thought is devoted to this simple proposition, it would be immediately realised that without the application of productivity techniques, any effort to provide basic necessities to all persons of a population of 428 million growing at the compound rate of 2% per annum would be a race between the hare and the hound. The rate of population increase (per thousand per annum) estimated at around 10 in the pre-Plan period rose to nearly 16 in the First Plan period, 19 in the Second Plan period and will exceed 21 in the Third Plan period. Between the beginning of the First Plan and the end of the Second (now approaching) population will have increased by 69 million. We shall be 431 million at the beginning of the Third Plan, 480 million at the beginning of the Fourth Plan, 568 million by the end of the Fifth Plan and so on. Within a quarter century of economic development, population would have increased by over 200 million or over 55%.

Thus the increase in population will have neutralised a large part of the gains of economic development, unless we are able to muster a counter-force of equal magnitude; and it is the conviction of NPC that Productivity constitutes the counter-force of that magnitude.

We can move faster, taking the help of Productivity. But even as it is, the targets laid down in the Third Plan Draft Outline would be difficult of realisation, unless productivity techniques are employed. Finished

* Italics ours

steel capacity is to be increased from 4.7 to 10.2 million tons: an increase of more than 100%. Production of coal is proposed to be stepped up by 37 million tons over the target of 60 million tons laid down for the Second Plan. We have not yet reached a level even of 50 million tons. Surely, in this field a substantial increase in Productivity should be a practical proposition. Electric generating capacity will be raised from 5.8 to 11.8 million KW. Here again, the employment of productivity techniques not only in the generation but also in the distribution of electric power would mean not only a considerable saving in investment expenditure but also a larger quantum of power supplied at plant site at cheaper cost; and *cheaper electricity is a reputed clue to the transformation of the economy.*

Other important targets of the Third Plan are, of course, not less important but would mean a degree of effort that should be considered sizeable in view of the increases contemplated. The following illustrative table gives the estimated output in certain major lines at the end of the Second and the Third Plan.

Estimated Annual Output

(In thousands or thousand tons unless mentioned otherwise)

	<i>End Second Plan</i>	<i>End Third Plan</i>	<i>% Increase</i>
Cement (million tons)	8.8	13.0	48
Aluminium	17.0	75.5	344
Sulphuric acid	400	1,250	213
Caustic Soda	125	340	172
Automobiles	53	100	89
Bicycles	1,050	2,000	90
Sugar (million tons)	2.25	3.0	33
Paper	320	700	119

Anyone having a minimum, intimate knowledge of the Indian economy knows that a substantial part of the increases contemplated above can be realised through productivity techniques. It is for the NPC to help in this direction, for the Plan is a matter of life and death for the country, and NPC is a part of the Plan.

Attitude To Productivity

GOVIND BALLABH PANT*

The concept of productivity is almost all embracing. It comprehends all fields in which one is engaged in any useful work or productive undertaking. The idea of productivity has not yet perhaps caught the imagination of the people. But steadily, and I hope rapidly, people are becoming more and more conscious of it and the need for a study of this problem to develop a proper approach to all those factors which conduce to raising the level of productivity.

Like all problems which affect human affairs, this is both a psychological and economic problem. Basic to it is the question of attitudes: the interest one feels in the work he has to do and the feeling of joy in doing an allotted task. A person who handles the machine has not only to do his part of the work because it pays him to do so but he must also develop a feeling for his instruments of work, a feeling so intimate that any mishandling or misuse of the machine is felt by him as a personal injury. It is this feeling of oneness with the tasks which are allotted to us or which we voluntarily undertake, that may be called a productivity attitude.

We have, of course, to make full use of the mechanical devices, to take advantage of the studies made on productivity and gain first hand experience of well-managed and efficient factories. But fundamentally it is a question of attitude. If we want to make the country productivity-minded, we have to find out the social techniques of developing productivity attitudes among the people.

SOME experts once made a comparative study of certain industrial units in the UK and the USA, in cases where the types of machines used were more or less identical and the technical knowledge of the workers was also of a comparable level, yet there was a twenty per cent difference in productivity of the firms compared. This 20% difference is wholly explicable in terms of productivity attitudes. In the firm, with 20% higher productivity, there was a greater degree of identification on the part of the workers with the objectives of the enterprise, and consequently a keener urge to make a distinctive success of their job.

It is this urge that has to be creat-

* Home Minister, Government of India.

ed all over this country. The National Productivity Council has so far been a platform, to some extent, for dissemination of information, the organisation of training programmes, seminars and the like. This sort of work is absolutely necessary. We must extend these activities and multiply them.

But we have to place before ourselves a higher goal: how to raise the general level of productivity in the country as a whole; how to manage affairs in a manner which will enable us to get the best results out of the minimum of resources. Productivity in one sector is powerfully influenced by the level of productivity in the other sectors. One cannot have high productivity in any sector if the general level of productivity is low. Producti-

vity is determined by the ratio between the output of wealth and the input of resources. The higher the output and the lower the input, the greater would be the productivity. We have to work so as to make the best and most fruitful use of our resources. We are backward in the industrial field, in the agricultural field, in almost every field. A clerk does not turn out here as much as he does in certain other places. In some countries, not very far from us, a girl can handle much more work than a robust, sturdy person can do in our own. In other respects also, our work suffers in comparison with the output of individuals in other countries.

Machines have replaced labour to a large extent but ultimately man is the central figure. Unless his importance is realised, we cannot get the best out of our men, however perfect our machines may be. We want experienced technicians but above all we want devotion to the cause which we undertake. Whatever be one's station in life, one must feel the thrill of seeing a new India grow, the sensation of his work making a contribution to the growth of the country. Let the grip of that feeling be there, and a high level of productivity would follow as a matter of course.

We are about to complete our Second Five Year Plan and the Third Five Year Plan is in the offing. During the course of the Third Plan, our economy must reach the "take-off", achieving self-sufficiency in the production of food and raw materials as well as industry. But the achievement is possible only if we raise the levels of productivity throughout the economy. If an agriculturist could produce 10% more than he is producing now, if a workman or technician could add to his output by 5 to 10%, there would be a marked difference throughout the whole range of the country's economy.

We must not only have new enter-

prises but also fully use our installed capacity. It would obviously be to the advantage of everyone to produce more goods: more in quantity and of better quality. It is not however very heartening when we see that in spite of our wages being low, and the abundance of raw materials for many of our industries, our cost of production compares unfavourably with other countries which have to labour under the disadvantage of distance. This is mainly due to the fact that their methods of productivity are superior to ours. The number of persons, for example, engaged in Indian agriculture are many times more than those similarly employed in, say, the USA; yet they produce not only for themselves but also feed the major part of the world. Partly, of course, it is due to mechanisation but it is largely due to better organisation, above all to the part played by the human element in their productive organisation. It is this factor which ultimately determines productivity. Even in the old China where there was greater fragmentation of land than here, the yield per acre was much more—many times more—than the yield we get from our own soil.

It is, therefore, necessary to give importance to the factor of productivity: it should not remain merely a platform. It should be a movement covering all fields, firms, factories, shops, offices: in fact all places. Even those not directly connected with any specific economic activity can make an appreciable contribution, for example, the research workers and scientists. We have particularly to take into consideration our workmen. Their wages do not compare favourably with wages in other countries. Even our top industrialists have not a margin in their resources from which they could contribute to promoting research or to any other cause, even one per cent of what a big industrialist in the USA can do. Here also we need a change in atti-

tudes: a greater awareness of the responsibility of the industrialists for scientific and technological research and study. Business should not be treated as a private family concern. In order to raise productivity, management must be well informed, open to new ideas and technically well-equipped. Management has to set an example to workmen, take the first step forward, treat them as participants in the task of management. If that is done, the present industrial imbalance would be corrected, harmony would take the place of friction which inevitably affects productivity.

The National Productivity Council has so far been concentrating mostly on industrial productivity. There is some advantage in concentrating on a limited field instead of spreading resources thinly over a large surface. But it is time that we devoted some thought to the connected problem of raw materials for industry.

NPC may be developing programmes for training workers in productivity techniques. It is good to train those who are already engaged in the task,

and to take them round, to go and see things for themselves in more productive firms. NPC might also be interested in taking up few factories or undertakings for application of productivity techniques in order to find out which methods suit our country best. It may also be desirable to create the spirit of healthy competition and emulation between undertakings so that each may try to raise its productivity. The results that are achieved should be carefully analysed and assessed.

I should like in conclusion to refer to two other elements of productivity which need special emphasis in our country: the factor of time and the attitude towards waste. In our country, we squander time with both hands. The methods of working give least importance to the element of time. Time has to be treated as a vital "resource". Similarly there has to be a built-in-intolerance of waste in every form. Proper use of time and avoidance of waste: they add up to productivity.¹

¹ Resume of the Home Minister's speech at the NPC Productivity Conference held at Vigyan Bhavan, New Delhi, on 25 April 1960.

* * *

PRODUCTIVITY CONSCIENCE

Hilde: I'm not sure, you know, that you didn't come into the world with a sickly conscience.

Solness: Sickly conscience? What devilment is that?

Hilde: I mean that your conscience is very fragile. As it were, fine-drawn. Can't bear to tackle things. To lift and carry anything heavy.

Solness: (muttering) Hm! What should one's conscience be like, then, may I ask?

Hilde: What I should like for you is a conscience—well, thoroughly robust.

From Henrik Ibsen's *The Master Builder*

A Word About Productivity

JAMES KEEN*

Throughout the ages there have been words which have had a magic quality in man's mind—'Gold', 'Oil' and others. Nowadays in India such a word is "Productivity" and it seems the answer to all problems but this perhaps requires some careful examination.

TWO years ago 'Productivity' had in India rather an academic implication and it is certainly a tribute to the work of the National Productivity Council that today everyone should look upon this magic word as a key to economic progress, higher profits, higher wages, and better social conditions for workers.

Two things come to mind, firstly, that the theory and practice of productivity demands a core of industrial engineers qualified to practise their craft with precision, authority and tact. India, it seems to me, is only on the threshold of creating such a group of technicians and there is a danger that expectations may be created which cannot be met. I see a need for an institute to train industrial engineers and I think that this is urgent in view of the faith placed today in productivity.

Secondly, productivity is not in itself

a good thing if it disrupts an age-old pattern of society by bringing to urban areas, villagers who had lived, if humbly, at least in a pattern of society which was assured. It is discouraging today to see the shanty towns which are springing up around the planned industrial estates, steel mills etc. and it is to be hoped that some of the profits of productivity, when the technique can become generally applied across the industrial field, will be diverted to social welfare schemes which will take care of the urban worker and prevent him becoming a source of social unrest upon which no democratic society can be founded.

The industrial revolution throughout history has demanded sacrifices in all lands and amongst all people. It is important to guard against the sacrifices at the altar of productivity being those of the unskilled labourer for he, too, has an important role to play in an evolving industrial community and a stable-pattern of society.

* Resident Representative in India, United Nations Technical Assistance Board.

* * *

PRODUCTIVITY TRAINING

"It is a matter of training: to train out of man the 'possessor's old and inbred custom of regarding himself as a superior being'"

From The Memoirs of Mark Twain

Human Relations & Productivity

VKR MENON*

"...The essential thing is to give men a sense of purpose. Only when men have this sense of purpose—only when they understand how by their work they contribute to the well-being of society—can they have that confidence in their own true worth which is a mark of freedom...." (Director General, ILO). ILO productivity missions to underdeveloped countries have been functioning in the spirit of their chief's philosophy, stated above; and they have proved what can be accomplished "simply because of the improvement in the climate of human relations in the works."

THE utilisation of material and human resources to obtain maximum production of goods and services of the kinds most wanted by purchasers at the lowest possible real cost—this, in substance, comprises the endeavour of higher productivity. Till recent times, it was generally supposed that progress in this direction could best be achieved by installing uptodate machines which produced more and better quality goods at lesser cost and helped in slashing the wage bill. During the second world war, however, when the pace of new machine manufacturing had to be considerably slowed down and, at the same time, production in certain lines had to be augmented manifold with the existing plant and equipment, man's inventive genius went to work and, as a result, a host of productivity techniques have been evolved. An important chunk of these techniques concerns the improvement in the climate of human relations, which can be a powerful aid in raising productivity.

After the close of the war, when countries in Asia and Africa became independent one by one, and the end of political revolutions brought them to the threshold of industrial advancement, these techniques held out great hopes, for they suited admirably the situation

in underdeveloped countries: plentiful manpower in the context of national policies of full employment, and competing claims on limited foreign exchange resources for buying new plant and equipment from industrially advanced countries.

A climate of good human relations is universally recognised today as a major factor in winning the race for higher productivity. The milieu in which this climate has to be built up is the individual undertaking. Improved utilisation of materials and reduction in waste; lesser tension between workers and the supervisory staff and among workers themselves; greater adaptability and sense of responsibility among workers; a sense of belonging to the enterprise and appreciation of the management's viewpoint; greater job satisfaction; and, above all, the development of a team spirit on the shop floor: these are some of the advantages which result from a climate of good human relations. It is obvious that where all these factors are present, higher productivity in an undertaking is ensured. Moreover, good labour-management relations can be built up only when the climate is favourable to good human relations. Progressive personnel policies which represent a large part of the steps for higher productivity can also be appre-

* Director, ILO, New Delhi.

A third field of the greatest importance is that of communication. It is concerned with the transmission of operating instructions in all forms down the line and the passing back of intelligence on operations up the line, and with ensuring good 'horizontal' contact between individual workers and groups of workers, among supervisors and foremen and within top management itself. Intimately linked with communication is the matter of joint consultation, both informal and formal. Other areas of action in a human relations programme cover attention to the progress of the worker from his selection and original placement on his first job with the company by means of a well-conceived programme giving him adequate prospects of advancement and promotion to more responsible work.

The causes of discord and resentment in the worker's mind may be centred on such factors as (1) inadequate wages (2) insecurity of employment (3) poor working conditions and (4) an unrewarding job. In addition to these general causes, workers may nurse grievances—imaginary or real—for various reasons, due to lack of adjustment and temperamental difficulties.

While the publicising of facts whenever rumours are afloat is of considerable help in preventing trouble from spreading, it is necessary to have a well laid out grievance procedure. Usually, grievances come to the notice of management through trade unions, foremen or joint committees. But the undertaking should take time by the forelock and try to ascertain periodically workers' viewpoint on various matters affecting them. An effective grievance procedure can, of course, help a lot in creating a good climate for human relations, a practical example of which is the procedure in the textile industry in Ahmedabad.

Although the prompt settlement of grievances can help a good deal in the

creation of good human relations, this at best is a passive approach. A counterpart of this should be an active approach to create among the workers an interest in the undertaking and the industry in which they are employed. In the past the large majority of undertakings were primarily concerned with profit-making; nowadays it is becoming more and more common for concerns to declare that they have three objectives: (1) to supply the public with better products and bring them within the range of an increasing proportion of the population, thus contributing towards the general prosperity of the nation (in India, this may be for the success of five year plans); (2) to guarantee a return on capital corresponding to the risk involved so that further capital will be available for the expansion of the undertaking; and (3) to offer their employees the highest possible wages compatible with competition and provide them with maximum of comfort, safety and satisfaction.

In order that there may be an appreciation of these objectives, among workers, they have to be associated with the management and profits of the undertaking. The scheme of workers' participation in management launched in India may be considered as a step in this direction. And if the management and trade unions both assist in making this scheme successful, then they would have created among the workers an interest in the undertaking.

To sum up, a two-way communication between managements and workers has to be established to create and maintain a cooperative atmosphere in the undertaking. In order to be 'socially efficient', management has to foster the growth of community satisfaction within the undertaking and to promote a sense of belonging among the personnel at all levels. In the last analysis, good human relations are only a means; the end is higher productivity. Although it is not possible to deal with the

various aspects of this question, one thing is clear. Much depends on the initiative of the top management. An appropriate conclusion of this short article may be a recapitulation of the directions in which top management can take action to achieve higher productivity:

To do all within their power to increase the purchasing power and standard of living of their workers in order to increase their Productivity....

