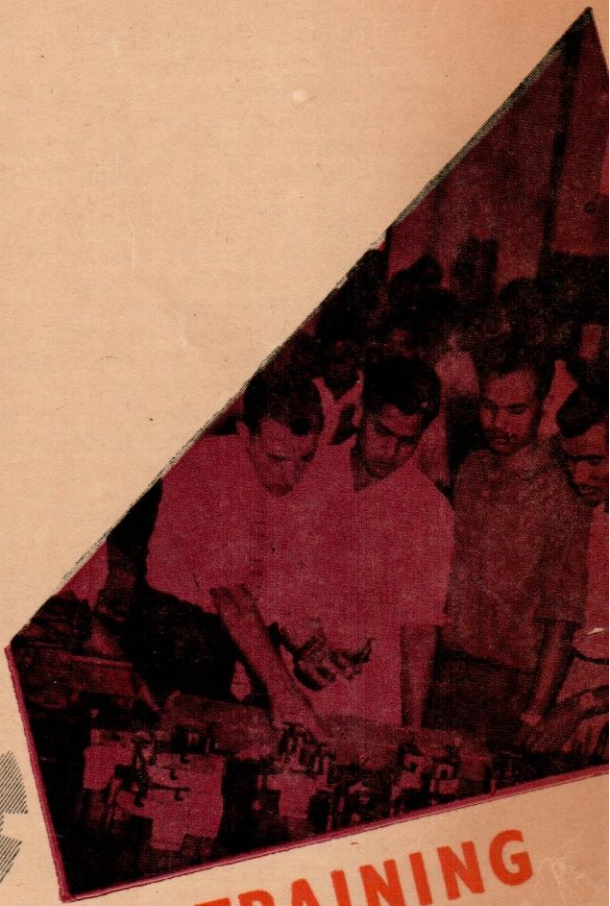
Vol. 5 No. 2 APRIL-JUNE 1964



योगः कर्मसु कौशलम्

...e Yoga is Efficiency in Action

SPECIAL ISSUE ON TRAINING

PRODUCTIVITY

NATIONAL PRODUCTIVITY COUNCIL JOURNAL

NATIONAL PRODUCTIVITY COUNCIL

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

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

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

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

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

Growing old gracefully . . .

Must old age make us infirm, grumpy and mentally dull? Not if we adjust ourselves to retirement sensibly. Most of us depend on work more than we realize, to express our personalities. In retirement, if we lack suitable outside interests, we may become bored and restless, and our feeling of being out of things may lead to imaginary complaints.

The most important thing is to accept the change gracefully. After 45, pursuits should be more intellectual, less physical. If you ever wanted to write or paint, do it now. This is the time to catch up on all the reading and gardening you dreamed of; to join dramatic and musical circles; to enlist in municipal or charity organisations where your administrative experience will be warmly welcomed.

Keep the mind active while the body relaxes. Avoid emotional upsets and spare your heart. Don't overtax your body or its organs. Don't overeat, don't overwork. Violent exercise is best left to the younger generation. Light exercise, the more simple sports and walking are for you. Above all, the best insurance against depression and feeling out of things is to have a yearly medical check-up, and follow your doctor's advice.

Consult your doctor

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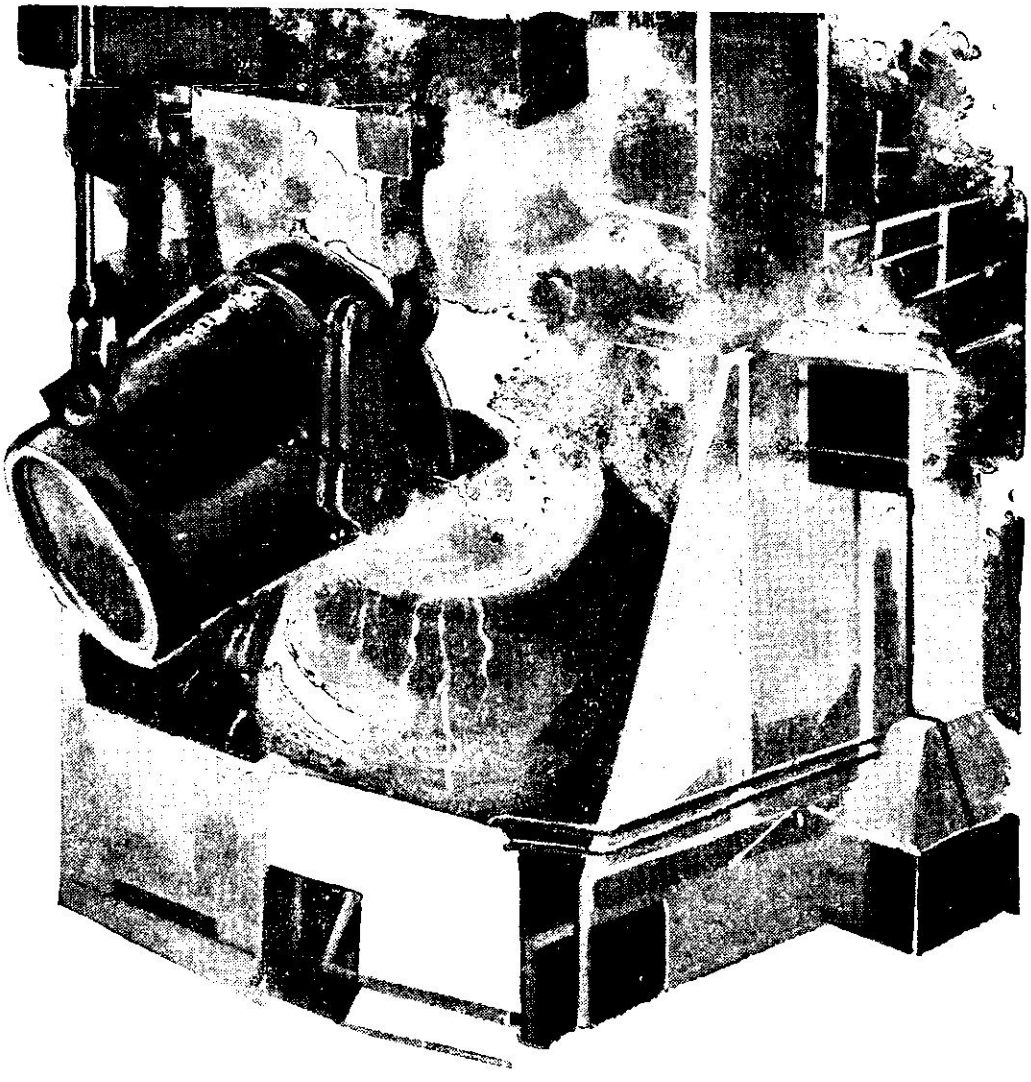

BOKARO

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NPC QUARTERLY JOURNAL

PRODUCTIVITY

A few recent opinions

"I would submit that the effect of the productivity movement has been well spread out in the small-scale industries, and that will be clear from the Journal published by the National Productivity Council".—*Statement of Sri Nityanand Kanungo, then Minister of Industry & President NPC, in reply to a starred question in the Lok Sabha on April 24,* 1964.

"...I have always looked forward to seeing this Journal."

SS Khera, Cabinet Secretary

"...Once again I have to compliment you on the NPC PRODUCTIVITY Journal".

Russell M Currie

"...latest issue of your journal indeed is put together with the most professional skill..."

Dr JW Strobl, Press Bureau of German Industry, New Delhi

"...We have greatly admired and would like to congratulate you for its contents and presentation..."

Prof AP Kanellopoulos, Economikos Athenes

"...I have looked at it with great interest, and consider it is a very creditable publication..."

GS Sanders, Urwick, Orr & Partners Ltd., London

"...I feel that you have done a very good job..."

Alec Miller, Chairman, Institution of Production Engineers

"...This Journal makes very interesting reading..."

EA Brackley, Metal Box Company of India

"...This number (Special Issue on PRODUCTIVITY AND THE ENGINEER) has a high demand in the market".

Shahid Pravin, Regional Director, NPC Calcutta

"...I must compliment you on the excellent material incorporated in the Special Issue on PRODUCTIVITY AND THE ENGINEER..."

AN Saxena, Regional Director, NPC Kanpur

"...I find the Journal very interesting and instructive..."

NR Rao, Deputy Director of Supplies & Disposals

"...I have found in it a book full of excellent articles, articles that will be of immense usefulness to my son in the future..."

NO Gale, Burnpur

Productivity In The News

A Productivity Formula

"It is futile to discuss the past. Efforts should be concentrated on doing the right thing in the future."