To seek to unite their workers into a team of men and women which sincerely desires the welfare of the company, the workers and the public.

To avoid all actions and directives which might produce distrust or lack of confidence in the motives of management.

To develop in themselves and in their levels of management an honest spirit of human fellowship and fairness in dealing with their workers.

To stimulate cooperation with workers, unions and government, rather than to attempt to dominate them.

To accept and express the conviction that industry has a definite responsibility to society.

To strive whenever possible to reduce the cost of production, thus permitting lower prices to the consumer and a higher standard of living for the people.

To accept and practise the principle of sharing equitably the profits between capital, workers and consumers, thus providing convincing evidence that industry does not exploit but serves the people*.

* OEEC Paris Conference, 1953.

* * *



Productivity and The Office Worker

DOUGLAS ENSMINGER*

The work being sponsored by the National Productivity Council and its many branches throughout India, is undoubtedly of great importance and value. But there is equal need for thinking about the 'office worker' and the role he plays in increasing productivity. In general, when we think about increasing productivity we think about how to get the maximum industrial production with the least cost. To accomplish this requires sound planning, good organization and efficient management.

In a very real sense, the office staff is an integral part of management, and can make the difference between good, efficient management and poor, inefficient management. If there is a good office staff — manned by capable people who are interested in what they are doing, trained to do their jobs well, and skilfully supervised, then the management has crossed the most important hurdle in being able to run the industry or business efficiently and effectively. If, however, the office staff is ineffective, management has no chance of being effective. In the former case, productivity is bound to reach a high level, while in the latter case, the level of productivity will suffer.

Probably a simple example will clinch the issue. If you make a quick size up of the office staff when you walk into the office of an industry or business for your first appointment, you are immediately impressed if the staff appears alert, looks happy, shows industry and is working under neat, attractive and functional surroundings. It is not difficult to guess what goes through your mind, when you are greeted by indifferent people, who appear listless, and whose surroundings are untidy and disorganized. It is only to be expected that in the first described office the staff

morale would be high and in the latter low.

It is therefore not surprising to find that research on staff efficiency reveals that the highest productivity comes from the office staff that has the highest morale. In this context it is reasonable for an industrial manager to ask whether it is possible under individual business conditions to produce the conditions for high staff morale.

The most important single factor which makes for an efficiently run office is the interest of staff members in their individual jobs. To get the maximum satisfaction out of a job, it is important that the job suits one's aptitudes. In a country where jobs are few and there are many seeking employment, great care should be exercised to match aptitudes to the work which needs to be done. Persons who have low aptitudes for tedious jobs, such as secretarial work, accounting or auditing, can be expected to do the job poorly. And if they do the job poorly, they will have no interest in it and they are almost certain to have a low morale. On the other hand, persons whose aptitudes are matched to their jobs, performance is likely to be good and morale high. Thus, there is an indispensable link between one's interest in his job and his aptitude for the work required of him.

* Ford Foundation Representative in India.

There are, of course, many factors which contribute to the interest of office workers in their individual jobs. They should have knowledge of how their jobs relate to other jobs in the firm or organization and also how they relate to the total operation. In other words, they should be able to see their jobs in relation to the end-product of the firm in order to gain satisfaction that their jobs are important and necessary and that they contribute in a significant way to the objectives of the firm or business. Office workers must feel that the salary they receive is fair in relation to the work required of them. They must also feel that there is an opportunity to advance either through periodical raises in salary or through promotion to jobs of greater responsibility. They must be satisfied with their working conditions; and highly important is the fact that they must feel that the people who supervise them are interested in them and that what they have to say and offer in the way of constructive suggestions will be listened to and welcomed. What I wish to point out here is that office staff should constitute a "team" with each individual office worker functioning in a real sense as a member of the total team, and with the supervisors providing team leadership. The office staff working together as a team will accomplish a great deal more in terms of a high level of productivity than will a staff working in isolation and with no cohesive force.

Another factor in developing a good staff is adequate, attractive and clean working conditions. All too frequently the boss, the manager, and the supervisor think their office space and surroundings are of paramount importance because they have to see and deal with important people. They conclude that since the office staff *just works*, there is little need to spend money making their surroundings attractive. What a great mistake this is? There is positive evidence that environment, be it for the

boss, the accountant, or plays a positive role in staff. Do you not feel better clean and you are garments? Is not higher when you are environment? Why your office staff would do more than you do to

Let me point out factors which will help. Have you ever description for each of your employees? Do you yourself know of your employees? job description of your reasonable to assume an actively supervise them or render their maximum. Have you ever thought makes for a happy that they individually feel strongly attached to that there is a sense of dependence on each other? said to be close and collegial? A psychologist would say it is a family group. You the greater the group cohesion is in the office staff, the happier who make up the group the group, the higher the higher the morale, output of high quality this way can you turn into a functioning and

Do you have quality standards for acceptable work? Are your memos sent out mimeographed is barely legible and corrections written in white ink? If you are, then you can be staff will never rise to your expectations. If, on your standards are high and supervise your high standards and your staff will be *recognition* a job well done, then your staff will not

Research on employee performance reveals that employee-centred supervisors get greater production than do production-centred supervisors. By this is meant if the supervisor keeps his emphasis simply on production of so many letters or accounts, the quantity will not be as great as if he expresses concern about the employees' working conditions, satisfaction in the job and rewards for jobs well done.

Uppermost in all of our minds today is how to reach the high level of productivity required to substantially advance India's economy and raise the living standards of the mass of the Indian people. This is tremendous challenge to all

of us — the government leaders and civil servants, the private businessmen, the educator, the industrial worker, the cultivator, and last but by no means least the office worker. Each of us needs to examine within our own organization how best we can contribute to and advance toward this objective. It is really not necessary to say that the human resource is the all important factor and that the office worker plays no small part in this task. If the office worker is a part of a functioning team, if he is provided with proper working conditions, given the right incentives and encouraged to increase his output, we will have gone a long way toward increasing productivity in this country.

* * *

..... + Intelligence = Productivity



An Experiment in Productivity¹

In 1955-56, Mr. L Mc P Brooks, a member of the ILO Productivity Mission carried out a productivity project at the Dapodi (Poona) Central Workshops of the Bombay State Road Transport. This aroused considerable interest among the various State Road Transport organisations which requested for similar studies to be undertaken. The 1955-56 project was, therefore, followed up. This Report records that in the case of almost every suggestion originally made, further improvements have been effected through continued efforts. The Report is, therefore, practically a case-study to emphasise that methods improvement is a continuing activity. It highlights the philosophy of Work-Study that the "one best way" interpreted as an engineering concept is the best way that is known at any moment of consideration and that it may have to be modified or changed immediately a better way is discovered.²

THIS Project was designed as a series of educational programmes followed by shop-floor investigations by the participants selected from among the managerial and technical staff as well as the workers. The following training courses were conducted: 1. Management Appreciation Programme. 2. Labour-Management Joint Work Study Training Course. 3. Introductory Course in Industrial Engineering. 4. Stores Re-organisation and Training Programme.

Work Study investigations and stores reorganisation studies were carried out during the project. Significant results have been achieved leading to many recommendations and suggestions for improvement. A majority of the suggestions for improvement were actually tried out and implemented during the Project with the cooperation of the shop supervisors and workers.

The Productivity Project seems to

1. A case study in productivity was published in Vol. 1 No. 2 of this Journal, page 18 (Experiments in Productivity). It indicated substantial achievements accomplished through Methods Study in a major aluminium concern in this country. It was proposed to publish such case studies as would become available in the pages of this Journal. In fact, in NPC Announcement 1 printed in the same issue of the Journal, the National Productivity Council invited industrialists, management consultants and others interested to furnish information to NPC regarding successful introduction of productivity techniques in the fields of industrial management, engineering, labour relations, methods study, incentive schemes, quality control, materials handling, plant layout and the like. NPC Regional Directorates at Calcutta, Kanpur, Bombay, Bangalore and Madras were instructed to advise industrialists regarding the manner in which these case studies may be presented. The particular procedure laid down was that conditions obtaining prior to the introduction of productivity techniques were to be detailed with a view to highlight the productivity increases achieved through Methods Study.

The editor of this Journal will be happy to print significant case studies in the manner that concerned persons and institutions desire. The idea is to set in motion a sort of cumulative chain of causation by which knowledge of productivity techniques at one place leads to general advances in productivity by which the whole community benefits

2. This case study is being published by the courtesy of Sri NS Mankiker, Director, Productivity Centre, Bombay, and Chief Adviser, Factories, Government of India.

have helped to stimulate both among workers as well as management time- and method consciousness. A regular Time and Motion Study Section has since been set up under a Methods Engineer.

SECTION I ENGINES

1. Engine Stripping and Degreasing

When the work study investigations were started the engines were being received in the Engine Stripping and Degreasing Section from the various divisional workshops through the old engine stores. These were stripped completely in the section and each part was degreased and sent to the engine shop for repair and assembly.

The section was found to be very congested. It was not possible to take more than two engines in hand at a time for stripping and degreasing. On the other hand, it was necessary to increase the production in the shop to meet the needs of the engine shop. Following were the main improvements that were suggested: (i) Change in layout (ii) Use of fixtures (ii) Use of an improved type of container for holding engine parts.

(i) *Change in Layout*: The improved layout resulted in the following saving in space and operation time:—

(a) An extra space of about 20' x 20' was made available. Because of the extra space available, it became possible to strip 4 engines at a time without any congestion, whereas formerly not more than two at a time could be taken in hand. This was made possible simply by changing the position of the receiving station. This enabled the engines received in the old engine stores at the farthest end to be directly unloaded from the truck by means of a monorail hoist. Further improvements have been effected in the layout after the introduction of pre-inspection section.

(b) By changing the sequence of operation and re-arranging the position of one degreaser in one line, unnecessary handling time was reduced. The second degreaser and the hand operated monorail were exclusively ear-marked for the axle and gear box stripping adjacent to the engine degreasing shop. This change in the layout resulted in the elimination of six transportations involving 292 ft. of travel per engine as shown in the flow process chart shown on the following page.

(ii) *Use of Fixtures*: Previously, the engine was kept on the ground and one man used to hold it while the other used to do the stripping job. Whenever it was required to turn the engine, the help of a third man was necessary. A new engine stripping stand was then introduced. The engine can be rotated on this stand both horizontally and vertically and one man can easily strip the whole engine. Tools of operator are also kept under this stand in a rack provided for the purpose. Another fixture for holding perkins Auxiliary drive gear (Figure 5) was also designed and found satisfactory in operation. A fixture for holding the exhauster of Perkins Engine was also proposed.

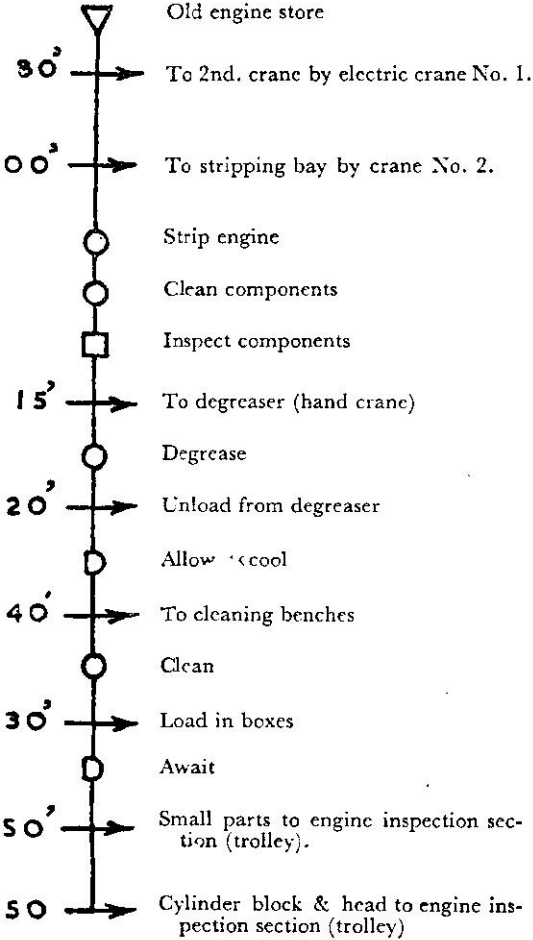
(iii) *Improved containers and air lines*: Dismantled engine components are now stored in suitable containers placed next to the engine stands. These baskets are capable of holding components of two engines at a time. Sufficient number of air lines have also been provided for cleaning engine parts. These are provided with suitable valves to control the flow of air as and when required. Consequent to the above changes, the capacity of this Section to handle engines per week has increased by 50%.

Subsequent to this study, as a further improvement a pre-inspection section has been added wherein some space has been provided for preinspection and storing of serviceable parts before they are sent to different workshops for repair.

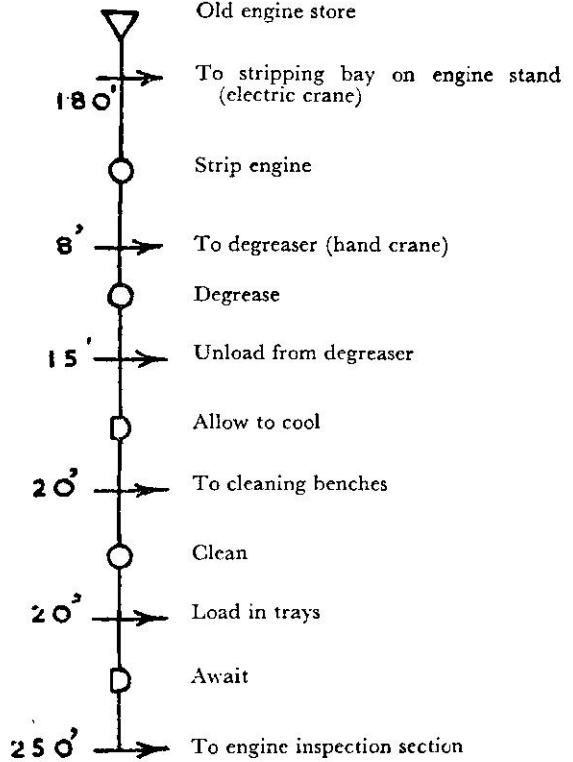
FIRST CHART

ENGINE STRIPPING, CLEANING AND DEGREASING (Flow Process Chart)

ORIGINAL METHOD



IMPROVED METHOD



SUMMARY

	○	→	D	□	▽	DIST.
ORIGINAL	4	8	2	1	1	785'
IMPROVED	3	6	2	-	1	493'
SAVING	1	2	-	1	-	292'

2. Piston and Connecting Rod Assembly

A study of the layout of the Engine Shop, undertaken by the Assistant Superintendent and an operator of the Shop, showed that there was scope for eliminating delays in the piston and connecting rod assembly operations. The enormous amount of handling and re-handling, unnecessary transportation, interference and congestion due to excessive inprocess storage immediately came to light. As a result of this study, the connecting rod boring machine and the lathe on which the piston crown was machined were shifted from the machine shop to the assembly line. Unnecessary delays in the assembly operations have now been avoided.

Another improvement as a result of Work Study investigation was the use of an easily fitting gudgeon pin in piston and connecting rod assembly, used only for assessing the amount of material to be removed from the piston top at the top dead centre position and not for the actual assembly. Originally the piston was heated in a hot water tank to press in and remove the proper size pin. The recorded time for the old method of assembly was 41.5 minutes. For the new method, the time recorded was 31.13 minutes recording a saving of 10.37 minutes.

Wooden platform have also been provided for the use of the operators at the last stage of engine assembly; these have enabled the assembly operations to be performed at convenient working height thereby reducing fatigue and making the work easier.

3. Fuel Injection Pump

Fuel Injection Pumps are received in this section for complete over-hauling, final testing and calibration. The pumps are then sent to the re-conditioning store to be stored till required in the divisions or the assembly line. A 20% increase in production was made possible in this section as a result of the changes in the layout and method of operation. There

has been progressive improvement in the performance of the vehicles in the different units and the number of assemblies received in the Central Workshops for reconditioning per year is steadily coming down.

Layout : The original layout entailed too much criss-crossing of material and labour. The proposals for a new layout were made and implemented resulting in a reduction of 86 ft. of travel per pump.

Operation Procedure : In the original method one pump was assigned to each operator, who performed all the operations, right from stripping to final assembly and testing. A process chart was drawn, as shown on the following page. It became evident that delays, interferences, idle-time and other bottle-necks were recurrent. In the improved method the operations have been divided in a balanced fashion. The operatives at each stage are expected to complete their part of the job and pass on the work to the next stage. They are not required to leave their work benches and there is a straight flow of material from one stage to the next. This procedure was tried out and was in operation for some time; but later on the workshops reverted to the old method of work, as it was found that some of the defects in the fuel injection pumps were so minute and required such careful attention that it was considered preferable that the person dismantling the pump should also carry out the reconditioning and inspection. However, it would appear that this method of dismantling and carrying out inspection needs further study.

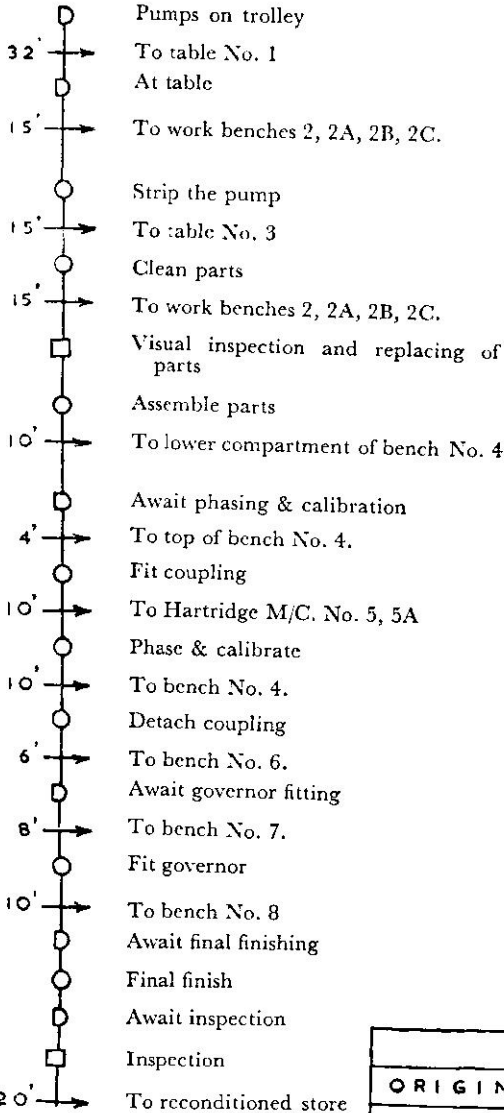
4. Atomiser Reconditioning

The Atomiser Reconditioning Section was initially laid out in an area of 1200 sq. ft. adjacent to the Fuel Injection Pump Section. Using card-board templates, a new layout was prepared which reduced transportation from 237 ft. to 118 ft. Subsequent investigations carried out after the project was completed resulted in a further reduction in the

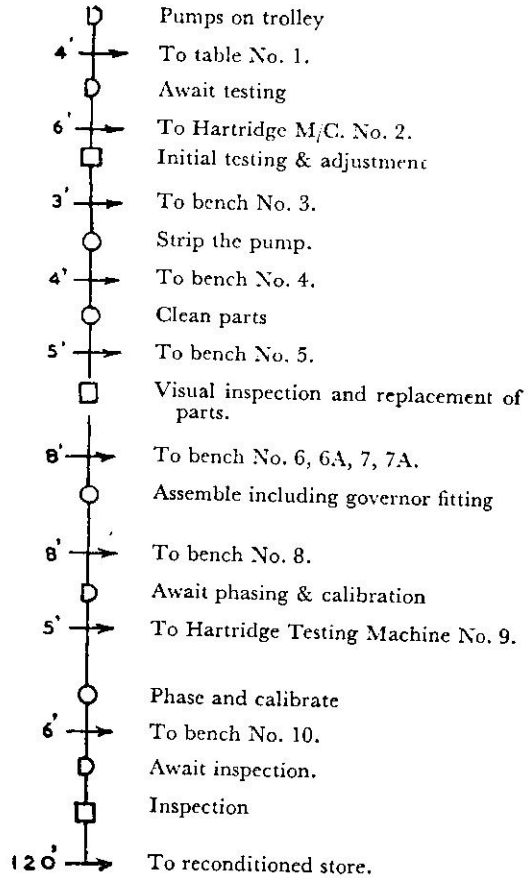
STRIPPING, CLEANING, ASSEMBLY AND TESTING OF FUEL INJECTION PUMP

(Flow Process Chart)

ORIGINAL METHOD



IMPROVED METHOD



SUMMARY

	○	→	□	D	DIST.
ORIGINAL	8	12	2	6	255'
IMPROVED	4	10	3	4	169'
SAVING	4	2	-	2	86'

transportation to 84 ft. and in a total saving of 72 sq. ft. of floor space.

SECTION II MACHINES

Machine Shop Layout

The machining of engine blocks, crankshaft and cylinder heads of Perkins P-6, Morris Commercial, Leyland and Mercedes Benz engines forms the main activity of the Machine Shop. Although specific machines and operators were allocated for each operation, the flow of work from stage to stage was not considered satisfactory. During the work study investigations, Flow Diagrams for all these operations were prepared. An analysis of the Flow Diagrams showed that there was considerable room for improvement in the travel of materials between work places; and that the implementation of the proposals would ensure a smooth flow of components through the shop, reduce the travel from 2342 ft. to 1688 ft. and bring about a saving in the floor area occupied by 1498 sq. ft.

SECTION III ELECTRICAL SECTION

1. Armature Reconditioning

Reconditioning of the dynamo armatures forms the main activity of the armature reconditioning section. The work was allocated to different operators without regard to the flow from stage to stage. This resulted in a great deal of unnecessary handling and in process delays. Flow process chart (shown on the following page) and flow diagram were prepared to draw attention to the operations at which excessive movement and delays were being caused.

Formerly, the armature was being sent to the machine shop for removing the commutator with the help of hand tools. This involved a transport of 500 ft. and delay in work in the armature winding section till the armature was

returned to the shop. A suggestion was, therefore, made to instal a hydraulic jack in the armature winding section to avoid this delay. The suggestion was implemented and the time taken in removing the commutator was considerably reduced.

A bench lathe has also been installed in the armature shop for turning commutators. This has completely eliminated the transport of commutator to the machine shop and back, a distance of 1,000 ft.

Another method improvement suggested was the use of a rotating stand for armature winding. This has made winding operation easy and less fatiguing. Consequent to the adoption of these suggestions, the layout was changed and the saving resulting therefrom has been shown in the flow process chart, printed on the following page.

Further investigations pointed to the advantage of moving the Electric Section nearer to the centre of the workshop, thus reducing its distance from the main Machine Shop. This has been done. The layout of the shop, however, had to be altered to suit the available space maintaining at the same time the smooth flow of work.

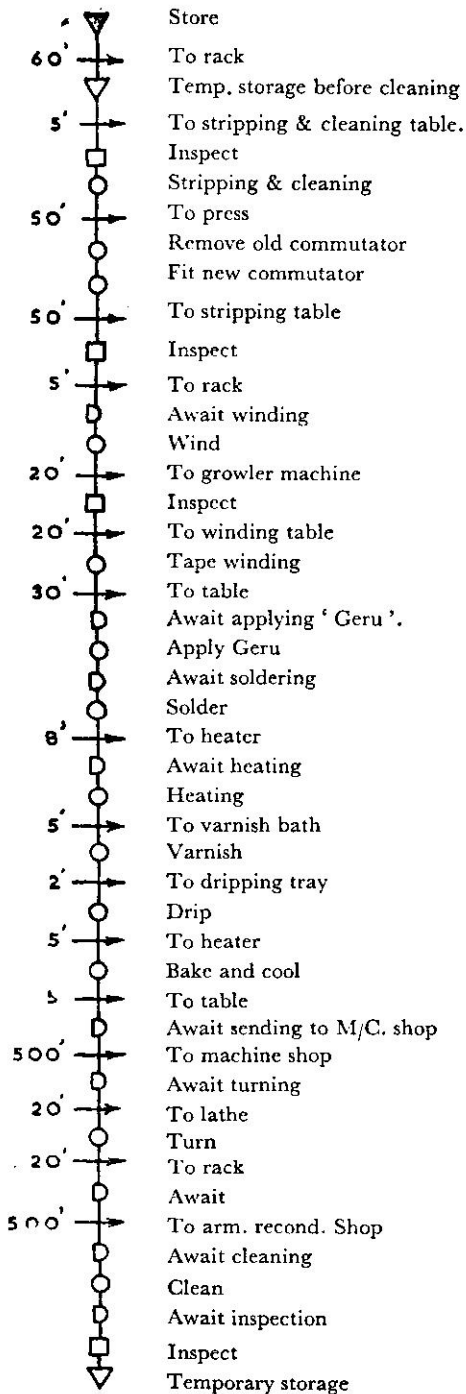
2. Battery Reconditioning

In the Battery Reconditioning Section, the batteries were received from Divisional Workshops and Depots for reconditioning and re-charging. Preliminary observations revealed that reconditioning of batteries was not being carried out in progressive stages and with due regard to the sequence of operations. Owing to the poor layout, movement of parts constituted a major handicap in the Section. Proposals were made for improving the layout and these were given effect to during the project. In the improved layout, the operations covering the removing of cell covers, the cleaning and fitting of new poles, the cell-covers were placed in one Operations of cutting of separat

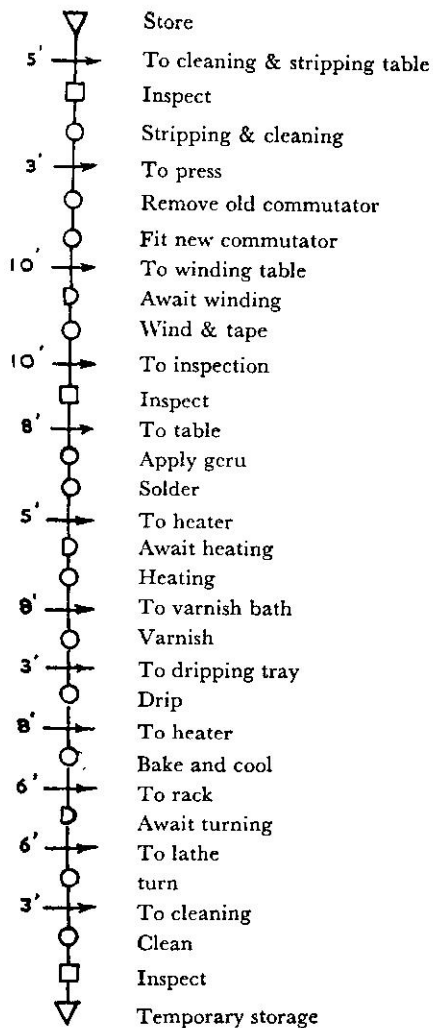
ARMATURE RECONDITIONING SHOP

(Flow Process Chart)

ORIGINAL



IMPROVED



pastings, forming and group welding of plates were placed in line parallel to the line where finishing operations like chipping off extra lead, levelling, sealing with compound and stamping were being done.

As a result of the improved layout, the flow of all the components was smoothed and 12 transportations involving a distance of 479 ft. per battery were eliminated. With the introduction of a trolley, in the battery assembly line, the handling and reconditioning operations were made easier.

With the improved layout, the reconditioning of batteries was continued for about six months. It was, however, found that while the connectors, cell-covers, separators and plates were replaced, the containers, which were made of vulcanised rubber became porous and had therefore to be replaced. This increased the cost of reconditioning to such an extent that it was decided to give up the reconditioning of batteries altogether.

SECTION IV

CHASSIS

1. Chassis Shop Layout

The Chassis Shop is engaged in stripping and reconditioning of the undercarriage and their component sub-assemblies. At the time the Project was undertaken, the chassis were being transported by a tractor from yard to the Chassis Shop and were parked widthwise. There were 18 gangs of workers and each gang, comprising one fitter and one helper, was assigned the work of carrying out the stripping and re-assembly of one chassis. The chassis was supported on two wooden stands. The sub-assemblies were then removed and transported to the respective sections in the unit repair shop. Brake-hangers and springs were also removed and repaired at site, if necessary. The flow of parts was such that it was difficult to control the progress of the materials through

the shop and the parts and the sub-assemblies were repeatedly delayed or mixed up in transit.

When the work study investigations were undertaken, the layout was studied not only from the point of improving the present layout, but also to provide for additional capacity required to cater for regular additions being made to the State Transport fleet.

It was suggested that there should be four lines in the shop, three as active lines and fourth as a stand-by for doing miscellaneous work of intermittent character necessitated by the supply of spare parts not being assured. The job was re-arranged to be performed in the following stages: Stage 1. Stripping of undercarriage. Stage 2. Re-inforcement of chassis frame. Stage 3. Alignment of re-inforcement of frame and pipeline fittings. Stage 4. Fitting of springs, front and rear axle, shock absorber, tyres and steering box on the chassis frame. Stage 5. Assembling clutch plate, pressure plate, back-plate, bell housing, air cleaner and gear box to the engine on floor. Stage 6. Assembling propeller shaft, master cylinder and radiator. Stage 7. Rectifying the defects and discrepancies.

The essential condition for the success of this proposed layout was that the supply of raw material and the spare parts in proper quantities was assured. Therefore, under the then existing conditions of scarcity of spare parts and raw materials, the suggestion could not be implemented at the time. It was, however, agreed that the suggestions should be given effect to as and when conditions improved.

Some of the recommendations made have since been implemented inasmuch as the Pre-Inspection Section has started functioning. Now when a chassis is received for reconditioning, all units are stripped from the chassis and are then dismantled further in the Unit Stripping Section. The chassis frame is cleaned

and then handed over to the chassis assembly section for rebuilding. The different assemblies after stripping are degreased, cleaned and inspected and the material then goes to the sub-stores, which then supplies complete kits to the unit assembly section. This arrangement reduces hold-ups in the chassis and the engine section by making available the material in complete sets. This also reduces the movement of the workers since they are given all the material at the place of their work. Further, the non-availability of material comes to the notice sufficiently well in advance, so that the necessary procurement action is taken in time to avoid any hold-ups on the line. It is proposed to organise chassis assembly on the flow line system in the near future, and efforts are being made in this direction.

2. Front Axle Reconditioning

Front axles after being dismantled from the chassis are brought to the Front Axle Stripping and Reconditioning Section, for complete dismantling and reconditioning.

Flow Process Charts drawn for operation in the Front Axle Reconditioning Shop, revealed that considerable amount of unnecessary transport was involved in the reconditioning operations. Possibilities of improving the layout were considered and as a result of the investigations, two drilling machines were moved to this shop from the machine shop to reduce transportation and the required for drilling the parts in machine shop. Further a door was provided between this shop and the engine degreasing shop to reduce transportation on the parts sent to the degreasing section. The layout has since been modified owing to the introduction of the pre-inspection section.

At present, the buffing of front axle is carried out in the Buffing Section involving a travel of 1200 feet. Subsequent to installing a Buffing Machine in the Front Axle Reconditioning Sec-

tion was made. However, owing to dust nuisance and hazard, the suggestion was not implemented.

After the project was completed, further investigations have been made in this section. Fixtures for opening axles and gear boxes and trolleys for the transport of parts have been provided.

SECTION V

COACH SHOP

Coach Fabrication

Various components for bus bodies are fabricated in this Shop. The methods at each stage were studied and the following suggestions were made:

1. **Welding of Floor longitudinals:** A fixture was designed for welding floor longitudinals. This reduced welding time by eliminating tack welding and the parts were no longer required to be held in position by another man. This fixture is in use for welding of mild steel parts.

2. **Bending roof sticks:** In the original method, one side of the roof stick was first bent to shape and then the other side using a fixture. It was suggested that the fixture should be modified so that both the ends could be bent simultaneously. The modified fixture was found suitable for bending mild steel roof sticks but was not found quite satisfactory for aluminium roof sticks.