—From a statement of the late Prime Minister Nehru

Incentives for Quality Control

The Central Policy Advisory Committee on Quality Control decided at its meeting in Bombay on April 30, 1964, to draw up a plan to give rewards to manufacturers ensuring quality control of their products. Dr CD Deshmukh, Chairman of the Committee, remarked that "in India, both quality and productivity are at a low level."

Productivity Neglected

"...possibilities of so organising the forms, processes and institutions of development as would ensure rise in levels of income and productivity for large sections of the population have tended to be neglected..."

—Tarlok Singh in the Yojana

The Most Productive Persons in Indian Economy

In the Madhya Pradesh Vidhan Sabha (State Legislature) a member remarked that in his next birth, he would like to be "either a sub-inspector of police or a minister..."

Incentives at Heavy Electricals, Bhopal

The agitating workers have placarded this slogan in Hindi—

Raghupati Raghav Raja Ram
Jitne Paise Utna Kaam

Broadly translated, it means

Blessed be the great god Rama
We shall work as much as we are paid.

Training in Public Relations

Sri JL Hathi, Minister of State for Home Affairs, informed the Lok Sabha on Wednesday (April 22, 1964) that the Government of India was likely to include a course in showing courtesy to the public in the syllabus for Indian Administrative Service trainees. He added that this was being done so that the conduct of IAS officers could be shaped from an early stage.

Socialism now is Just Productivity

"...the new technologies themselves provide a contemporary re-interpretation of traditional socialist concepts..."

—The New Statesman

Decimalisation of Time

Decimalisation of weights and measures has, it is rightly claimed, led to increased productivity. Now there is a proposal to decimalise Time. *The Economist* (London) has published the following two tables, which give a broad idea of the decimalisation process and relationship to the Old Time System. The New Day will be called the Gut, equivalent to a little over one-third of the Old Day. The year, however, will only change its name to kilogut, but will remain equal to the old 365 days, probably because the solar system is resistant to decimalisation. As it will work out, sunrise and sunset will be rather violently disturbed from day to day, but that doesn't matter: the modern man hardly sees the sunrise, and the sunset is no longer the limit of Man's Productive Day!

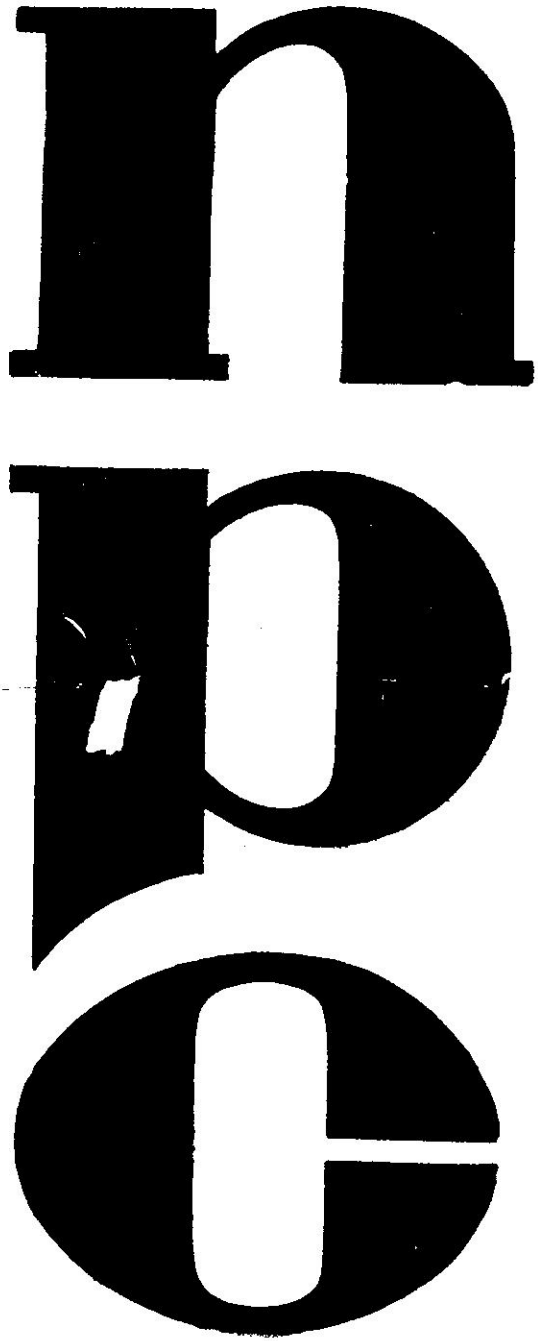
TABLE I

1 millennium	=10	centuries
1 century	=10	decades
1 decade	=10	years
1 year	=10	months
1 month	=10	weeks
1 hour	=10	minutes
1 day	=10	hours
1 week	=10	days
1 minute	=10	seconds
1 second	=10	thirds

TABLE II

1 millennium	=10	centuries	
1 century	=10	decades	
1 decade	=10	years (Kiloguts)	
1 year (kilogut)	=10	hectoguts =365	old days
1 hectogut	=10	dekaguts =36.5	,,
1 dekagut	=10	guts =0 .365	,,
1 gut	=10	centiguts =0. 876	,,
1 centigut	=10	milliguts =5 .256	,, minutes
1 milligut	=10	miniguts =0.5256	,, ,,
1 minigut	=10	microguts=3.1536	,, second
1 microgut		=0.31536	,, ,,

national productivity council journal
PRODUCTIVITY volume 5 number 2



Jawaharlal Nehru: The End of An Age

special issue on training in industry

April-June 1964

editor DH BUTANI

Illustrations In This Issue

PRIZES FOR IDEAS

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

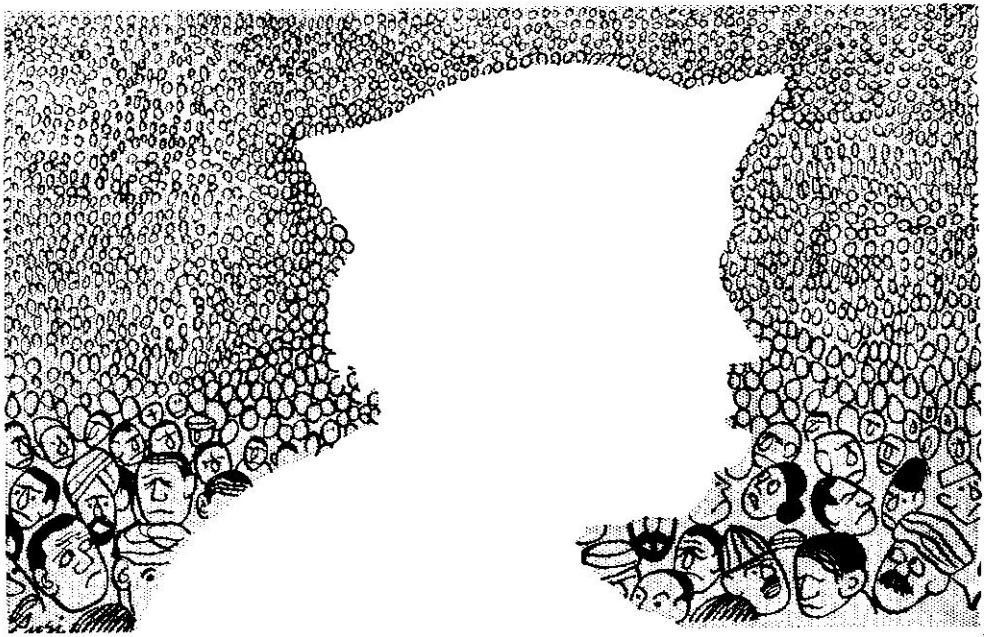

РУКНА
РЦ

The inauguration of the Prototype Production and Training Centre, Okhla, by Prime Minister Nehru (Mar. 2, 1961). India's new Prime Minister, Sri Lal Bahadur Shastri, is seen on the extreme right.

Jawaharlal Nehru

(Nov. 14, 1889—May 27, 1964)

"'Tis Death is dead, not He"



THE END OF AN AGE

IT is difficult to write about Jawaharlal Nehru, for he was no ordinary mortal. In many respects, he touched the highest watermark of human evolution. It would be difficult to find in recorded history a combination of Nehru's talents—utter selflessness, a mastery of statecraft, the deepest humanism—one really does not know what to say. Thinking about him, we feel like Lilliputians before a terrific Brobdingnagian: the sheer stature of the man is frightening and all that we humble mortals can do is to bow down in all obeisance to the memory of the man who loved us and worked for us for many decades. He has placed us, our children and grandchildren under a burden of debt which cannot be paid.

One thing surely we can do is to hold fast to his ideals, the primary one being to admit no second to the love of the country. In a famous speech long long ago, when accused of being pro-America or pro-Russia, he asked: "Why can't people imagine that I am pro-India"? The fact is that he loved the country and its people with an almost immortal passion. None of us of course can ever conceivably equal him, but there is one thing we can do: hold together like a man in defence of his secular ideas, in defence of the country's territorial integrity, and be on jealous guard against any disruptive elements that might possibly take advantage of this national catastrophe.—D.H.B.

"We Cannot Speak Our Grief"*

We had not thought to see this day so soon
When India's son so loved should fall asleep,
His eyes are closed, he lies with garlands strewn,
We cannot speak our grief—and so we weep.

PRODUCTIVITY: A BUNCH OF NEHRU'S UTTERANCES

"...I request you to forget all differences and think of nothing but crossing the river and reaching the other shore..."

* * *

"...**To hell with the man who cannot walk fast...We want no sluggards. We want no slow people who always complain...I want men who work as crusaders. Can you conceive of a bigger thing than to build up this immense country of ours?...Let the weak and the slow and the lazy go to the wall...**"

* * *

"...We have to prepare ground for our next jump, and not the next step...The devil is at our heels...I should like you to have this kind of feeling...I want work and work and work. I want achievement...I want you to do big things. I want you to build up India. That is the spirit in which you have to undertake this job... Let us go swiftly and definitely in the direction of a socialistic economy..."

* * *

"...**Apart from the practical results which we have achieved, and these are considerable, there is something even more important, even though it cannot be measured and weighed. This imponderable factor is the spirit of the people, the removal of inertia in thought and action, the development of a team spirit in national work and a sense of partnership in great undertakings...**"

* * *

"...We must realise that this is an age of dynamic change, and we have passed the stage when a few persons, whether they call themselves Government or captains of industry, could control the many-faceted life of a country and lay down the decree. One has to find an equilibrium among the various forces at work. In finding this equilibrium in a democratic country one has to take the vast masses of the people into confidence. One has to produce a sensation in them that they are partners in the vast undertaking of running a nation, partners in Government, partners in industry..."

* * *

"...**What really comes in the way of achieving our objective is a certain inertia to do things, a certain looseness in our working, in our structure, in our economy. I am not in favour of putting too great a burden on anybody, but this kind of looseness in work, in management, and in everything, is neither refreshing nor productive...**"

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*This poem, written by a Commonwealth citizen who happened to be in Delhi at the time of the Prime Minister's death, is reproduced here by courtesy of *The Statesman*.

NATIONAL PRODUCTIVITY COUNCIL JOURNAL

VOL. V SUMMER 196

PRODUCTIVITY

THE RIGHT TO TRAINING

Ever since its inception in 1958, training has been the Prime Card of the National Productivity Council, for it constitutes the limiting factor to the intake of Productivity Techniques. The issues involved, however, are of tremendous social significance, for the basic fact that holds up not only a significant rise in productivity but the direly needed mobilization for defence and development is that we are by and large an untrained nation, untrained in the tasks of modern life, untrained not only in skills and techniques but also in the attitudes which make up for a fruitful and productive life. "It is", as Wellens has said in a recent publication on the Training Revolution (reviewed elsewhere in this Special Issue), "not a problem about little boys in short trousers: it is about something basic and important that is happening to society itself."

"To each according to his capacity, there *must* be given by means of an adequate education and occupational training, the opportunity to climb the ladder of general and occupational instruction from the lowest state to the highest". This important statement occurs not in Marx's Communist Manifesto nor in the reports of the Indian Planning Commission but in an important policy document of the European Common Market. The underlying truth is "*that adequate basic education and occupational training is one of a man's natural rights*, for training alone gives him the right and the opportunity to make the maximum contribution of which he is capable".

We Must Educate Our Masters

This not only indicates the intimate relationship between Productivity and Training but also the much more fundamental proposition that the economic and social rights so grandly enunciated in the Directive Principles of State Policy depend vitally upon the quantity and quality of training and the speed with which we are able to do this job. The very survival of democracy depends upon Disraeli's significant formula: "*We must educate our masters*".

Even in Economic Thought, there has been in this context a significant shift in the dynamics of capital formation : a significant shift in emphasis from investment in machines to investment in human beings. Probably, nobody has put it more powerfully than Prof. Galbraith: "Both technological advance and improved skills and abilities are the product of personal development. *Machines do not improve themselves*...most technological advance is now the result not of the accident of inspiration or genius but of highly purposeful effort. Once we had to wait for the accidental appearance of Edisons and Wrights. Now through education and organised effort in a laboratory or experimental shop, *we get approaching the* same results from much more common clay. So it comes to this. We now get the larger part of our industrial growth not from more capital investment but from improvements in men...We get from men pretty much what we invest in them".

Many analyses have been made of the productivity of the US economy. It has however been insufficiently realised that a very substantial element in the productivity of that economy is the fact that most of the workers in the industrial installations of that country are high school boys and girls. Now it makes all the difference in the world if a high school boy or girl is handling a machine as against an illiterate man from the countryside. Often, we hear academic training being decried. Yet American business managers, hard-headed dollar lovers, are every day buying PhDs from the British market on fantastic terms, apart from their agents regularly campaigning at university campuses, trying to enlist university graduates.

Soviet Communism

Of course, the dimensions of our economy are quite different but the differences only serve to underline the urgent need of an astronomical investment in human beings, as the primary task of economic development. Citing the Soviet example Prof Gunnar Myrdal rubbed this point in a remarkable address to the Indian Parliament delivered at the special invitation of the Prime Minister: "...It is far from my intention to make propaganda for Communism, but on this point, simple honesty compels me to stress that the Soviet Union never made this mistake. In the time of the harsh and cruel dictatorship of Stalin, and in spite of the exigencies of the long civil war and the Second World War, and in spite also of an outmoded materialistic theory of capital formation, which marxism has inherited from

the classical economists and defines capital as only material goods, and while they were pressing up capital formation in that narrow materialistic sense to extraordinarily high levels, the Russians, at the same time, also continually, made huge investments in the human beings, what Marshall called 'personal' capital. The result is that the Soviet Union now stands with levels of education and health equal to, and in some respects superior to, what is standard in the richer Western countries."

It should be obvious to us after a decade and a half of economic planning that *the take-off depends entirely on Trained Manpower.* In fact, we need to rethink in terms of training, our major and intractable problems of large-scale unemployment, the massive need of rehabilitation of refugees from East Pakistan, the mobilisation of the enormous rural manpower, the preparedness for defence, and the whole host of problems that have now come to plague the Indian polity. The stark tragedy is that we are untrained in the handling of these problems and the mass of the people are also untrained in tackling them effectively on their own, at the ground level. Not only in government departments and factory establishments, but in the running of trains and buses, in house-keeping, in the conduct of meetings, seminars and conferences, we need training, for the wastages in all these lines and activities add up to what would be a really shocking figure.

The Population Explosion

This brings us to our major problem, the population explosion that has occurred in India during the last three decades. It is not weeping and whining that will save us from the Deluge: what will save us is an organisation of training facilities on a massive scale to convert this enormous population from a liability into an asset. To some extent, our Planning Commission was conscious of the underlying idea, for in the very first report on the First Five-Year Plan, the Commission referred to this enormous population as an Investment Potential.

It must be said to the credit of the European Common Market authorities that though Western Europe is no longer under the spell of the Malthusian Devil, they have really grasped the essence of the matter: "Occupational training makes a connecting link between demographic changes and technological development...An occupational training policy is required which will facilitate industrial development in certain areas by improving the quality of skilled labour, thus encouraging a more balanced geographical distribution of economic activities... In this respect the common policy on occupational training constitutes one of the main factors for equalizing living standards and working conditions of labour in an upward direction... Changes in the structure of agriculture are having their effect on the size of the labour force employed and special efforts must, therefore, be made to provide young people in rural areas with opportunities to train for occupations other than work on the land." It looks as though this were written specially as an analysis of the needs and problems of the Indian economy.

Gandhi's Nai Talim

It should by now be obvious that all this means a massive organisation on a national scale. In evolving a national system of training in a planned economy concerned with mass mobilisation of resources in a predominently illiterate community, the question of response at the level of the Central Government is a vital one. Is it to be divided between the Ministry of Education and the Ministry of Labour as at present in the United Kingdom? Or do we have an integrated educational system with the same background philosophy as Mahatma Gandhi's *Nai Talim* in which craft training and the teaching of the Three Rs are taught as part and parcel of an integrated system? These, however, are policy questions beyond the jurisdiction of a Productivity Council. Nevertheless they are vital to the success of the Productivity Drive.