3. **Angle cropping machine:** The top of angle cropping machine, which was only two feet from the floor level, was raised to 3'-6" by providing a concrete block at the base and thus bringing the machine to a convenient working height.

4. **Sub-assembly of Side Frame of Bus Body:** The side frames of the bus body are assembled out of the standard components manufactured in the shop. This sub-assembly work is a part of the activities in the New Coach Building Section. In the original method, the parts were laid out on the floor and as-

sembled there. This method seemed to contribute to unnecessary fatigue. A special stand 36" high, 57½" wide and 253½" long was designed. The components are now assembled on this stand with the operator in a standing position, and extra holes in the parts for sub-assembly can now be drilled easily from above or below according to the requirements.

5. **Assembly and Welding of Waist Rail Corner-ties:** Waist rail corner ties are used at the two back corners of a bus body. The part consists of an 18" long angle iron piece bent in the shape of an arc with two 4" angle iron pieces welded in vertical position at the two ends of this arc. According to the original method of welding, the frame had to be first tack-welded for accurate positioning and after inspection, it was finally welded. This operation required the services of a fitter to help the welder in accurately positioning the parts for tack-welding. A fixture was designed and was fitted on a stand at a convenient working height. This made it possible for the welder himself without any assistance to fix four parts in the fixture at a time and weld them directly. The use of the fixture also eliminated altogether initial pre-positioning, tack-welding and inspection.

This improvement pertained to the welding of the mild steel sections the use of which has been gradually discontinued in favour of aluminium sections.

Coach Reconditioning

The activity of this shop includes reconditioning bus bodies and building new bodies on reconditioned chassis. The existing layout of the shop was studied and suggestion was made proposing the shifting of the following machines from the manufacturing shop to the coach reconditioning shop: 1. Sheet cutting machine. 2. Angle Cutting Machine. 3. Band Saw Machines from carpentry section, and 4. Four drilling machines to be located one at each stage.

A saving of 6445 ft. in distance and elimination of 65 delays and 40 portations were expected after the implementation of the suggestion.

SECTION VI

TYRE SECTION

Tyre Retreading

In the tyre retreading section, worn out tyres received from the divisional workshops and those removed from the chassis received in the Central Workshops for reconditioning, are retreaded. The production is about 750 tyres per month. The operators were spending a major part of their working time in the handling of tyres. Therefore, to minimize handling, a new layout of the shop was proposed.

The suggestions made in the proposed layout were discussed with all concerned with a view to encouraging them to offer any further suggestions for improvement. As a result of these discussions, a new automatic tyre spreader was installed. Further, work places were arranged according to the sequence of operations and storage space was provided adjacent to the tyre spreader so that the tyres could be taken directly into the drying chamber without their being stored in the shed outside the shop.

The following are some of the suggestions relating to improvements in methods: 1. During the process of stripping, instead of stripping off the shoulder only, the tread is also removed. Though it involves an increase in the operation time at this stage, the increase is more than compensated by the resulting saving at the buffing stage. 2. The use of stands made out of scrap king pins in cleaning, rasping and trimming has made it easier for the operators to rotate the tyre and work on it. 3. A dust-proof room has been provided for applying the solution. This has minimised the possibility of tread separation due to dust

and other foreign material collecting on the surface. 4. The original manually-operated tyre spreader has been shifted to the curing stage for fitting the inflated tubes inside the tyres. As a result of the above improvements considerable unnecessary handling and transportation have been avoided. Further increase in production is anticipated at the building stage by the introduction of a spray gun instead of round brushes for applying the solution.

A storage shed, 30' x 40' has been provided in front of the Tyre Section as proposed. It is capable of accommodating about 1100 tyres. This would minimise the risk of ply-separation due to absorption of moisture in the casing. It would save time of the inspection staff in removing water from the casing in the rainy season. The use of power stitcher has also been recommended. This would eliminate tapping the camel-back with mallets and rolling down the camel-back wings, thereby saving considerable amount of time. The actual production is, however, limited by the capacity of the curing moulds.

Inventory Control

General Standing Orders were in force which required every Store or Sub-Store to ensure that their maximum and minimum inventory levels were maintained. But the maximum and minimum stock levels were neither defined nor maintained with the result that the stocks of certain items were sometime completely exhausted and on other occasions were in excess. In order that correct inventory levels were maintained, the following suggestions were made and action taken accordingly:

(i) Maximum and minimum inventory levels based on the past consumption over periods of 6 and 2 months respectively should be worked out for every item of store and noted on each bin card so that items could be indented when the inventory reaches prescribed re-ordering point.

(ii) If the stock of any item exceeds the maximum prescribed for it, the excessive stock should be declared as surplus so that it could be re-allocated and transferred to other stores. Further, full details of the surplus material declared by the Divisions should be maintained by the Controller of Stores so that these may be utilised before ordering fresh purchases.

(iii) Items which have not been consumed for more than 3 consecutive months should be reported by the Depot Manager to the Divisional Mechanical Engineer who will decide whether the item should be transferred back to the Divisional Stores.

(iv) Divisions should send the monthly indent to the Controller of Stores separately for each schedule of stores, the stocks of which have reached the minimum level for a quantity which should be only sufficient to maintain the minimum stock level until bulk supplies are expected.

(v) The Central Stores should likewise maintain a minimum stock of three months' demand of all the Depots. The maximum level should be four months consumption and the re-ordering procedure and supply to depots in time should be strictly enforced.

(vi) Only one make of vehicles should be given to a depot.

Issues of Stores to Depots and Sub-depots

The Depots and Sub-Depots were deputing their clerks to the respective Divisional Store for weekly and monthly supply of Stores. The expenses of store clerks of one division in terms of fare, daily allowance and salary in transit amounted on an average to Rs. 245.75 per month. The cost incurred for sixteen Divisions was Rs. 47,184 per year. A closer co-ordination between Depots and Sub-Depots (indentors) on the one hand and Divisional Stores (supplies) on the

other hand was proposed. The requirements of the indentors were analysed. A planned programme (detailed below) of periodic supply of stores was recommended.

(i) No Depot clerk should be deputed by the Depot for the mere collection of stores from the Divisional Stores.

(ii) Depot Managers should send their indents for stores once a month on the dates prescribed by Divisional Controller and arrangement should be made by the Divisional Controller to supply the material within 7 days. The material should be sent suitably packed and small items should be sent in boxes with locking arrangement.

(iii) Urgent demands should be placed by the Depot Manager by sending indents through the regular state transport service bus or by telephone.

(iv) Despatch of heavy and bulk items like assemblies, lubricants, oils, tyres, etc., should be arranged by the Stores Supervisor by Depot truck or other suitable transport on fixed dates and the truck should bring back the old and unserviceable items.

3. Classification of Stores

The inventory of Central Workshop Stores, Poona, runs into about 40,000 different items. Coding of all these items on a rational basis was attempted for an effective inventory control and for reducing losses which were not otherwise evident.

Knowledge of what is available in the inventory is dependent not only on the accuracy of description and completeness of the schedules, but also on the orderly arrangement of the inventory. Investigations were carried out in regard to four types of spring washers and four types of hexagonal nuts which were being classified under different headings in the Auto Stores and the General

Stores. These items in the Auto Stores were imported specially for Perkins Engine while in the General Stores, they were purchased at a much lower price from indigenous sources. Thus it was observed that identical items were being purchased at different prices. As a result of the investigations, nuts and washers are now purchased from indigenous sources and are stored in the General Stores under one category only. The import of these items has been discontinued altogether and this has resulted in a saving of Rs. 3850 per annum.

The following suggestions were made during the project. The action taken since the Project is also indicated against each suggestion:

(i) Progressive reduction in the number of imported items.

Action taken: Considerable progress has been made in this direction and a number of indigenous items are now being used, and all encouragement is given to indigenous manufacture. Some of the indigenous items now used are springs, thin ball bearings, spring brackets, special types of radiator hoses, electrical accessories, i.e. tail lamp, roof lamp, coils and commutators, water pump assemblies as well as components, bell housings of all makes, brake drums of all makes governor diaphragms, booster diaphragms, fuel and oil filters, mufflers, silencers, etc.

(ii) Inventory re-organisation in a form conducive to open tender system of purchase.

Action taken: The various schedules of spares and other stores are now so grouped as to make it convenient to issue consolidated tenders for stores produced by common manufacturers.

The work is being continued to cover all the other items in the Central Stores and to re-organise the inventory control on a rational basis. It has since been reported that this work has brought

about a saving of about Rs. 25 lakhs per year over what would have been paid if the purchases were made from chassis suppliers. The savings would repay on an overall basis nearly ten to fifteen per cent of the annual purchases and on certain items, e.g. bearings, to the extent of even 60 to 70%.

4. Interchangeability of auto spare parts

In the State Transport, vehicles of nine makes are used and certain parts are common to various vehicles. The price of such common items varies with different suppliers. The investigations were aimed at the collection of data by listing these interchangeable parts and finding out the cheapest source for their procurement. About 12 items were taken up for study. The savings from this study alone approximated to Rs. 53,178 per annum.

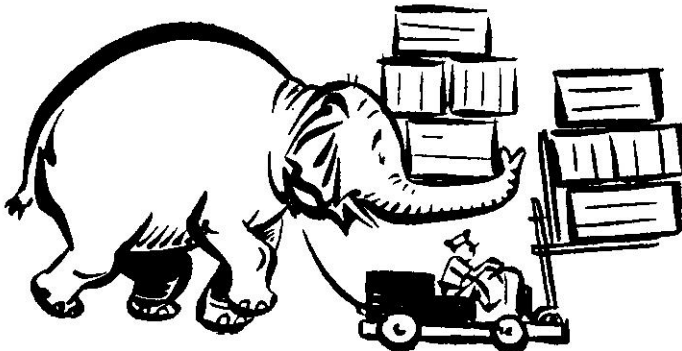
A suggestion was also made that whenever a Division or a unit came across any interchangeable part, they should pass on the information to the Purchase Section of the General Stores, who would inform the other units so that due note was taken during indenting. This suggestion is being followed now. At present, the interchangeable parts are given cross references on the bin cards for easy reference.

5. Procurement of auto spares from indigenous sources

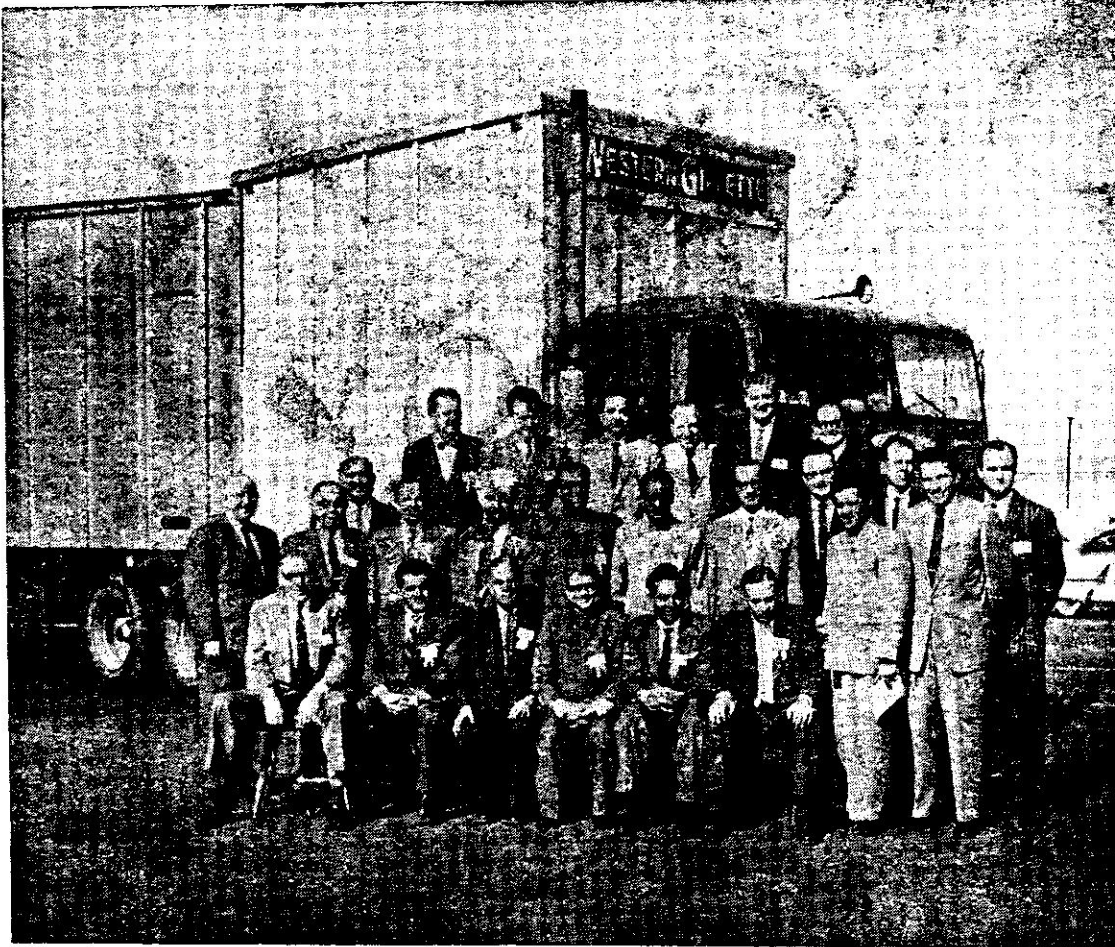
All the auto spare parts used to be imported generally from the original suppliers overseas. This project was taken up to examine the possibility of purchasing these components at a lower price indigenously and eliminating delays owing to uncertainties in purchases from overseas. The question of effecting purchases from indigenous sources was under investigation even before the Project was started in the Workshops. The Project, however, provided an opportunity to study and investigate the problem further, and as a result the possibility of obtaining a number of additional items of indigenous manufacture was brought out. The comparison of the cost between only eight items, imported and indigenous, shows that Rs. 1,38,300 could be saved. It would also ensure an uninterrupted flow of supplies and facilitate closer co-ordination between the suppliers and the Transport Organisation.

Owing to the present foreign exchange difficulties, more and more items of indigenous manufacture are being made use of but it is not possible to include in this report any exhaustive list of the large number of such items which have replaced similar items of foreign manufacture.

Materials Handling



THE ROAD TRANSPORT TEAM
with
THE WESTERN GILLETTE



Sitting (L to R) Cantlay (President, Western Gillette), Wates, Nair, Rathor (leader of the NPC Gupta, Sahai.
Standing (1st row) Noronha, Goera, Bhatnagar, Manmohan Singh, Mani, Bommiah, Darga Kundan Lal, Cantlay (Jr).
Last row Werner (Project Officer), Seshadiri (third from left).

What We Learnt Abroad

This is the central chapter in the NPC Report¹ on the Productivity of Road Transport in West Germany, the UK and the USA. It gives a critical account in an integrated way of what the Team has to say about the productivity techniques in the countries visited. This chapter has been specially written for the policy-makers. The principal lesson underlined in the Report is that investment in productivity techniques (including amenities not only for the travelling public but also transport personnel) is made possible by a large and growing market; and particular attention seems to be paid, in these countries, in brushing aside all such inhibiting factors that come in the way of developing the market in road transport.... "...We present this Report in the humble conviction that our recommendations will become the basis of making the road transport system a more efficient instrument than it is today for movement of men and materials. But we were out just for seven weeks (including travel time) and have had a peep at various critical points in the operation of the road transport industry. We are convinced that its productivity is at once the index, and in a large measure, an explanation of the high efficiency of the economies concerned. They are highly productive because the road transport system enables the movement of men and materials at high speed and low cost. On the other hand, the road transport industry is highly productive because the general economy provides a highly profitable market for the road transport industry... That is why we submit in all humility that a certain priority be accorded to road transport—we mean, its productivity—to accomplish the fateful take-off, which is the main objective of the Third Plan on which we embark next year...."