In this context, an attempt has been made by certain abstruse thinkers to draw a line between education and training and on that basis to argue that vocational training should form no part of basic schooling. While we would not like to be involved in such a controversy, it appears plain commonsense that education has necessarily to be a preparation for training and both have to be integral parts of a well thought out social policy. This is obvious from the Robbins Report on Higher Education in the United Kingdom, which has major implications for industry particularly regarding the proposed facilities for technological and management studies. The Robbins Committee not only recognises that the improvement of technical skills would be the main objective of education but also that its aims must be:

1. **To ensure that the population contains an adequate number of cultivated individuals because not only is that good for them but also for society generally**
2. **To advance learning so that society can benefit from the development of knowledge, including in that purely technical or technological knowledge (This also influences productivity)**
3. **To transmit a common culture and common standards of citizenship to the community at large.**

Illiteracy at the Top

Prof. Edmond Denison of the Brooklyn Institution has attributed 40 percent of the annual increase in productivity in the period 1929-57 in the United States to the wider spread of higher education. These statistical findings have already received their confirmation in the extremely important productivity studies of Dr. Solomon Fabricant. This fact needs to be emphasised because of the very legitimate fear that "between illiteracy at the top and illiteracy at the bottom" this country is likely to get a raw deal, unless radical steps are taken.

This brings us to the important subject of training in management development which constitutes the real dynamics of productivity change. One skill that we lack and that is going to make all the difference is the skill of managing men. In his thesis on Economic Growth, Prof. Arthur Lewis referred to this as the crucial factor: the craft of managing men on a large scale as the limiting factor to growth in under-developed areas because the people of these countries lack the necessary experience. We have so far been running relatively small establishments but in dealing with men in the mass, our industrial managements both in the public as also in the private sector are seriously deficient. This requires training: A training not only in Production Planning and Control, in the understanding of markets, but more so in the understanding of men, their basic motivations and desires, the realisation that industry is not merely a production machine, but an area of partnership where the cake grows by sharing and men become brutes or citizens.

It's good to have goodwill
It's good to have enthusiasm
But it is essential to have training

—Jawaharlal Nehru

THE TRAINING REVOLUTION*

JOHN WELLENS

This is not a signed article. It is really a resume of the somewhat explosive ideas elaborated in pleasant journalistic style by Mr. John Wellens in his recently published book on *The Training Revolution*. The exposition of Mr. Wellens' ideas was considered necessary partly because this is a Special Issue on TRAINING but mainly because this country, a lot more than Britain, needs a TRAINING REVOLUTION. How far Mr. Wellens' analysis fits into the framework of the Indian economy can be illustrated from the reference to training of the rural population: "...Special efforts must...be made to provide young people in rural areas with opportunities to train for occupations other than work on the land...."

READING this rather controversial Book, one is conscious of some implicit political assumptions. However, that may be, one political assumption appears essential to Mr. Wellens' theory, viz., that a Government which organises this show on the basis of *Mr. Wellens' principle of Training for All Men* (all women too) *for all Jobs must have both the faith and the machinery of economic planning*. This of course very obviously includes economic forecasting, for it is an essential part of the Wellens theory that training must be direct and precise with reference to a fairly reliable appraisal of technological possibilities, society's future requirements, its population growth etc. Further, while training should be as long as necessary—depending entirely on job requirements—it should be made as short as possible, for modern life has become rather *fast* and the adjustment to new technological requirements is almost mandatory. Training should also take into consideration the aptitudes and possibilities of the individuals and they should be trained directly for the jobs that would be available in the future, each taking his place in the stream of economic life at the appropriate point and at the appropriate time. The Wellens Plan has thus a tinge of Platonism in it, but it is really, markedly practical.

The way Mr. Wellens has arrived at his theory and at his Plan may be analysed. In the first instance, Mr. Wellens has been particularly attracted to the American system of occupational training, and the new techniques in which the American educators are now experimenting: "The system of occupational training in America covers the whole field...there is good foremanship training, excellent management training and probably the best training and re-training of adults in the world...At this moment American education is in a seething state of productive ferment on the subject of techniques in education and training. This ferment has produced what can only be described as the greatest major break-through in education since the invention of printing...Television† in the service of instruction, teaching machines, programmed learning through a new type of textbook, teacher-teams, a brilliant perception that what is important in education is the creation of a 'learning situation'...These ideas and many more have richly fertilized American technique."

*PUBLISHED BY *Evans Brothers Limited, London*; 136 pages; price 12s. 6d.

†"A TV camera can take students into the most dangerous places in complete safety, to the bottom of the sea, if need be, into a poisonous atmosphere in a digestion tank, for instance, to see a chemical process in operation in industry. A fibroscope TV camera can enter the most inaccessible place—the interior of a complicated machine, the human body, any place whatever, provided there is a one-inch access. A TV camera can watch events which would destroy the human eye—the welding process, for instance." *Ibid., p. 104*

The author's revolutionary idea of planned *training for all* however, had its origin in what he calls the "little known aspect of Common Marketry": its document on manpower planning and occupational training which he quotes at length characterising it as the Workers' Charter. The training of the rural population for non-agricultural occupations quoted in the opening paragraph, is a Common Market Idea. In fact, the whole philosophy fits in rather remarkably into the basic needs of the Indian economy: "Occupational training makes a connecting link between demographic changes and technological development....policy on occupational training constitutes one of the main factors for equalizing living standards and working conditions of labour in an upward direction ...Occupational training must do more than enable people to earn a living; the development of a balanced personality is equally important...It must not be overlooked that the common occupational training policy involves, apart from its technical objectives, systematic efforts for cultural advancement which, of its nature, is bound up with a far-reaching improvement of working and living conditions..."To each, according to his capacity, there *must* be given, by means of an adequate organization of education and occupational training, the opportunity to climb the ladder of general and occupational instruction from the lowest step to the highest..."

This, in somewhat Marxian language, is practically a restatement of the philosophy underlining the Directive Principles of State Policy of our Constitution, the basic policies repeatedly stated in the Five-Year Plans of the Planning Commission, and the socialistic programme of the Indian National Congress. In fact, probably Mr. Wellens' own language would suit us extremely well: "...adequate basic education and occupational training is one of a man's natural rights...it is this that identifies man's proper human relationship with his industrial machine, not his supposed need for a corrective shot of liberal or cultural studies, but his need for the training which alone gives him the right and the opportunity to make the maximum contribution of which he is capable..."

We may now summarise what may be called the Wellens Plan or what he calls the Common Market Plan:

> **"Prepare the economic master plan, taking account of available financial investment, trends in the economy and other developments in the economic situation, national and international. The economy, in this sense, includes industry, commerce, the public utilities, public administration, and all other labour-using parts of the total structure of the modern state.**
>
> **"Break this master plan down into sectional plans—plans for more hospitals, plans for more schools, plans for new industries and plans for the extension or contraction of existing ones.**
>
> **"State the labour needs of each sectional plan.**
>
> **"Examine the population distribution and its likely changes over the period of the plan.**
>
> **"From this prepare an employment plan to match item 3 with item 4.**
>
> **"Turn these decisions into action through a wise and humane manipulation of the educational system and the system of occupational training."**

This probably would give us a reasonable framework for our Fourth Plan. Not only the details of the Plan (more hospitals, more schools, new industries etc.), but its basic philosophy suits the type of planning developed by us in the post-Independence period: "...the case for society to claim the right to use its educational system consciously as a means of socio-economic engineering..."

TRAINING IN INDUSTRY

K KHOSLA

Additional Agent, Tata Iron & Steel Company Jamshedpur

Industrial training is admittedly a major problem facing the planners in this country. The accelerated economic development visualised in our Five-Year Plans cannot be a reality, unless a great deal of effort and expenditure is devoted to the training of personnel required for our expanding industries.