(i) An Expansionist Philosophy

The principal thing we learnt abroad is the general prevalence of an expansionist attitude among all the co-operant factors in the social economy, Government personnel of all categories, managers, operators, and last but not the least, the workers. As we have pointed out elsewhere² in the chapter on the US road transport system, the only question that the licensing or regulating authority asks is: "Will it enable the goods and agricultural produce to move in such

a manner as to encourage the growth of our national economy?"

People do enjoy, particularly in the United States, *the fundamental right of providing better service at cheaper cost. The Government recognises it; the people exercise it and the courts enforce it.* This, in fact, is the principal lesson we have to learn if we want to raise productivity: that a contractionist philosophy goes ill with an expansionist economy.

Apart from the economic philosophy

1 The layout of the Report may be indicated here in the language of the authors: "...The lessons that we learnt abroad have of course been recorded and they form the main body of the Report but we thought that these should be preceded by a few chapters dealing with the general perspective of the industry in India, its economic background, its level of productivity and the size and growth of the market as the limiting factors in the incorporation of foreign productivity techniques in the industry.... These introductory chapters are the jumping off ground for what we consider the centre of the piece: Chapter V (reproduced above).... Then follow a series of country chapters, which support the conclusions of the preceding chapters. Each of these country chapters has been written with a view to underline the significant details in the context of the productivity techniques employed in the line in the country concerned. At the end, there is a series of chapters, dealing with what we consider as the highest priorities—an expansionist policy, research and training...."

2 See the full Report, vide footnote at the end of this article.

essential to an expanding transport economy, we would rather like to set down quickly the basic facts we came in possession of during our inquiry in the road transport economy of West Germany, the UK and the USA.

(ii) Optimum Utilization

The whole of the road transport economy in these countries is patently characterised by maximum utilization of vehicles, for the capital and overhead costs get progressively diminished per mile of a longer and longer run. The statistics of the 10-12 ton articulated 6-wheel diesel combination in the city of London show that fixed costs diminish from 30 to 6d per mile, as the annual mileage increases from 10 to 50 thousand miles. Taken along with running costs, the total charge per mile becomes less than half, as the total run increases from 10 to 50 thousand miles. That is how high productivity is obtained in the western countries. There, the daily mileage of a vehicle is often 500 miles and the annual run 1,50,000 miles or over.

(iii) Vehicle Maintenance

A striking feature of all the undertakings visited, whether large or small is the emphasis on good maintenance of vehicles and equipment. Only suitably trained and experienced engineers and technical staff are employed. Automatic equipment is utilised wherever possible because of the high cost of labour. In most of the undertakings visited there is a definite plan of maintenance, proper schedules for docking and repairs.

(iv) Repairing and Reclaiming of Parts

In spite of the fact that the countries visited manufacture vehicles and spare parts in large numbers, yet the transport undertakings there attach great importance to reclamation of worn out parts. They have studied the effect of repairing and reclaiming, both from the point of view of cost and reliability. Their experience has shown that to repair, re-

claim and re-use are economical and safe. They do this extensively within the limits of safety and in keeping with economic use.

(v) Better Use of Fuels and Oils

Closely linked with better maintenance is the better use of fuel and lubricating oils. The various undertakings visited by the Team show a growing tendency to study the effect of better use of lubricating oils. Even where lubricating oil is not as expensive as in this country, experiments are being carried out to achieve economy in its use.

(vi) Speed Limits

We have already referred³ to the optimum use being made of road transport equipment in the countries visited by us. As a substantial amount is invested in a motor vehicle, be it a truck, a bus, a tanker, a delivery van, the investor endeavours to have the maximum return on the capital. This is achieved by high pressure methods, specially in the United States, to get the maximum by way of mileage, the maximum by way of payload and the maximum by way of rates in keeping with the cost of operation and giving the user a fair deal. His intention to do so is assisted by the facilities made available by the State in the form of good roads etc. Factors which retard quick transit have been eliminated. By fencing or by other steps, ingress or cross traffic is almost eliminated. Vehicles are permitted to travel at high speeds. In fact, the slow moving vehicles have difficulty in keeping pace with the rest of the traffic and have to take to slower lanes or keep off the highways. By keeping out slow moving traffic from fast highways and preventing indiscriminate entry of cattle and pedestrians, larger volume of goods and more passengers are carried in less time. In all these countries there are proper road signals and signs, intelligently got up boards, etc. to guide the road user

3 All such references are to the Full Report.

towards safer driving. It is a common sight in Germany and America to see boards put up by the side of the road which indicate to the driver what he can expect ahead. Be it a telephone, a parking space, a road diversion, the driver is prepared well in advance for what is ahead of him.

(vii) **Truck-Trailer and Tractor-Trailer Combinations**

We now come to one of the most vital steps towards increasing productivity in the haulage industry which is to use heavy trucks and truck-trailer and tractor-trailer combinations. As against a gross laden weight of 8 to 12 tons permitted for trucks in India, which enables vehicles to carry a load of 5 to 8 tons, the gross weight allowed for combinations in the USA and Germany is 32 tons (72,000 lbs.) so that a load of as much as 25 tons can be carried. Semi-trailers or articulated trailers which are extensively used in UK and USA usually carry 17 to 21 ton consignments. In Germany a heavy truck usually tows a drawbar trailer equipped with turntable and power brakes. The truck has 2 axles and the trailer 3 axles with a combined carrying capacity of 25 tons. Improved drawbar and turntable designing, have increased manoeuvrability and safety even on steep gradients and narrow roads. Our observations have convinced us that there are hardly any grounds for the fears expressed in some quarters in India, that the use of these combinations will be a danger to public safety and that they are unfit for use on roads less than 22 feet wide. We actually travelled in a trailer bus at Bad Homburg, in a very narrow street which was barely 12 feet wide. The use of the above combinations has cut road transport costs by as much as 77 per cent in the past two decades.

(viii) **Refrigeration**

The use of refrigerated trailers has enabled the road transport industry in

Western countries to serve the industry in an efficient manner. Such trailers can maintain a temperature of upto 20° below zero and have a separate and independent power source.

(ix) **Accounting and Statistics**

In the USA, a good deal of development of the road transport industry has been due to the amount of information that is available to the Inter-State Commerce Commission or to the State regulatory bodies. Much of this has been possible by a uniform system of accounting and statistics which has been prescribed by the Inter-State Commerce Commission for all road transport operators. The accounts and statistics maintained as a result of this directive are uniformly kept and are available to the authorities to permit a study of any particular aspect of operation which might become necessary. Thus, there is a healthy connection between the cost of operation and the rates charged. No one is permitted to charge more than he should; neither is he allowed to charge less than what is necessary. Tariffs are published on behalf of the operators by their tariff conferences for acceptance by appropriate authorities. These tariffs are carefully studied by the authorities and are only allowed after the parties concerned have had a chance of examining them and raising objections, if necessary. In effect, the industry is permitted to charge what it should and the user, too, is assured of a fair deal. All this is made possible by maintaining accounts and statistics in a uniform manner.

(x) **Regulation of Road Transport**

The manner in which Government regulations have helped the organisation of bigger operating units in the USA has very strongly impressed the Team. These regulations give the operators every encouragement to expand, to increase the efficiency and quality of their services and to provide ever-increasing

amenities to the users of transport. In the USA once an operator has a certificate of public convenience and necessity, he can put as many vehicles into service as the growth of his business warrants. Again the certificate is perpetual and has not to be renewed periodically, thereby giving the operator every incentive to build up his concern on sound business lines. There is no curb at all on expansion as long as an operator is fit, willing and able to perform his service. In order that the freedom to expand may not result in the creation of surplus transport capacity with the consequent tendency to indulge in wasteful and cut-throat competition, the tariffs which are fixed by the operator and filed with the authorities cannot be deviated from except with the latter's prior approval. This ensures that competition is on service and not on price.

A further useful practice in USA and West Germany is that trailers do not require separate permits. They merely have to pay taxes like private cars and different trailers may be used in conjunction with any prime mover. The prime mover used for such haulage is generally a high-powered short wheel base diesel truck, the major part of the load being carried on the trailer. The advantage of this system in America is that long distance services have been developed through interchange of trailers between one operating company and another. A loaded trailer can be hauled all the way from San Francisco to New York (over 3,000 miles) so long as the tractor hauling it is licensed in the areas traversed. It is possible because of this system for a consignment to be carried by road from any part of the USA to the other even though the operator who books the consignment may have operating rights in a limited area only. There are indeed some operators licensed for operation from coast to coast but the trailer interchange system makes it perfectly easy for smaller concerns to serve the shippers from door to door, routes as long as 3,000 miles.

(xi) Role of Associations

In all of the countries that we visited we met the top officials of national associations of the road transport industry. We visited them in their offices. Though we had no occasion to get into contact with associations of bus operators except in West Germany, yet we were impressed very much with the way the industry was organised and their associations functioned. The very high degree of organisation which the industry has achieved in these countries has helped the individual operator to reap all the benefits of large scale operation without merging his identity into bigger fleets. In West Germany, to begin with, the law had made it obligatory on all operators to join the OUC Association. Though now the membership has been made voluntary, 99% of the operators are still members of the National Association. This Association has been given a very high status: powers to enforce the tariffs etc. have been delegated to it by the Federal Institute.

The American Trucking Association which is the federal organisation of trucking industry in the USA is so well equipped and staffed that it is rendering effective help to all its members in so many ways, legal, financial, public relations, etc. We were very much impressed by the way the spokesman of the American Trucking Association described its functioning. He said that they sold their services to their members, offered advice to the authorities and served as a liaison between the user and provider of transport services.

(xii) Training and Selection of Personnel

In all the countries visited by the Team, spending money on training of drivers, maintenance and managerial personnel is considered a worth-while investment, because the operators get returns in terms of better maintenance of vehicles, maximum utilisation and economy in use of fuel and lubricating oils.

Universities in America have training courses for drivers, and teenagers are taught in how to drive a car. Many of children turn out to be professional drivers. Therefore, before a person has his training for a heavy vehicle sport vehicle, he has already got a very background.

an important feature of the road transport industry in the countries visited is that they employ properly trained and experienced top management personnel. Very rarely is an undertaking managed by men at the top drawn from other industries or from Administrative Services having no past experience or involvement in road transport. Much of the success of the road transport industry in the West can be attributed to the fact that it is managed by top management personnel, whose experience has helped to increase its productivity. Some presidents, directors, general managers, and persons of similar rank have risen from the ranks by merit. They have been able to develop their knowledge, skills, and ideas by closely studying the various facets of this complicated and diverse industry. The employees assist their staff in acquiring realistic qualifications.

Research

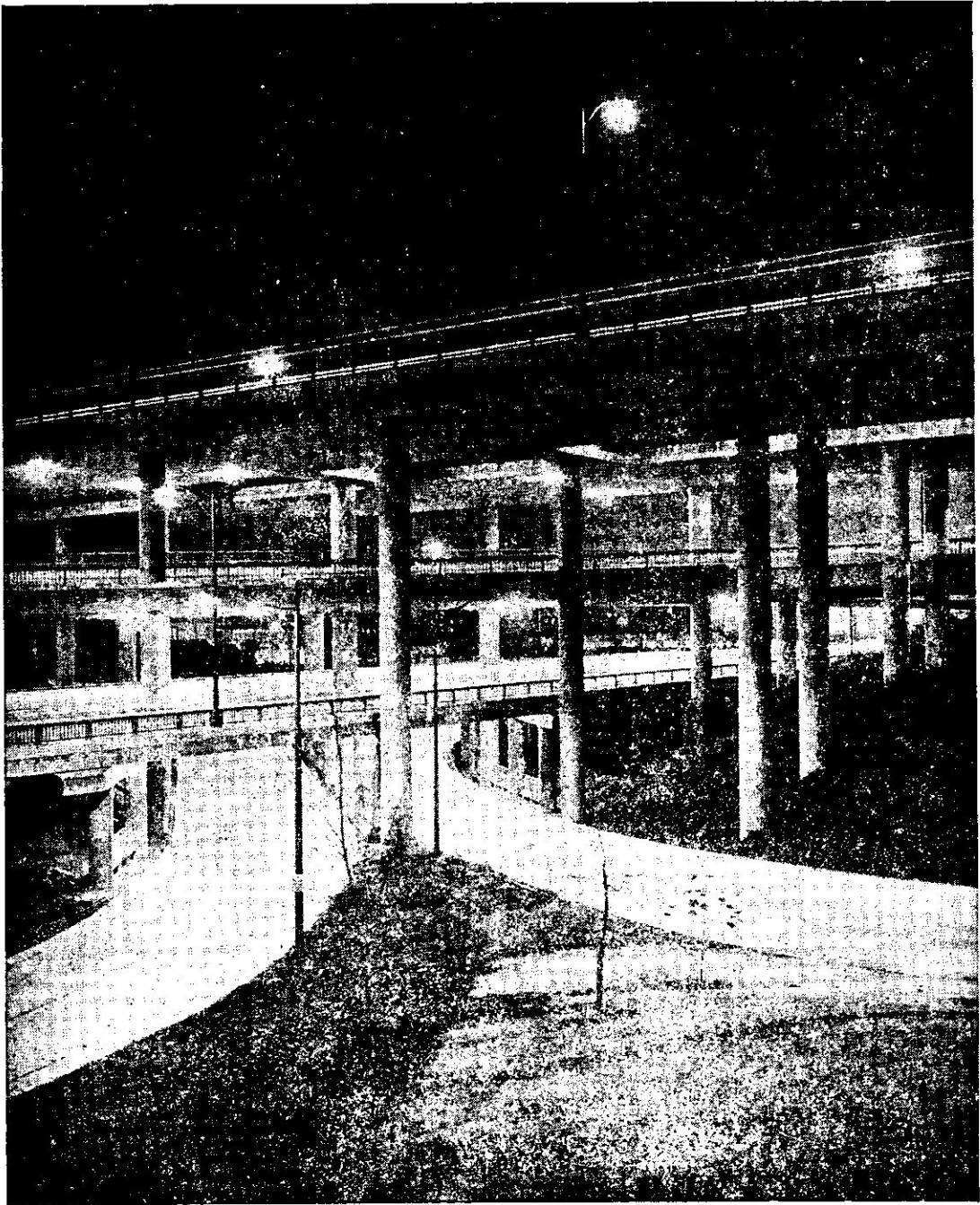
In Western countries, road transport has been given the necessary attention and encouragement because of the importance of study and research in the industry. A typical example has been put into it. A typical example of the manner in which this has been helped is the setting up of the USA of the Inter-State Commission which, in addition to its advisory functions, has devoted a great deal of attention to research and development in road transport. This commission is equipped that it can study any problem, whether it be safety, vehicle design or operation. As a result of this, not only the operator,

but even the user of transport is protected from any exploitation.

(xiv) Labour

A sound trade union movement is conducive to productivity. Working conditions in western countries are good and the workers are generally cheerful and hardworking. They are disciplined and do not need much supervision. Conditions in America are slightly different from those in the two other countries, in that the hours of work and other terms are determined by bipartite agreements for specific periods between the unions and management. These agreements not only determine wages, hours of work, working conditions but also provide for welfare trusts, gratuity, pension etc. The workers in transport organisations are also given free passes. The two powerful transport unions in the USA are:—(1) Amalgamated Association of Street Electric Railway and Motor Coach Employees and (2) Teamsters Union. Wages in America are much higher as compared to West Germany or England. Taking into consideration the cost of living in America, it cannot perhaps be said that they are too high. Reasonable wage cuts are accepted when the unions are convinced that the employers are unable to meet the wage-bill in spite of all efforts. The view was expressed on behalf of trade unionism that the worker is entitled to a fair share of the productivity which he helps to promote. Likewise the employers' view is that trade unions being reasonable and responsible would eventually realise that the industry could pay no more.

Every worker is covered by various types of insurance and he feels assured of his future. This and his high sense of responsibility and discipline contribute to the high efficiency witnessed. The workers observe the rules and regulations very strictly and they receive the full cooperation of the travelling public. Trade unionism has developed and is a very strong factor. The



A close-up (at night) of a 4-level traffic inter-change structure in California, USA

workers pay their union subscriptions regularly.