THE THIRD FIVE-YEAR PLAN HAS MADE AN estimate of the country's technical training needs in the coming years. But as we have not yet perfected an organisation or the statistical base for a precise assessment of manpower requirements, the estimates are of necessity very rough, and will require revision in the light of further knowledge and experience. Qualitatively speaking, there are many factors that contribute to the volume and variety of our training needs. Training is necessary for those who enter industry for the first time. It is also necessary for those already employed. The rapid technological changes involving new plants and machinery and new processes tend to render the old skills obsolete and create demands for retraining. The heavy industries, their ancillaries, the engineering and chemical industries—all are, in many instances, new to this country and there is hardly any pool of skill and experience, which can be readily tapped to man them. Rising occupational mobility resulting from the enlargement of employment opportunities in the country has also contributed to the need for training and retraining at different stages. When a person changes his job, he is often in need of reorientation to adapt his skill to the new circumstances—the new organisation, its environment and managerial set-up.

No less acute are the training needs of industry at the supervisory and managerial levels. *The large number of workers who are entering the ranks of supervisors hold the key to production.* They have to be trained in supervisory skills, which are different from the skills of the operative. Those who are already in supervisory or relatively higher managerial positions also need training. They have to improve their human relations skills and learn newer techniques of planning and organisation to increase their effectiveness. They must also be able to adjust themselves to the changed socio-economic climate of the country. *The new complexities of management only serve to accentuate the need for training,* enlarging its scope and content at the same time. It is a need that must be supplied, inspite of the all round paucity of resources —time, physical facilities, trainers.

There can be no two opinions that in the context of our particular needs, *time is of crucial importance. As our plans progress, manpower emerges as a serious stumbling block in the way of our* economic development. New facilities cannot be commissioned or put into operation or made to attain their rated capacity, not only because of the paucity of raw materials, plant and machinery, transport or marketing facilities, but because of the shortage of skilled manpower at different levels. The experience of the public sector steel plants amply testifies to the gravity of such shortage. The American hesitation to commit aid for the Bokaro Steel Plant with-

out an assurance of the availability of trained personnel to run, is another painful reminder of the same fact. Never before was the need for training so urgent, so imperious as today. The question is, how to win the race against time.

It is a fact that skills take time to impart and such *time can be reduced only marginally.* Putting up facilities also take time, and so does training teachers. Nevertheless, it is possible to reduce training time by introducing *condensed, job-oriented courses*, with more emphasis on the immediate, practical needs of the job. In almost all engineering and artisan courses, such condensation may effect a reduction of training time by one-third or half. Besides, courses may be so arranged that they can be taken in one's off hours, without interfering with day-to-day work.

In some cases, supervisory or management courses are delayed because of the dearth of trainers. Here, the answer may be to make the training courses *more dependent on the syndicate and other methods of discussion, role-playing*, etc., involving member-participation in extension and depth, and *less on the lecture method* or availability of professional trainers, though some use of the latter will be essential.

Tata Steel has organised two management development programmes on a residential basis in the recent past, *relying heavily on the participative method*, and they have been acclaimed (by both the organisers and the participants) as highly successful. The fact is that there is a diversity of training methods and they can be used in different combinations—depending on the subjects to be covered, the age and calibre of the participants, the size of the group, and the predilections of the organisers and trainers. In *our present stage of management knowledge, it cannot be said with certainty that a particular combination of teaching methods is the best.* Different combinations may prove equally useful. In any event, as the participative or discussion methods, or role-playing, can help the participant to *develop his capacity to think, reason and analyse, to communicate, to exercise initiative and imagination*, and these qualities are essential for managers, we can lean heavily—if necessary, even more heavily than we would otherwise like to—on such methods for management training, at any rate, for the present. Later, when there is a sufficient supply of trainers, we may introduce or experiment with other combinations of teaching methods.

Nor must the possibility of *using the course-participants as trainers* be ignored. In fact, many of the future trainers may come from their ranks. Although this may lead, in the initial stages, to some dilution of the quality of training, it may be a good answer to the problem posed by shortage of time and trainers. And what may be lost in quality may, perhaps, be profitably made up through refresher courses, later.

The dearth of trainers is truly an acute problem in all spheres of training and education. With the vast expansion of training facilities, we just do not have enough trainers to go round. Secondly, the salaries and working conditions of these in-training establishments are generally poorer than in industry. As a result, there is an outflow of personnel from these establishments to industry, thus thinning the already depleted ranks of trainers. Conditions of service of trainers may therefore have to be improved. Besides, technicians and *managers may be 'drafted' from industry to act as part-time trainers* in formal institutions, so that their experience and knowledge may be made available to a larger body of people than in their own organisation.

The problem of inadequate physical facilities is more acute in relation to training in technical skills than for other types of training, like company information courses or supervisory or managerial training generally. *The recent Apprenticeship Act seeks to marshal the entire resources of the industrial sector for imparting practical training in technical skills.* This will involve in many cases, the construction of new buildings, laboratories and workshops which will make a heavy

demand on funds, building materials, etc., which are so scarce in relation to the needs of so many equally important projects. Here, a *proper allocation of priorities is the basic essential*, having regard to the fact that while training takes time to yield dividends, the absence or shortage of trained personnel may hamper the growth of industrialisation. Against this background, careful consideration should be given to the possibility of introducing shifts in existing institutions or holding sessions during vacations, so that it may be possible to train a larger number of students than now, or the same number of students in shorter time, according to specific needs.

An answer to the problems of time and trainers is provided by the recently developed technique of programmed instruction. In this method, the trainee is given an opportunity to acquire knowledge at a self-regulated pace through the study of specially prepared lessons. This makes it possible for each student to advance according to his own abilities. The method also largely dispenses with classroom training and lectures, thus effecting a great saving in time and in trainers. Nor does it disrupt the work of industry. The training is free from the routine of the class, and the student learns his lessons in his leisure time. Programmed instruction has been used with very promising results by many major industrial organisations in the United States of America and the United Kingdom. There is no reason why its possibilities should not be explored in this country also.

In the matter of supervisory and executive training, it may be useful to bear certain basic principles in mind.

Firstly, *no organisation should introduce training merely because it is the fashion to do so.* And if it is sold on training, it *must not borrow a package programme* in the belief that it must succeed, because it has succeeded elsewhere. It should assess the specific training needs of its personnel, and then design a programme to meet such needs. The following successive stages are generally followed in this context

i. **Organisation planning, that is, planning for future organisation requirements indicating the personnel needed, say, during the next five years.**
ii. **Preparation of a time schedule of replacements based on a study of the ages of the existing personnel, and also of a working list of persons who can be considered for filling future vacancies.**
iii. **Supervisory and executive appraisal, so as to discover what promotable material exists in the organisation. The appraisal should indicate one's strengths and weaknesses, his growth potential, what he needs to improve his effectiveness and how that need can be satisfied.**
iv. **Development of a training programme designed to supply such need.**

Secondly, *training must not be viewed in terms of a course.* It is a continuous process and different programmes must be devised to suit different levels of experience and maturity. A programme that may be suitable for middle level managers will obviously not be suitable for top management.

Thirdly, *training should not be regarded as an end in itself*, but only as a means. It should aim primarily to improve the performance of the trainee in his present job and, secondarily, to prepare him for higher responsibilities. This distinction between the primary and the secondary objectives is important. For promotion cannot be certain in every case, and, in any event, it is one's current performance that will largely determine his chances of promotion in the future. First things must come first.

One can even go further and say that it would be *advisable to disabuse the minds of the trainees of any impression that the course would bring them automatic promotion or advancement.* For if such an impression is allowed to exist and is eventually falsified, the result would be *disillusionment, an actual lowering of the morale of the participants.*

Fourthly, similar disillusionment may follow, if there is a wide divergence between what the course teaches as right and what is actually practised in one's organisation. The course will have only intensified his awareness of such divergence, filling him with a new sense of dissatisfaction with the organisation. It is, therefore, necessary that *training should begin at the top which is the centre of policy making.* A trained top management will not only seek to stream-

line the organisation and *bring their professions into relation with practice,* but also give opportunities to lower levels of management to introduce new ideas and practise what they have learnt during training; *otherwise, training can only be a weariness of the flesh and vexation of the spirit.*

Broadly speaking, training programmes can be divided into three types according to their subject matter: Training in particular technical skills; training in company policies and programmes; and training in supervisory and managerial skills.

Training in technical skills aims at enabling a person to respond in a desired manner in a particular situation; it fails him when the situation changes. Training in technical skills, therefore, meets the demands of today, but seldom meets the demands of tomorrow. This limitation should be clearly kept in view and adequate steps taken to revise the content of technical training courses in accordance with changing circumstances.

Another common disadvantage of skill-oriented programme of training lies in its stress on particular ways of performing a particular task. *It tends to act as a block to imagination,* shutting out the very source of creative inspiration or innovation, so essential to progress. Such programmes should, therefore, also emphasise the necessity to look for new and better ways of doing a job, so that productivity may always be on the up-grade.

Training in company policies and programmes is more an orientation than a training programme. Although such programmes fill an important need, they do not greatly enhance the individual's ability to contribute to the organisation or its productivity, except indirectly through the development of a sense of belonging to the organisation.

Training in supervisory or managerial skills is the area where further breakthroughs are possible for the attainment of higher industrial productivity. By giving the manager an insight into the intricacies of human relations, the complexities of modern management, and the environmental framework, such training can broaden his outlook, stimulate his capacity for adjustment to change, increase his general effectiveness, and help him to keep productivity on a rising level in the midst of constantly changing circumstances. In fact, *the measure of an industrial training programme may be said to be its ability to prepare a manager to face a change,* or even influence it to the advantage of his organisation.

At higher levels, such training tends to be less formal. The experience and maturity that goes with higher management jobs can be better acquired on the job, through greater delegation and decentralisation, through job rotation, and generally, by confronting the manager with a challenge and motivating him to accept it. Formal intensive courses of short-time duration can also help. Such courses may be internal or external. As the need for better management comes to be increasingly recognised, more and more of such courses are being organised in the country. Management in individual organisations should make an endeavour to study the approach and appeal of each course and coordinate it with its internal courses, if any, as far as possible.

To conclude, the problem of training is immediate and vast. It has many facets. But our resources are extremely limited. We cannot afford the luxury of waste. Every possible care must be exercised to ensure that our training programmes are so devised as to yield the maximum dividends at the minimum expenditure of time, effort and money.

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"Where's the dividing line between inspiration and brain-washing ?"

A PRACTICAL VIEW OF TRAINING

LT COL LD GATES

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ABOUT A DOZEN YEARS AGO IN THE UK, TWI (Training Within Industry) started to become known and with it, perhaps because of its proved value in wartime, came the word 'Training'. No one knew anything about it, but it *soon became the vogue to appoint a Training Officer, possibly an ex-service man.* Mostly, however, this new post was used as a means of promoting a passed-over foreman, or of getting a particularly useless Manager out of the way of others. No attention seemed to be paid to the special ability required for the job, and mostly these Training Officers were too low in the ranks of Management to have any influence on the levels where it was most needed. Training was therefore Job-Training only, until TWI came along. Then it was realised that *here was something that might be helpful to the oppressed foremen.* Thereafter, when there was any trouble, it was looked on as *a sort of "Industrial aspirin"*! *"Let's give the foremen some TWI"*, senior Managers would say, but they hadn't any idea what it was all about, nor did they realise that there were certain principles being taught in this which they themselves were not in fact using. As a result, directly after the course (a 'shot in the arm' effect) foremen started shyly trying to apply the principles taught, but as soon as they realised that their seniors did not do so themselves, they dropped the new habits and took the easy way back to the old. The attitude was *"He* doesn't do it, so why should *I"*.

At this time many firms told me that TWI had failed. Largely they blamed TWI, and not themselves for not giving it the necessary support. However one farsighted executive told me *"We started TWI from the bottom and it failed.* Now we are going to start all over again from the top". Those who did this succeeded to a degree, and the principles of the three programmes Job Relations, Job Methods and Job Instruction are now firmly established in these firms throughout their management and supervisory cadres. The reason for this, however, was not so much that the application of the technique started from the top, but that the realisation of its value by the top executive (or executives) engendered enthusiasm, and consequently by force of example, the correct attitude.

It was sweet music to my ears in those early days to hear the Managing Director say to a departmental Manager "Get the *facts* first, then you will be able to solve the problem correctly"! I would say to this particular man afterwards: *"One remark like that from you, Sir, can have greater value than the whole course itself"*. The actual value of a course lies in the use made of it by management, and *if top management speaks the course* language, the effect is great.*

Training, to be successful, must be a continuous day-to-day process. Managers are training their subordinates all the time, and *the value of the 'shot in the arm' type of course should be that it gives them more ammunition* for this very purpose. If courses are not so

* *Not Coarse!—Editor*

used they lose their immediate value, but there is *still much value in the cross-fertilisation of ideas and experiences* through association with people from other departments or firms.

This is a very big factor, and as helpful to a business executive as it would be to a staff officer in the army. For instance, the whole of my particular course at the Staff College, Quetta, *and* the two short courses run alongside it, were used to form the Burma Army. There was hardly a formation in which I did not know personally the Brigade Major and Staff Captain or their equivalents...

However, I am digressing a little. It was in this way that TWI, in those first years after the war, paved the way for more comprehensive management training and development later. Some firms drew up Management Development plans based on an inventory of age etc. Others took it further to a full scale Personnel Development Plan. In one firm in which I was personally responsible to the Managing Director for this very function, we analysed the future needs of *all* posts of any sort of responsibility, including key operatives (and even girl typist/secretaries) and for each ladder of development we set an annual intake, bearing in mind that for every responsible post held by an executive of over 45 we needed 4 trainees at the bottom, according to Colonel Urwick's findings (50% wastage on the way up, plus a choice between 2 at the top).

On the technical education side, we built a chart showing the kind of intake, the technical qualification required for each kind of job, and how further qualifications would be progressively achieved up the ladder of technical management by those sufficiently motivated to develop themselves. They were then encouraged to do this.

On the management inventory side (in which supervision was included) every departmental head was asked to make an initial assessment of each person under his control on a simple 3-point scale:

1 Outstanding
2 Satisfactory
3 Unsatisfactory

and further code numbers were used to indicate in which direction further development was necessary to improve each person's capacity —either for the job in hand, or for the potential job ahead. All this, together with age, service and qualifications was recorded on a large organization chart.

A skeleton chart was made to superimpose over this, showing the likely position in 5, 10, 15 years and this chart then became, in conjunction with annual appraisals of all concerned, the key to the Development Drive.

I think one of the most satisfying Training jobs I have ever done was at this particular time where I was doing a Job Study (Evaluation) of a certain department to establish the priority of jobs, largely for development purposes. There was a bad foreman who was hated by his team and production suffered. The foreman decided to leave and go back to his original firm. This was just as well, but no one had yet been trained as his understudy. The Development Plan had not started. The General Manager of the unit concerned picked a particular senior operative in whom he had faith, but was a little doubtful of him because he was very shy. He made him a temporary chargehand and asked me to see if I could help him.

Every evening after the shift changed I gave this man an hour's instruction in the theory of supervision, and he also related his practical problems to me and we ironed them out together.

What is more, during the shift I was actually with him, since I was doing Job Study most of the time, and was able to act as coach when needed. From being a man with his chin on his chest and eyes downcast, he looked up and straight, and threw his chest out. He doubled production, and had a most happy team and *this and his smile of satisfaction* and pride were good to

see. The General Manager chose well. All the man had wanted was confidence and this I helped him to get by this individual coaching process. He had all the rest, and *out it came*! The men of course helped him too. His confidence gave them confidence in him, and so he became a foreman straight away. I will always treasure this case in my memory as a most remarkable one.

Training, as a management technique, had now come to stay. Many Industrial Educational bodies sprang up after the war offering courses on various subjects, and the industrial psychologists had a particular lot to offer.

But after 10 years, firms began to realise that these courses, though most instructive, were too impersonal to any particular organisation, and needed to be supplemented by Management Courses within the firm itself. In fact it has now become the reverse. Outside courses are now largely considered as a supplement to the firm's own domestic efforts, and as much a part of 'broadening' in the Development Plan as are visits to other industries and foreign countries etc.

It was on this score that early in 1957 I joined a large Steel firm as Education Officer (and Vice-Principal) with the brief to assist the Principal to build up and run a Company Staff College, the first of its kind in the Steel Industry.

This we did and developed three main types of residential courses each of 3 weeks.

1 *Departmental Management (Established Management).*

2 *General Company Management (Potential Management).*

3 *Foremanship (1/3rd established, 2/3rd potential).*

Although the last item was my own personal responsibility both in the college and also in units (and I had the brief to train some 700 in five years!) I also helped the principal with the practical side of the other courses: TWI, Work Study, Job Study, Safety, Suggestion Schemes, Standard Costing were all covered. The basis of all courses was Case Study work and at this the principal was an expert, but throughout every course there ran a practical project as well, for the preparation of which I was responsible and which was dealt with by syndicates in progressive stages, until it reached a climax at the end of the Course.

For the foremen there was George Johnson, who invented a garden truck and wanted to know whether he could start up a business, and if so how to go about it. We made them work this out for themselves, having trucks we could take to pieces, measure, and weigh and put together again. *With* price lists and handouts, they made a forecast Budget and Profit and Loss Account for the year, and revised it later (second year) after TWI and Work Study had also been practically applied to the problem. They had to prove to themselves that the venture was worth-while.