Industrial relations between the management and the unions are generally cordial and they definitely believe that disputes can be solved by discussion round the table and by mutual agreement. Perhaps it is due to the fact that each party respects the views of the other and is reasonable. There is mutual trust between the employers and employees. When there is difference of opinion, the matter is referred to voluntary arbitration. Such industrial relations confirm the view that mutual understanding and negotiation can achieve a good deal.

(xv) Road Safety

The safety of all road users, whether they be pedestrians, cyclists, car drivers or drivers of transport vehicles, is an important function of regulatory bodies. The Inter-State Commerce Commission maintains close liaison with the vehicle manufacturers and operators. All serious accidents are reported and their important aspects are studied. Wherever necessary, important information resulting from the studies is made public, so that others benefit from what has happened.

(xvi) Change in the Position of Road Transport

Our observations in the countries visited by us testify to the important role played by road transport and to the facilities given by States to perform such a role. A few figures will be of interest in this connection. In West Germany, road transport which carried 16% of the total volume of surface transport in 1950 increased to 22.6% in 1954 and to 25.8% in 1955. This percentage is still on the increase. In Great Britain, the railways carried 54% of the total of road and rail transport in 1954 (in ton-miles) while the share of road transport was 46%. These proportions had reversed by 1958 in which year road transport carried

56% of the total and railways only 44%. The report of the British Ministry of Transport on a sample survey carried out in April 1958 states: "Whatever unit of measurement is used, road transport is now the major means of inland carriage of goods."

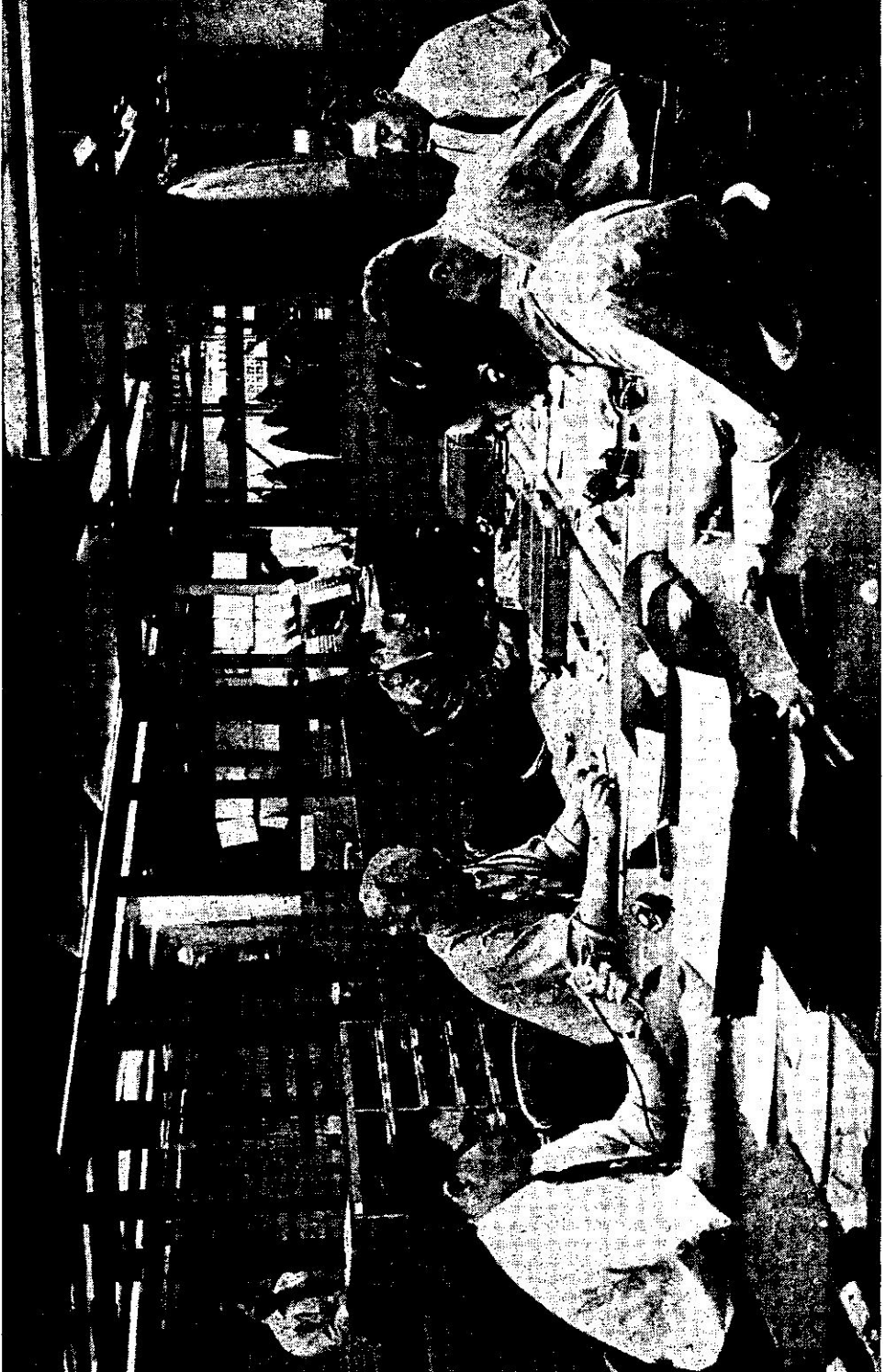
Transport, like engineering techniques, is constantly undergoing change. For instance, the waterways of the UK became partly obsolete for particular mode of traffic in the past quarter of a century. Just as it is injurious to the economy of UK to prop up waterways when a better and more efficient service is rendered by other modes of transport, so would it be inadvisable to expand railway capacity, when road transport has proved more economical.

The State-owned British Railways, instead of seeking any restrictions on road transport, recognise that the consumer must have freedom to use whichever mode of transport he finds best suited to his needs. The railway report states: "Competition is fiercer than ever before and in consequence the pattern of transport in this country is changing. There are many jobs which the railways have done in the past which they will no longer be doing. There are other jobs, particularly in the transport of materials in bulk and other full-load traffic, that they can hope to do to an increasing extent. The railways of the future in conforming to this new pattern will be a more streamlined organisation."

It may be of interest here to note that in Germany as well as in other Western countries some railway lines have been actually dismantled.

(xvii) Roads

In the countries that we visited we were struck by the prime importance attached by governments to an extensive and efficient net work of roads. We were greatly impressed by the large width and smooth surface of the roads, on some of which we had an occasion to travel. It has been realised in all these countries



Port of New York Authority
Motor Truck Terminal Information Office

that a good road is worth far more than the money spent on it. Improved roads carry larger and heavier traffic at faster speeds, saving both time and money. Recognising the importance of road research, large sums of money are being spent on the study of new construction methods, soil conditions, use of different materials and their behaviour under varying conditions. The results of research in other countries are also taken advantage of. Interesting studies are being made specially in the USA about space utilisation of the highways by different kinds of vehicles travelling at varying speeds and traffic signaling etc. Separate Highways Departments have been set up, charged with the responsibility not only of constructing and maintaining roads but also of studying methods for their better utilisation. Considerable progress has been achieved in all these fields. Still they are eager to do more.

A special feature of the road system in the USA which impressed us was that the construction of certain roads and bridges was financed by imposing a toll on the vehicles using them. These roads are called 'turn-pikes' and they have helped in the fast development of road transport in certain parts of the USA. They provide a super-highway as an alternative to the ordinary road already in existence, so that road users have the option of using the old road free of charge or the super highway on payment of a toll. The 'turn-pikes' are constructed by corporations or other authorities set up for the purpose or even by individuals. The authority constructing the road is authorised to collect a certain toll from every vehicle using the road. The maintenance of the road is also the responsibility of the same authority. After the investment has been recovered, the ownership of the road reverts to the Government.

(xviii) Terminals

Bus and Truck terminals have become a regular feature of road transport operation in the countries visited by us. In New York there is an excellent bus terminal built by the Port of New York Authority, with control room signals to indicate occupation of loading platforms, arrangements for fanning out in-coming and out-going traffic, escalators for passengers to move between the lower and upper floors, restaurants, rest rooms, information counters, well laid out ticket-windows, shops, bowling alleys for recreation, etc. At their own bus terminals also, large companies have provided similar amenities for passengers.

Cooperative bus terminals likewise exist in many places. The terminal of the London coastal coaches serves a large number of bus companies operating from the countryside to London. Departure fees and parking fees are levied for the use of such common terminals where the facilities provided include rest rooms for passengers and bus crews, canteens, booking halls and facilities for minor repair to vehicles.

Truck terminals have loading platforms, trolley trains run by overhead or underground conveyor belts for transferring goods to and from waiting trucks, fork lifts and cranes, as also storage space for cargo. These terminals also are sometimes provided by local authorities in addition to those built by operators themselves.

Though long, the above is really a brief account of what we saw and learnt. It is really a story of productivity; and we have told it at length, country by country, in the chapters that follow.⁴

4 See the Full Report, obtainable from the Information Officer, National Productivity Council, 38 Golf Links, New Delhi, on payment of Rs. 2.00 by money or postal order or bank draft drawn in favour of National Productivity Council.

Productivity and Management

HKS LINDSAY*

Managerial policies must in the first instance take into consideration the general economic situation in the country. In India, particularly managements must realise that a highly urgent problem facing the country is inflation: an insidious and ever present menace to the country's long term planning for forcing the rapid growth of the economy. It is equally a menace in the short term, as it constantly threatens the success of current fiscal operations. It is apparent from the policies of the Government of India that the nation's managers are determined as a matter of high priority to meet the challenge of inflation. Managers of industry must cooperate with Government in the implementation of its anti-inflationary policies.

THE part industry can play to combat inflation is first to pursue sound pricing policies. But with rising labour costs—by which I mean *all* costs directly resulting from employing workers—this can *only* be achieved by increased productivity. This then is the standpoint from which I start: increased productivity as a means of reducing prices or at least keeping them stable. This, however, cannot be the ultimate objective, which is, that the economy must somehow take off into an atmosphere of self-sustaining growth. This 'somehow' is increased productivity, through which we make the most of the country's existing resources of men, machines and materials.

In this connection, we in industry must have humility: the answer by no means lies entirely in our hands, for whilst in higher productivity lies the key to economic advancement and the remedy to most inflationary ills, primarily what is required is a dramatic rise in agricultural productivity and here we have the sobering thought that food prices, even after last year's bum-

per harvest, remain disconcertingly high due to distribution difficulties.

In short, industry has no control over this huge area of food prices; over the encouragement of demands for higher wages irrespective of the productivity of labour; over Government's policies determining the allotment of controlled and imported raw materials; and its policies governing the importation of certain essential equipment so necessary, if the full fruits of work study are to be reaped.

Two points arise out of these limitations: (a) In our Local Productivity Councils we have wholeheartedly accepted the principle that in any drive for productivity the workers must be brought fully into the picture, that there should be no retrenchment as a consequence of the drive, that there should be no unfair addition to the work-load, and that its benefits should be equitably distributed amongst employer, employees and, let us not forget them—consumers. In practice, however, many industries have reached the point where unless there is increased productivity, increased payments to workers can only be made at the cost of higher prices to the consumer. I want to see the

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wages of Indian workers very greatly increased; but a great increase in wages without a correspondingly great increase in productivity will be illusory. It will mean inflation: just additional rupees to buy the same amount of goods.

It needs no saying that the mutual pursuit of higher productivity by managements and workers is essential. We need not ask our union friends to refrain from seeking higher payments and improved conditions for their constituents—let's face it, that, in their constituents' eyes, is what they are there for. But it appears reasonable to ask the workers to link their demands, wherever possible, to increasing productivity. I would strongly urge this view upon them, their unions and the Labour Ministries, safeguarding their true interests.

Secondly, attention of the planners may be drawn to the fact that if increased productivity is to be striven for against the background of a guarantee of no retrenchment, there must be—since normal wastage will not take care of the surplus men made available for other work by a really successful productivity exercise—there must be an increase in production. Increased production inevitably means the use of more raw materials, including some locally produced materials which are the subject of controls and some imported materials, usually a small but irreducible fraction of the total. There are very real difficulties about the provisioning of these materials: but they must be faced up to if a general productivity drive is to succeed; for who gains if all the time and effort devoted to increasing productivity results merely in your having idle men on your hands, a result which is demoralizing for everyone?

Linked with this point which has a bearing on the marginal use of foreign exchange resources, is the fact that following work study the output of all

machines in a production line may be increased by 100% or more, with the exception perhaps of one piece of equipment which may need to be imported. Without this importation the speed of the line cannot be increased. A good example in this field is form grinding equipment which would enable chucks and seaming rolls to be made by 2 relatively unskilled men rough turning them on a capstan lathe and finishing them by form grinding. Production rate: 2 per minute compared with the present rate of 2 per day by 3 highly skilled men precision turning, grinding and polishing.

I have the greatest sympathy for those entrusted with the thankless task of allocating scarce materials and scarce foreign exchange, but unless there is a more liberal attitude in the matter of recognising capacity increases resulting from ingenious efforts to increase productivity and licensing the importation of essential equipment not yet made in India, but not involving major foreign exchange expenditure such as twist drill grinders, temperature control instruments, hardness and other testing instruments, and special-purpose equipment, any general drive to increase productivity may fail.

While these areas of difficulty are important enough to draw attention to, they should not deflect us, as managers, from our task of striving after increased productivity. After all innovation is management's responsibility and a great deal of its *raison d'être* is the pursuit of increased productivity, that is, promoting the full, proper and efficient utilisation of men, materials, processes, machines, land and capital.

Now what can we as managers do to improve productivity in our enterprises?

a) To begin with, we should all sharpen our tools of management and control; and introduce new ones where necessary. I would say that manage-

ment accounting should be the foundation—it is essential to have a proper instrument of measurement of production, activity, plant utilization, efficiency, costs. If you are going to improve the productivity of your men, materials, machines, capital and land, you must have tools to measure the performance of your operations.

b) To bring about improvement, work study is one of the most important management tools. It has been fashioned specially for the purpose. It is an “analytical method applied deliberately and systematically to every problem with complete objectivity and fearlessness to find whether improvement can be made.” It is formally broken down into the components of method study and work measurement: method study first, because there is no point in measuring work that method study may indicate does not need to be done.

c) In applying work study, Russell Currie's six-pronged approach is worth repeating. I quote it with comments:

i) *Improve basic processes by research and development*: more of India's medium and large size enterprises should have research and technical development units. ii) *Improve existing and provide better plant and equipment*: often much can be done to improve upon, in our own factories and in relation to our own particular needs, the plant supplied by machinery makers. iii) *Standardise and simplify the product and reduce variety*: the key to variety reduction is often in the sales office. iv) *Improve the methods of operation of existing plant*: mostly by method study and quality control, particularly as applied to raw materials. v) *Improve the planning of work and the utilization of manpower*: by the techniques of work measurement and production control. vi) *Increase the effectiveness of all employees*: good morale, good working conditions, good incentives.

Work study will, *inter alia*, give us production standards and methods of measuring performance against standard. These can frequently provide a good basis for a production bonus scheme whereby the fruits of additional production can be shared with the workers.

So much has already been said on this subject in general terms that it may be worthwhile mentioning some of the conclusions of a particular industry which has been operating successfully a production bonus scheme over the last fifteen years. They may conceivably be helpful to others contemplating the introduction of this form of remuneration. The equivalent industry in the UK does not use premium or production bonuses; the scheme was developed in and for Indian conditions. The main difficulty was a very large range of specifications (hundreds of sizes and shapes of tins, with differing closures, some lithographed, soldered, welded, etc.) having different production characteristics, but it was possible to organise the factories' work in flow production lines so that each line manufactured a range of products of similar characteristics (e.g. a line making round tins of small to medium size). It was then possible to agree with our workers first upon production norms for each size group manufactured on the lines, and thereafter upon graduated bonus rates for production above the norm.