The Management courses aimed higher. We had first to get ideas from the Technical Research Unit, and when we found we had something really promising, we then had to build up the brief by first going to our Engineering Research Unit for Plant details, and then obtain from the Librarian a brochure of all technical pamphlets and known literature on the subject, and also obtain reports from our own Market Research Unit as to the saleability of the product etc. The whole thing was largely in the air but the Managing Director saw in it a chance of getting his practical managers to *pull the bright ideas of scientists to pieces*, and at the same time cover the training purpose.

To set the example, for this management development effort, the Managing Director and the top 10 executives (of the Company of about 50,000 strong) came to the college for a course of 3 days every six months. This gave impetus to the whole work of the college, and *it was part of the development plan for each individual to want to get on a course. It was a necessary qualification for advancement.*

I remember being chosen as Methods of Instruction Officer at the Indian Military Academy when that new technique was brought to India. My Chief was very keen on these new methods and gave me the utmost support. Next door was another School and here also an Officer was chosen as Methods of Instruction Officer. But his Chief was not keen. He saw *no use in these new-fangled ideas.* What was good enough for him, when he was Chief Instructor at some other school, was good enough for him now. *My function flourished under the sunshine of my boss.* His gradually disintegrated under the leaden skies of indifference and disinterest of his boss. This is rather typical. Success in productivity as in other things depends upon one thing only—the impetus given from the top.

Before closing let us go back to the start: the success of job-training in a Workshop. Here the economic aspect can be readily appreciated. I remember some ten years ago being asked to help the foreman of the Butchery of a Food Factory over the training of six operatives transferred from another department. From the Work Study angle, they were being paid only the basic wage at the end of the week because their output unit hour (O/U/H) was less than 60 (60% of the possible). After one month's training through the medium of a chosen butcher who was able to demonstrate with patience the RIGHT METHOD (in the exact use of the knife for each part of the job), these operatives learnt a simple combination of skills in a month, sufficient to raise their production above 80 O/U/H and give them at least 1/3rd more pay at the end of each week. The Company benefited by more than 1/3rd more output with only the same overhead cost. The proof of the effectiveness of this training in the right method was to be seen factually in the weekly wages bills, and this was no exception. For example, 3 butchers taken in from shops in the town started work in the same way; had to be taught the right method, and then at speed. There were two other teams (of 3 butchers each) one working at a constant 100 O/U/H, and one at 90 O/U/H. It took 3 months to train the new butchers in the technique required, but at the end they found a constant half way between the other two groups—another practical proof of the effectiveness of Job Training.

The Personnel Department found that through this Job-Training (including careful induction) turnover figures were very much reduced (particularly with young people who are always changing jobs).

One last word. Sixteen years of experience in the Indian Army before partition proved to me that

1 **The Indian rank and file are more easily trainable than their western counterpart.**
2 **Human Relations, the basis of Indian Army tradition, would be equally effective in Indian Industry.**

This is why I returned to India after 10 years, and *expect that in my present job here I will see better results than I did in British Industry.*

There are great possibilities for Indian Industry to derive much more value out of the Productivity effort than has been achieved in the West, provided that too frequent legal interference does not act as a deterrent to progressive Industrial Relations Policies.

Even A Little Nonsense Has Productivity In It !

'A little nonsense, now and then, is no bad thing"—*Enoch Powell quoted in the 'Economist' (London)*

THE TRAINING CLIMATE

NITISH R DE

Staff Officer Indian Aluminium Calcutta

As with so many other management techniques, attitude towards 'training' or 'executive development' varies between two extremes. There are companies which are fond of externally run courses, seminars and programmes: they have a feeling that they are doing something. I know of one company which made about one hundred reservations for its junior and senior employees in a series of programmes scheduled for a year. There is nothing wrong with this scheduling as such but for the fact that the same company has been gradually curtailing its business activities on account of adverse operational results. We have to think it out: are formal training courses a 'wonder drug'? Then again, there are company executives like Mr Johnson of Subash Textiles, an efficient weaving master, who would frown upon and even oppose a TWI programme or a workers' training scheme sponsored by the Company's Training Officer.* It is not uncommon to come across hard-boiled executives who denounce training activities as a 'fad', useless, time-wasting, etc.

AS ALWAYS, THERE ARE ELEMENTS OF TRUTH at both extremes. One cannot seriously dispute the premise that the right type of training activities under proper guidance will immensely enrich a trainee in his knowledge, operational skill and attitude. Is it in doubt that in the highly specialised fields of scientific research, teachers like Max Planck, Madame Curie, Neils Bohr and in our own country Sir PC Ray and Sir CV Raman have, apart from their own brilliant performance, helped a great many scientists to achieve fresh laurels? The great masters thus inspired their proteges with their superior knowledge, authority and dedication to the cause dear to them. Similarly, one cannot underestimate the true worth of a Harvard programme based on case-study technique when it is remembered how much labour, planning and thought have been bestowed upon the formulation and execution of the programme. The very basic fact that a training programme is primarily aimed at strengthening a trainee's usefulness in his present and potential job level makes it welcome.

On the other hand, mechanical and formal approach to training activity will reduce it to a *useless ritual*, even worse. I may cite two instances from my experience. In a medium-sized engineering firm, a Labour Officer had been working for over five years, whose activities had rightly given the impression that *his existence was primarily on account of the requirements of the Factories Act.* Then, suddenly, a new Works Manager appeared on the scene and he felt that the Labour Officer could do a lot in the field of industrial relations. As a first step, he sponsored the Labour Officer to a course on "Communication in Industry". Back to the factory, fired with bright ideas, the Labour Officer started *firing instructions to line supervisors on Communication.* This created a furore and if anything, worsened the Labour Officer's relations with his colleagues. One could find excellent psychological reasons as to why the Labour Officer, whose energies were bottled up for five long years, behaved in this unusual manner, but the fact is that

**ASCI Case Collections, First series, reviewed in NPC Productivity Journal, Vol IV No. 4, p. 746*

he could not get at the heart of the problem: that it is *one thing to learn a technique* but it is *quite another matter to apply the knowledge in a factory environment.* The message of training would not have been lost on the Labour Officer, had the Works Manager taken some basic precaution from the beginning. As it is, the supervisors blamed the blinking training programme attended by the Labour Officer.

Take another case. One senior engineer in a big firm returned from abroad after attending one-year management development programme followed by one-year directing staff assignment in the same Institute. As soon as he returned, the Training Manager deputed him to a Seminar discussing evolution of personnel policy in a factory. *The Engineer felt bored* and his contribution to the Seminar was hardly worth anything. Firstly, he was *out of touch with the hang of things in India* and secondly, factory personnel policy was not in his line of specialisation. The Personnel Officer or the Assistant Works Manager in charge of administration would have been a better choice.

The point to make is that *a training programme must have a purpose* and that the basic fact is that *the climate management creates and the way the business is run are the controlling forces in executive development.* I can do no better than make a reference to Mr Robert K Stolz's article in the PERSONNEL, Volume 30 (May, 1954):

1. **Companies cannot develop executives: executives must develop themselves. As one company expresses it: "Executive development is from the inside out. It is first the responsibility of the individual himself". Each man must possess the native abilities required for executive leadership, and must have and apply fully the energy, drive, initiative and purposefulness required to bring out and develop his inherent talents.**

   A few years ago, a brilliant engineer in a manufacturing firm was promoted as Factory Manager in which position he was, as time went on, found to be somewhat of a square peg in a round hole. *As a desperate measure he was sponsored to a high-level executive development course in a well-known centre.* There was no improvement. The fact of the matter is that this middle-aged successful engineer had grown in stature over the years as a very able engineer, a line much to his liking, but did not aspire to managerial position nor did he develop the requisite qualities for the job.

2. **But companies can and do exercise considerable control over the development of executives through the business environment they establish: The way the management runs the business, *the philosophy and approach used to direct and reward men,* and the management methods employed control the freedoms, opportunities and challenges that men need to bring out and develop their potential.**

   Since the very success of a training programme hangs on this pre-condition rather than on the syllabus or on the methods employed in presenting the programme, it may be worth-while to know the attitude towards training as revealed in the career of the late Albert D Laskar who went into business at the age of 12 to become a multi-millionaire at the age of 35. Mr John Gunther, Laskar's biographer writes as follows:

   ".....Soon Laskar, the $ 1,000-a-week wonder boy realized that *Lord and Thomas* must have a full-dress copywriting department. But there were...no such things as copy-writers in those days. He sounded out Mr Thomas and came out with an idea: I want you to let me put up nine offices...and advertise for nine young newspapermen. Kennedy and I will start training them, because out of the nine we might only get three or four.