It might be helpful to mention some of the problems and conclusions we have arrived at: (a) First of all there is the major problem of setting standards and getting these agreed with the workers. Actually this provided the first benefits of our scheme because in the process we reviewed very carefully our methods and plant lay-out with two results: (i) We improved them greatly. (ii) There was a good Hawthorne effect on our workers who responded to the interest taken in them.

b) However, to get our standards accepted as reasonable we had to start our incentive payments for performance a little below standard. In the long run however performance, well above standard, was achieved. Speaking generally, it is not unrealistic to expect a general improvement of as much as 30% by the introduction of an incentive scheme though much more spectacular results may be achieved in certain lines.

c) We do not rate individual machines, rather the working group manning a production line producing a certain product range. This may mean groups of say 10 to 80 men. Working as a group engenders team spirit and healthy rivalry between groups and causes the application of social pressure to shirkers and late-comers. Each member of the group must be able to relate his individual efforts to the measured performance of the production line, the group as a whole is manning.

d) To help workers to relate their personal effort to the results achieved, we initially paid bonus on the following day. Now we find it sufficient to notify daily the performance of each line.

e) The bonuses should preferably be low-g geared because too great a disparity in payments causes heart-burning and discontent. They should not form a disproportionately high fraction of total emoluments because, if they do, hardship is caused when, through no fault of the worker, that is, shortage of raw materials, shortage of orders, or breakdown of equipment, bonuses cannot be earned.

f) We believe—though this is a controversial point—that workers whose work cannot be accurately measured should be paid some average bonus related to the performance of the factory as a whole, so that all feel they have a stake in the high performance of the factory.

g) Production bonus schemes are

usually, of necessity, complicated schemes. It is, however, absolutely essential that their basis should be thoroughly understood by the workers' representatives, and preferably by every worker.

h) It is also important that any change of standard which can only be justified by a change in production characteristics, must also be negotiated with them; for the whole success of this type of remuneration depends on mutual trust.

So much for company managements in isolation. How can their productivity efforts be intensified by cooperation with organisations outside their own? What facilities exist to stimulate ideas, to provide training in new techniques?

The most fruitful fields are participation in LPCs, in local management associations, and by our specialists, in such professional institutions as the Institute of Works & Cost Accountants, the Institute of Chartered Accountants, the Institute of Engineers, the Institute of Production Engineers, the Indian Statistical Institute, etc., for these bodies are concerned with improving the quality of management and developing the tools which make it more effective.

In our LPCs, we have got to avoid the pitfall, in our enthusiasm to get ahead with training programmes, of failing to cooperate with management associations and professional institutions. LPCs must work with them to avoid duplication and to ensure the most effective implementation of, and effective participation in their programmes. To be specific, if we are organising application courses on cost control for supervisors, we should do so in cooperation with the Institute of Cost & Works Accountants; if we are dealing with job evaluation we, as LPCs, should do so in cooperation with the Institute of Personnel Management, and so on, provided of course these institutes have local branches.

By participating in and encouraging

our executives to participate in these LPCs, management associations and professional activities, we shall achieve a very worthwhile pooling of knowledge; also its effective extension over a wider area of employees.

Needless to say we should put forward candidates to participate in the various productivity teams which are being organised by the NPC. The full benefit of these teams' activities will however only be achieved if the LPCs study their reports and take steps to implement their recommendations where practicable.

Finally, I would like to refer to the LPC programmes of inter-factory visits and in-country productivity teams. Even the most sceptical will agree that any competent industrial administrator will gain some inspiration by a general visit to someone else's factory even though it may not be in the same industry. How much more benefit then will teams of technicians and departmental managers obtain from organised visits contemplated under these programmes? The effectiveness of these programmes will be enhanced if the factory visits have behind them a clearly defined purpose. For example, in a circuit dealing say with Mass Production Techniques, the production processes at each factory

might be seen in full but only as a background to the study of a particular aspect of the subject. The emphasis in one plant, specially chosen for its proficiency in the subject, might be Production Control, the next Plant Layout, another Quality Control, another Materials Handling, and so forth.

Once it is appreciated that there is no question of giving away secret process data, and that a company may reserve the right to exclude competitors from visiting their factories, in-country study teams and inter-plant visits clearly provide a very effective means whereby industries can share knowledge for mutual benefit and whereby the more organised sectors can provide general industrial know-how to the sectors which are less organised.

The problems of economic breakthrough are so massive that what may be described as *professional cooperation is a national duty*. The NPC and the LPCs, with their aim of stimulating this cooperation and broadening its base, provide a fine meeting-place for every interest in the country which can promote higher productivity which is ultimately the only means of improving the lot of the common man and of raising dramatically his standard of living.

* * *

PRODUCTIVITY ATTITUDES

Rita : Then I must educate myself for it. Teach myself. Train myself.

Allmers : If this is in real earnest—everything you're saying—then there must have been a change in you.

Allmers : (Standing thoughtful for a moment, then looking at her) As a matter of fact, we haven't done much for those poor people down there.

Rita : We've done nothing for them.

Allmers : Hardly ever thought about them.

Rita : Never thought about them in sympathy.

Allmers : We, who had 'the gold and the green forests'—. . . .

Rita : Our hands were closed against them. And our hearts closed, too.

From Henrik Ibsen's *Little Eyolf*.

S U P P L E M E N T

F O R

T H E S E M I N A R

O N

Management

C C O U N T I N G and M A N A G E M E N T

T O B E I N A U G U R A T E D

B Y

T H E P R I M E M I N I S T E R

On 19 August 1960

U N D E R T H E A U S P I C E S

O F

D E P A R T M E N T O F C O M P A N Y L A W A D M I N I S T R A T I O N

M i n i s t r y o f C o m m e r c e a n d I n d u s t r y

G O V E R N M E N T O F I N D I A

“ . . . true Scientific Management calls for a unifying point of view and a unity of interests and of efforts seldom present in a particular establishment. The directors must understand it in purpose and principle; that it is a matter of development, not installation; that it is in the nature of an investment the returns from which, though great, may be deferred; that the development takes time and patience. The active managers, all of them, must understand these things and have great skill in developing new standards to supersede obsolete standards, and in substituting the new for the old without interrupting orderly processing. And especially must management be skilled in aiding workers to understand the purpose and meaning of Scientific Management and in maintaining their confidence in the purpose and in the management. Taylor said in his testimony that it takes two to five years—more frequently five years—to develop Scientific Management in an enterprise. It must be planted, and cultivated and fertilized, and pruned and shaped, like a shrub or tree. It is not something to be bought and installed like a boiler or a machine . . . ”

**Harlow S Person
From the Foreword to Taylor's Principles
of Scientific Management**

Accounting as an Aid to Management

GEORGE RONSON*

MOST under-developed countries have embarked on economic development programmes which have involved the establishment, or expansion, of various types of industrial enterprises. In many countries, some or all of the following types of enterprises are to be found: nationalized or new State-owned enterprises; mixed ownership or joint venture enterprises involving participation of the government and of private capital, either national or foreign; and private enterprises, mainly medium-scale and small-scale industrial establishments and cottage industries.

Many of these establishments have to cope with a variety of difficult problems, among which those relating to management are of particular importance. Many of the difficulties experienced can be traced to shortcomings in the accounting services. The problems in this field usually vary with the type of enterprise, its size and its stage of development. It is the purpose of this article to examine some of the accounting problems involved, on the basis of the experience of the author in certain countries of Asia, and on that of many people concerned with various aspects of industrial development in other under-developed regions.

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Accounting in Developed Countries

Before considering some of these problems in detail, it would perhaps be of interest to give an indication of the place that accountancy occupies today in many industrial concerns in developed countries.

Until recently, about up to the end of the First World War, many entrepreneurs in developed countries, particularly those in small business, regarded the cost of keeping basic accounting records as an unjustified expense or unnecessary overhead. In many cases, they would not have kept proper accounts had they not been compelled to do so by law for taxation purposes, or by the practice of banks or financial institutions as a condition for obtaining loans.

Even then, many concerns kept books mainly for compiling a financial statement once a year, often several months after the end of the financial year. Provided this statement showed a reasonable surplus, all was well. In many cases, when a concern had failed, it was found that accounting records were seriously incomplete or much in arrears, so that the proprietor of the business had been entirely unaware of his financial position until it was too late. Without realizing it, he had usually been drawing cash from the business at a higher rate than the profit earned would justify, or had accumulated excessive inventories of work in

progress or finished goods, or debts, and found himself unable to pay his creditors because of a shortage of ready cash.

While well managed concerns now attach great importance to the use of modern accounting techniques, it is of interest to note that, in a recent investigation, failure to keep and use good records is still regarded as one of the causes of insolvency in small manufacturing concerns: "inadequate or misleading financial records probably cause more trouble than any other error of management".¹

Since the end of the Second World War, much attention has been devoted to studies of the effective use of accounting techniques, including costing and budgetary control, as a means of exercising an effective control over the organization of the enterprise and, also, of raising industrial productivity. Such studies were carried out, in particular, by a number of productivity missions whose reports undoubtedly helped to stimulate a greater interest in the use of accounting as an aid to management; this particular development in the use of accounting has now become firmly known as "management accounting".²

The Institute of Chartered Accountants (England and Wales) has defined it as follows: "Management accountancy is the presentation of accounting information in such a way as to assist management in the creation of policy and in the day to day operation of an undertaking".³ The word "management" is used here in the widest sense. Management is the function of planning the activities of a business, and the control and execution of the plan. It includes

organizing, directing and controlling money, man, machines, material and methods to achieve a predetermined purpose with maximum economy. It is exercised, in varying degrees, by all persons who are responsible for others, which, in certain large organizations, covers a wide range, from the president or the chairman of the Board of Directors down to foreman or supervisor responsible for small groups of workers and/or machines.

The following accounting processes—which are inter-related—normally form part of a comprehensive management accounting service: (a) financial or historical accounting; (b) budgetary control; (c) cost accounting; (d) material control and stores accounting; (e) organization and methods of accounting; (f) internal or management audit.

Financial or historical accounting

This heading mainly calls to mind the traditional double-entry book-keeping systems recording historical financial transactions leading to the preparation of the annual manufacturing, trading, profit and loss accounts and balance sheet or similar accounts. Most organizations are expected, and sometimes required by law, to prepare these statements once a year, but the time taken to finalize and present them to the persons who should see them varies considerably. Unless the statements are prepared promptly, the details may have only a historical interest and be of little value for making policy decisions.

The modern trend and the well-accepted practice in many organizations is to prepare operating statements at least half-yearly or quarterly, and even monthly. In the latter case, the accounting organization must be streamlined and a number of estimated data must be used. *An estimated statement, if prepared promptly, may be of more value to management than one delayed for the sake of absolute accuracy by*

1. Woodruff, A M & Alexander, T G, Success and Failure in Small Manufacturing, Bureau of Business Management, University of Pittsburgh.
2. See, in particular, Anglo-American Council on Productivity, Management Accounting, Productivity Report.
3. Ibid.

an accountant who is not prepared to use estimates.

These accounts can be particularly useful to management if they include comparisons with previous periods and the budget estimates. Their usefulness can be further enhanced if figures are grouped and presented so as to show at a glance manufacturing, administrative and other overhead costs and selling and distribution expenses.

Budgetary control

Budgetary control has been defined as "the establishment of budgets relating the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results either to secure by individual action the objective of that policy or to provide a basis for its revision".⁴

One of the main underlying principles provides for the breaking down or controlling of expenditure under various sections of management responsibility usually called "cost centres". This means that the budget should be prepared — and, of course, subsequently compared with actual results — for the individual sections of an enterprise as well as for the whole. In this way, departmental executives and supervisors can be asked to contribute in the preparation of their particular budgets and be called upon subsequently to explain any unusual deviation of actual results from estimates. An important principle which must be kept in mind in this connection is that no person with managerial responsibilities should be expected to answer for expenditure beyond his control or to accept budgets imposed upon him from above without consultation.

The form in which budgets are to be prepared and the items further broken

down depends to a large extent on the type of business and the method of delegating responsibilities. A budget, when approved, is sometimes considered as an authorization to spend money. To a certain extent this may be true, but the main point to be emphasized here is that *a budget is a guide for action which, in actual implementation, must by all means be improved upon.* It is dangerous to accept the rigid principle that no expenditure can be incurred if it is not provided for in the budget, as the necessity for payments of an urgent nature may arise from an emergency or some circumstance not known when the original budget was prepared. It may be equally dangerous to spend money simply because it is provided for in the budget. Many concerns have a system providing for continual revision of budgets according to the level of activity actually attained, which is known as "flexible budgeting".

Cost accounting

Cost accounting has been defined as "the process of accounting for cost which begins with the recording of expenditure and income on the bases upon which they are calculated and ends with the preparation of statistical data".

This form of accounting provides a means of calculating unit or product cost data which are indispensable for determining selling price levels. It is often considered, however, that frequent calculations of costs of many items may not be justified and that sample costings taken at intervals may be as useful. Cost accounting is also used as an essential tool of financial and production control. It is, in fact, on this control aspect of the technique that more and more emphasis is laid today, particularly in the form of "standard costing," by means of which variances under headings of material, labour and overhead costs are regularly analysed; variations between actual expenditures and previ-

⁴ Institute of Cost and Works Accountants, *Terminology of Cost Accountancy* (London).

ously calculated standard costs are periodically examined, their causes ascertained and remedial action taken, as necessary. Cost accounting should preferably be part of the main financial accounting system; if it is kept separate, its records must be reconcilable with the latter.

In addition to their use in determining production costs and exercising control, cost accounting techniques provide other important data such as machine and labour productivity, idle time, ratios of waste and scrap, production costs in relation to output, administration and distribution costs, and so on. Cost accounting concentrates on analysing, sorting out and presenting facts and figures for the best use of management. In the larger enterprises, cost accounting systems are usually tailor-made for the particular project after a detailed review and study of its organizational structure and operational pattern.

The person responsible for cost accounting must be familiar with the operations of the business; he should work in close touch with technical officers, supervisors, foremen and even operators; he should be constantly looking for the type of data which will help management at a given time. On the other hand, technical personnel should be encouraged to ask the cost accountant for information and statistical data within their spheres of control. All returns and data should be systematically reviewed from time to time to make sure they are being used to advantage.

Material control and stores accounting

This branch of accounting comprises all records dealing with control of materials, including raw and accessory materials, spare parts, fuel and oil, manufactured goods, and the like. Apart from the keeping of the usual records of stocks received, issued and held, provision should be made for recording

such details as orders placed, and stocks earmarked for particular purposes.

Effective control of physical property and of records of all materials is most important because losses or leakages can be quite easily sustained, and these may have serious effects if not checked time. Regular review of stocks to disclose any excessive or slow-moving items is essential to avoid unnecessary immobilization of capital. It is also most important to forecast well in advance requirements of materials and spare parts, particularly when these have to be obtained from abroad.

In many progressive concerns continuous physical stock-taking, with perpetual inventory records, has replaced the 100 per cent annual or biennial stock-taking to avoid the concentrated effort needed to do this at one time. Stores accounting is very often a weak section in the accounting routine, and the introduction of a sound system is well worth the initial effort.

Organization and methods of accounting

In all the forms of accounting mentioned previously, books have to be kept up to date and the accounting organization streamlined to produce returns promptly and regularly. Producing records on time is vital if they are to be of the best use to management.

This may entail using modern aids such as listing, calculating and book-keeping machines, which speed up and remove drudgery from routine analysis work and calculations. The introduction of the latest types of stationery and books and the use of expenditure and income code symbols instead of descriptive headings save clerical effort and expedite routine. In larger concerns, punched card machines are also used extensively. Large organizations usually maintain an appropriate unit which ex-

amines and reviews all procedures and methods.

As intimated before, accountants and staff should study the technical side of the business and learn to appreciate the points of view of the management and production staff, if they are to serve the organization to best effect. A point should be made of carefully discussing all new forms and returns with those concerned before they are introduced, in order to avoid misunderstandings. This human relationship aspect is of considerable importance.

Internal audit

In addition to the audit done by external auditors, the internal checking of records is a valuable aid for control within the organization. Internal audit, which is usually done on a selective basis, should include all financial, stores and costing activities.

The function of internal audit has been recently enlarged by a new approach which is sometimes referred to as "management audit". It consists essentially in presenting to management an independent review of certain aspects of business performance and an evaluation of the facts revealed. Such review provides information on weaknesses and difficulties in the operation of the organization. It may reveal the causes of delays in processing orders and sales, of excessive scrap, of excessive variations in the rate of activity of machines and/or operators, or the extent and causes of absenteeism. It may provide answers to such questions as whether purchasing functions are operating properly, whether overtime is justified by increased production, whether office procedures are working smoothly, or whether larger stocks should be built up.

Management Information

It may now be appropriate to consider the types of information that the

accountant or controller should be regularly providing to management. The form and detail of such data will vary according to the level of management concerned. "Top management", for example, will be concerned only with vital summaries or trends, whereas lower levels will require more detailed and more voluminous information concerning their particular sphere of responsibility. It is, therefore, essential that statements be prepared in such a way that they are clearly understood by the persons expected to use them.

No hard and fast rules can be laid down about the information that should be provided, as this varies with the enterprise. The following are some examples of the types of information more commonly supplied.

(a) Monthly statements showing production, income and expenditure, under main headings, with profit or loss figures, to permit easy comparison of results with budgets and preceding periods. Cumulative totals from the beginning of the financial year, or, better still, moving annual totals, that is, for the previous twelve months to the date of the account, should be given, as monthly figures by themselves do not always indicate the trend, particularly if there are seasonal variations.

(b) Statements showing profit return on capital invested. These may be broken down under divisions of activity, and should include comparisons with previous periods.

(c) Periodic statements showing calculations of actual production unit costs of articles manufactured. These need not necessarily be prepared every month, as sample costings may suffice, particularly if provided for the purpose of reviewing selling prices. Again, comparisons with previous figures or standards should be made. All new products should be costed as soon as possible; this should also be done when there have been changes in methods of manufac-

ture, or major variations in prices of materials or other items of expenditure.

(d) Breakdown of sales figures by products and areas of sales, quantities and values, compared with targets and previous periods.

(e) Monthly summaries of stocks and work in progress inventories, compared with agreed targets of maximum or minimum holdings, and with previous periods.

(f) Details of outstanding orders to be fulfilled and workload available. These data are necessary to keep an even flow of output and avoid under-production or over-production.

(g) Data on labour productivity, required to ascertain extent and causes of excessive unproductive time, absenteeism, and the like. The extent and need for overtime should also be reviewed.

(h) Data on the rate of machine utilization. These are required to maintain production at maximum capacity.

(i) Statements giving net liquid asset position, including available balances of cash on hand and at bank.

(j) Schedules of overdue debts, required to maintain a sound credit control system.

(k) Graphs and charts showing such key data as production, sales, profit or loss, outstanding orders.

To sum up, an efficient management accounting service should present all or most of the following features. Accounting books and records must be kept up-to-date, so that financial statements can be prepared frequently and promptly. There should be a sound system of material control and stores accounting providing for perpetual inventories and up-to-date stock data. Some form of budgetary control and cost accounting should be in use. The accounting department must be well organized with staff trained to produce figures quickly

on set target dates; the use of modern forms and machines can help to do this. An internal or management audit service should be available in the larger organizations to carry out checks and investigations for the use of management. There must be a sound and efficient organization, providing for adequate delegation of authority to take action on the accounting data provided. It must be stressed that the best systems of accounting are of little avail unless management at all levels is prepared to demand and use the information.

Management Accounting in Under-Developed Countries

The state of accounting in under-developed countries usually depends upon the availability and background training of both management and accounting personnel, and varies with the type of enterprise.

New State-owned enterprises

It often happens that the staff lacks practical experience not only in accounting but also in many other fields of management. Sometimes, civil servants with little business experience are called upon to establish and operate accounting systems in accordance with government accounting regulations; the latter, as a rule, are hardly suitable for commercial purposes.⁵ Recruitment of

5. See, in this connection, United Nations Technical Assistance Administration, *Some Problems in the Organization and Administration of Public Enterprises in the Industrial Field*. United Nations publication (sales number: 1954.II.H.1). The following quotation illustrates this point: "Governmental accounting and auditing have the limited purpose of preventing over-obligation of appropriated funds and unlawful expenditures. Frequently, individual transactions must be approved in advance by representatives of the central control agencies such as Ministry of Finance or the Controller. Moreover government departments generally find it necessary

foreign accountants for the establishment of accounting systems and training of local counterparts who, later on, will take over the function, is often necessary.

Nationalised Enterprises

It often happens that government financial regulations and civil service personnel are introduced in the enterprise. The regulations may have to be used by persons unaccustomed to them, and the new personnel may experience, in the beginning, difficulties and frustrations. However, when well established procedures are continued and kept up to date, the situation is usually satisfactory. The policy of leaving well enough alone may often be the best to follow in the beginning: introduction of improved methods may have to be deferred until a thorough study has been carried out and trained personnel made available.

Foreign Joint Ventures

Accounting systems are generally satisfactory when the foreign partner brings in managerial and technical expertise, including competent accounting, as part of the contract. Normally, suitable accounting systems, sometimes including standard costing, are set up and local staff trained with a view to taking over in the long run. Provision is also usually made to send senior members of the accounting staff to the foreign partner's country for specialized training.

Private Enterprises

The state of accounting varies generally with the scale of the enterprise.

to lay down rigid rules for the purchase of supplies, contracts, and so on, so that there is no risk of public money being wrongly expended or dishonestly used. These rules, however, may conflict with accepted commercial trade practices and hamper individual judgment and initiative which are necessary for the successful conduct of an enterprise".

The larger concerns often have fully qualified accounting staff, and are in a position to use the various techniques outlined above. In medium-scale enterprises, day-to-day control may usually be maintained with the help of a book-keeper or accountant. Budgetary control and cost accounting, however, are seldom undertaken.⁶ The accountant generally concentrates on the preparation of financial books and accounts; the concern's auditors are usually able to complete the annual accounts and, at the same time, to compute cost figures from the available records.

It is in the small enterprises and cottage industries that the problem of keeping some form of accounts is the most difficult. While the manager or owner of a small concern is admittedly in close touch with day-to-day routine, and may not require all the returns necessary to the operation of larger enterprises, even a minimum system of accounting is often not maintained. In most cases, the smaller enterprises cannot afford to hire book-keepers or accounting consultants.⁷ At best, a professional auditor is employed once a year; in other cases, for instance when a loan is applied for, local firms of professional accountants are called upon to prepare the financial statement required by the bank. Most of these enterprises are obviously in need of assistance; this can generally be provided in the form of management training and should con-

6. The use of budgetary control and costing, particularly standard costing, in the smaller enterprises, is discussed in a booklet entitled "Management Techniques in the Smaller Enterprise" published by the British Institute of Management. It is a reprint of a paper prepared under the auspices of the United Kingdom for the Tenth International Management Congress of the International Committee for Scientific Management, held at Sao Paulo, Brazil, in February 1954.
7. In general, the overhead cost of producing data is to be related to the latter's usefulness to the enterprise.

centrate on the simpler techniques. It is likely that it would be quite difficult — though desirable — to generalize the use of more refined techniques, such as budgetary control and costing, among owners of small-scale enterprises. Selling prices are generally determined more by local market conditions than by costing calculations, and *the owner seeks essentially to make a living rather than maximize profits*. He should nevertheless know, even roughly, what his product costs to manufacture so as to be able to ascertain the available margin between cost and selling price at various levels of production. Assistance with costing might be conveniently provided to enterprises belonging to co-operative schemes, and extension of co-operative services in this direction should be encouraged. The questions of training and assistance are discussed below in more detail.

Government Enterprises

In the following section, some problems that have been faced by a number of industrial enterprises in under-developed countries are reviewed to illustrate the role which management accounting can play in industrial development. The examples concern government industrial enterprises; it is considered that a brief review of their particular problems may present a greater interest to authorities in charge of industrial development in various regions than a discussion of problems facing private enterprise.

In one country, construction of a large government factory was begun without having the accounting resources necessary for calculating the initial capital building costs or allocating costs under the various departments of the factory. Such calculations would have required a progressive analysis of expenditure on direct labour, materials and other costs on individual sites by an accountant who should have been in office from the very beginning of construction.

There was, at this critical period of construction, a shortage of experienced accounting staff and even of clerical assistance, and only essential day-to-day accounting requirements could be met. The system of material control was most inadequate, and procedures had to be outlined and established and store-keeping staff trained in their use at a late stage in construction. As priority had to be given to establishing a basic financial accounting system, the development of costing and other management control techniques was delayed. This state of affairs would have been avoided if it had been possible to train local accountants well in advance of starting the project or, alternatively, if a foreign expert had been engaged in the early stages to set up adequate accounting system and, at the same time, train local staff.

Another example is provided by a government-owned textile factory which had been in operation for about five years. During that period, annual statements and budgets on a cash basis had been submitted under normal government budgetary rules, but compilation of the annual financial accounts was some years in arrears. As a result, the government management board and local executives were completely unaware of the profit or loss position. The lag in accounting was primarily due to the difficulty of obtaining sufficiently experienced accounting staff. A first effort was made to determine the capital construction costs and to break them down under departmental headings. A firm of consultants advised on a costing system and produced manuals for the accounting staff to follow. Because of the serious arrears of financial accounts, the cost calculations were either computed separately or based on data which were not up-to-date. The management soon realized that, in order to be of value, the cost figures had to be reconciled with results of production shown by financial accounts. In order to get up-to-date figures rapidly, monthly pro-

duction statements, partly based on estimated figures, were prepared. The statements included details of production of yarn and cloth and percentages of waste. A breakdown of income and costs in terms of weight of raw cotton used, and comparative statements of expenditure related to production income were provided. Within a short period, the management was able to use these figures, investigate the unusual variations which they revealed and take remedial action.

Admittedly, this was a rather unorthodox approach to the accounting problem. There was no use waiting for the arrears of records to be cleared and estimated figures proved to be more helpful than out-of-date information. The factory management is now developing a new form of process accounts which, in due time, will provide a foundation for a standard costing system.

A further example is the case of a government brick and tile factory, where the accounting system was modelled on government accounting procedures, the preparation of the financial statements—profit and loss account and balance sheet—was very much in arrears, and no reliable costing could be undertaken. Remedial action consisted in compiling budgets at various levels of production, and preparing for management a “break even” statement—showing the volume of sales corresponding to the various levels of production at which the concern would balance revenues and expenses. Plans were made for streamlining the accounting system in order to obtain up-to-date returns on which to base, eventually, a costing system.

In another country, the government operated a number of paper mills located in different regions. Each factory maintained local basic accounting records out of which monthly returns were compiled and sent to headquarters where the financial accounts were prepared. The finalization of ac-

counts at headquarters was very much in arrears, and management could be informed of production results and make comparisons with budgets previously agreed upon only many months after the end of the financial year. Individual factory managers could make only rough estimates of operating costs on the basis of information available locally. It was suggested that “process costing”⁸ be considered and record keeping largely decentralized to enable local managers to be informed of the financial situation of their plants.

A government-sponsored publishing and printing company compiled financial accounts on the whole of its activities once a year, some months after the end of the financial year, and had no reliable data on costs for determining selling prices. A revised system of budgetary and production control and costing was set up; budget responsibility was placed on heads of individual divisions.

In another case, financial accounts and various production statistics were provided to the management of a government-operated gunny bag factory. Decisions based on these data proved to be faulty; an investigation showed that the foundation of some of the figures compiled was not reliable and that the statements did not correctly reflect the factory's operation. A reform of the reporting system was suggested.

Promotion of Accounting

Any discussion of the problems of accounting in underdeveloped countries must touch upon the question of measures of promotion and assistance, of which training presents a particular importance.

8. A process cost system is one in which costs and quantities are collected by departments; the departmental costs are reduced to a cost per unit of production from which the average cost of any quantity of product may be computed.

As has been pointed out above, an efficient way of improving accounting in small-scale industries would be for enterprises in the same field to join in some co-operative or other association and obtain the advice of a specialist who could develop book-keeping and costing techniques on an industry basis. An effort of persuasion may be necessary, both to induce entrepreneurs in the same industry to co-operate in spite of competition, and to overcome their long-standing unwillingness to disclose private information.

An alternative approach would be to establish a technical advisory service, for instance in the form of a productivity or service to management centre, which would extend advice, among other things, on accounting techniques. Such a centre might have to be staffed, in the beginning, by foreign specialists who would train local counterparts. Provision of direct services may have to be supplemented by channelling requests for services to consultants already established in the country.

In the absence of such centres, established local consultants or foreign experts may be induced to assist by preparing booklets for individual industries in order to awaken interest in improving accounting procedures. They might also write articles of interest in local business journals, organize lectures and seminars, provide a question and answer service, and so on.

A more general measure consists in training: on the one hand, training accountants in their profession; on the other, educating managers to recognize the need for accounting data and to use such data in making policy decisions. Studying accountancy in universities and business schools should be encouraged. In some countries, it will be necessary to advertise the fact that the accounting profession is an important one and offers good career prospects. Academic courses should be supplemented by practical training in accountants'

offices or good business houses, as the possession of a degree or diploma does not necessarily provide sufficient background for assuming a responsible position in an industrial accounting organization. This is particularly important in under-developed countries, where young people with degrees but no experience are often called upon to assume responsible positions as soon as they enter a concern rather than join the lower ranks and progress gradually to more senior posts, as is generally the case in more developed countries.

The use of foreign accountants and professional accounting consultants in setting up accounting systems and training programmes had already been mentioned. Training can also be provided by sending trainees abroad. It must be emphasized in this connection that fellowships of one year's duration or less cannot normally provide the necessary practical experience even to personnel having already some knowledge of accounting. Two to three years at least are needed for specialized training in budgetary control or costing. Short fellowships, however, are useful to older, more experienced accountants to widen their knowledge of their particular job and, especially, to acquaint them with the latest technical developments.

As regards training of managers, courses, lectures and seminars should develop an appreciation of the value of accountancy among persons having managerial responsibilities. Recruitment of managers from the ranks of the more experienced accountants may be useful, as the insight derived from a critical approach to financial problems may provide a good background for executive positions. Closer co-operation between executives and accountants in reviewing and interpreting financial statements is desirable in any case.

As industrial programmes of under-developed countries increase in scope, greater claims will be made on services

of those—now in limited numbers—experienced in modern accounting techniques. It is the responsibility of governments, industrial and professional associations and educational organizations to ensure that sufficient emphasis is placed on measures to improve and extend accounting practices at present and to provide adequate numbers of trained personnel in the future. Under-developed countries should not be content with old-fashioned and out-of-date accounting methods, but should take every opportunity to use the now well-proved modern techniques. The introduction of cost accounting and budgetary control should be particularly encouraged. In this connection, it may be worth quoting from a recent publication of the International Labour Organisation: "The absence of good cost accounting often leads managements to attach too much importance

to economizing on labour, causing unrest and impaired relations, when a good analysis of costs would reveal that savings in other sectors such as raw materials or better machine utilization would reduce cost considerably more. Good costing would also reveal the cost of labour turnover, an item that most managements in countries where there is a surplus of labour completely fail to understand".⁹ It must be added, however, that the development of new techniques may have to take place slowly, and, in the early stages, in the simplest form possible, to allow accounting staffs to familiarize themselves with their operation, and management personnel to learn how to interpret the data.

9. "ILO Productivity Missions to Under-developed Countries", *International Labour Review*, vol. LXXVI, No. 1, July 1957 and No. 2, August 1957.

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" . . . the great loss which the whole country is suffering through inefficiency in almost all of our daily acts . . .

" . . . the remedy for this inefficiency lies in systematic management, rather than in searching for some unusual or extraordinary man . . .

" . . . the best management is a true science, resting upon clearly defined laws, rules and principles, as a foundation . . . the fundamental principles of scientific management are applicable to all kinds of human activities, from our simplest individual acts to the work of our great corporations, which call for the most elaborate cooperation . . . whenever these principles are correctly applied, results must follow which are truly astounding . . ."

Frederick Winslow Taylor
From the Principles of Scientific Management