   Thomas agreed, nine candidates were duly found and the training session began. Laskar, with burning enthusiasm held regular classes after office hours, twice a week for four or five hours each time.

   This was the origin of modern copy-writing in the United States; Lord and Thomas was the first agency in America to set up a systematically trained copy staff.....Laskar himself, a great innovator of techniques, had an unexampled gift of finding creative people and getting them to work for him. Nobody ever hired better talents."

Here is a good example of the combination of Stolz's pre-conditions recorded above. It is, therefore, no wonder that Laskar could make *Lord and Thomas* one of the greatest advertising houses in the USA, and he became as legendary a hero in the advertising business as J Pierpont Morgan was in the

field of finance. His success lay in his ability to pick up his boys and then train them up.

The attitude of the top management to the day-to-day process of growth of the executive cadre is thus of paramount importance in the success or otherwise of a training project. An employee working in a restrictive climate, whatever be his native talents, which stifles his initiative and creative thinking and action, will decidedly respond poorly to a training assignment. At the most, *the training period will be a tension-release session and treated as a holiday-camp life.* Since such an attitude in a trainee will not bring about any welcome change of outlook in him, the employer will probably curse the trainee and shrug at the training programme.

I may cite here a case, which I hope is not representative. A firm having manufacturing interests in a wide variety of products has been rather conservative in its industrial relations policy and practice. Union-Management relations are far from harmonious in the factories controlled by the firm and the Personnel Manager of the group has always been on tenterhooks. *As a compensation (apart from periodical financial gains) the big boss has been sponsoring him to various training courses in India, and one trip to overseas.* Such a venture, I feel, is like pouring water on a sandy soil.

The elements that effectively provide the opportunities and challenges, men need to develop themselves can be defined and controlled, at least in large part. Experience indicates that the following are among the most important:

(a) **Policies and practices which place full responsibility for a job upon the individual and hold him accountable for results.**

(b) **Challenging jobs that require each man to stretch his abilities and apply the broadest possible range of talent.**

(c) **Character of manager-man relationship, particularly the extent of manager's ability and willingness to delegate, to set high standards and let men know where they stand.**

(d) **Practices and criteria used in awarding increased compensation and promotions.**

(e) **Willingness to face up to executive incompetency.**

(f) **Approach to the use of management tools.**

(g) **Degree of understanding among executives down the line of company objectives, policies, organization and how one's own job ties in.**

(h) **Spirit created by top management and the extent to which an atmosphere of entrepreneurial risk-taking, confidence, and encouragement is generated.**

As Stolz has himself mentioned, these are nothing more than the fundamentals of good management. It is thus obvious that the *basic requisite to ensure success of company-run or external training activities is to subscribe to sound management principles.* In other words, *a training programme, cannot by itself be a workable substitute for good management practices.* If somebody sets his hope that high he will be asking for disappointment.

After all, training programmes are aimed at fulfilling certain needs of individuals so that they can turn out to be better suited for the discharge of their present or future responsibilities. These needs fall under three headings:

(a) **Needs for improved social skills, such as communication skill, human relations skill and needs even more distinctly personal (for example, aggressiveness etc.)**

(b) **Needs for improved skill in certain managerial functions, such as, planning, delegation, co-ordination, control, training, evaluation etc.**

(c) **Needs for more knowledge, such as, technical knowledge, knowledge of company policies and procedures, knowledge of work of other companies etc. (Philip B Swain: Management Development at Boeing).**

For the benefit of a trainee it is necessary to identify the particular need or needs. The reason why I intend to hammer this point can best be understood from the two illustrations I can cite here.

CASE NO 1: The Training Department of a big organization suggested that a particular personnel officer from one of the plants be seconded to a training course aimed at imparting human relations skill. The appraisal of the person concerned pointed up to this need but the Personnel Manager vetoed this suggestion on the ground that *the person concerned was not smart enough to attend this course.* In other words, he would not be able to create a good impression among other trainees about this company. *Ultimately, a smart person was selected.* Now, the question is, is it an object of a training programme to create a public relations image of the Company or of the trainee?

CASE NO. 2: The Managing Director of a medium-sized firm is in the habit of attending practically all training programmes arranged in a particular region for senior executives. His intention, as far as I can make out, is to pick up business friendship with other executives to seek sales promotion. Now, this is probably adding a *new slant to a training objective.*

I would like to sum up my stand, which is based on common sense and my limited experience, with the comment that the success of a training programme will ultimately depend on the attitude of the management towards training as well as its policies and practices. The cart cannot be placed before the horse.

—❋—

Communication by notice !

THE RATIONALE OF INDUSTRIAL TRAINING

MANUBHAI M SHAH
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Like all underdeveloped countries, India is facing the twin problem of low levels of production and productivity. The expansion of production and the rise in productivity depend upon the supply of the traditionally classified factors of production. It has been found by experience and experimentation that these can be secured by more efficient inter-factor input ratios at a given stage of a country's/firm's economy. Variations in factor-combination may start a chain of effects which, when positive and leading to an optimal size, will reduce the unit-costs of production and customer-prices, stimulate demand, encourage expansion of supply, give a fillip to that particular unit/industry and generate momentum in related industries/organisations and the economy as a whole. However, for ensuring accentuated and continuous growth, it becomes necessary that each factor of production in itself becomes more efficient. This aspect may be expressed as intra-factor input-ratios. Industrial training should be viewed from this angle.

IN ANY INDUSTRIAL ESTABLISHMENT, the entrepreneurial layer of promoters and policy-makers constitutes a point slightly above the apex of the administrative pyramid. The latter is the multi-triangular structure consisting of the top executive as its apex, the decentralisation-of-authority-responsibility lines running downward through the middle and the supervisory layers of management as its skeleton, and the multitude of skilled and unskilled workers as its base. The concept of industrial training in its wider perspective includes the provision of training for all types of people working in different industries i.e. for the top, middle and lower management personnel, whose major functions are of decision/split-decision-making, execution and co-ordination, as also for the operative level employees in all industrial trades/crafts/jobs, whose major function is that of 'doing' or 'performing' the manual/mechanical work allotted to each one of them.

There has to be a fundamental distinction between the type of training to be provided for the executives—both line and staff—belonging to the former group and that for the operatives constituting the latter group. The former consists of advanced—specialist or general managerial—training, the degrees of sectional/sectoral specialisation depending on the job-assignments and the administrative cadres allotted. It is not intended to deal with this sphere of advanced technical/professional training in this short paper except to make a passing reference to the need for establishing a reliable correlation between the present and the probable future requirements of such personnel in terms of clearly defined specialisation-fields, cadres, industries and regions in the country and the expansion of the different institutions of advanced learning/training/research for the supply of qualified and efficient staff. The significant fact that as one moves up the hierarchical ladders the numbers of posts go on diminishing, should not be lost sight of while undertaking the first and repeat censuses of posts for establishing dependable short-term and long-term demand-supply relationships.

In so far as the operatives are concerned, they form two major categories—unskilled and skilled (including semi-skilled)—for the

purpose of industrial training. The unskilled workers are supposed to perform tasks which do not involve any special skill-use. Hence, they require no industrial training in the technical sense. However, in any industrially advanced society, such *unskilled workers, too, need to have the background of general education that develops their receptivity, power of understanding,* alertness, responsible behaviour, job-satisfaction, etc. This aspect is generally presumed to be covered by the Plan-provision for the expansion of primary and secondary school education in the country. Unfortunately, *little thought is being given to the peculiar circumstances which prevent the children of the workers from taking advantage even of the facilities available* in regard to compulsory free primary education and the subsidised secondary education. The important ones, based on my extensive field-work, are summarised below :

(i) Poverty, unhealthy home environments and lack of appreciation of the importance of education on the part of the workers.

(ii) The general backwardness and the prevalence of social customs like early marriages, superstitions, discriminatory treatment towards the girls, etc. in the communities of which the working class is composed.

(iii) When both the mother and the father were mill-hands or factory workers and had to attend to their duties in the same shift, they had to keep their youngsters at home even if it had attained the school-going age because (a) their still younger babies had to be looked after by him, (b) they thought such action increased the safety of their homes during their absence, and (c) they were worried about the possibility of accidents from road traffic, road-crossings, etc. to their school-going child.

(iv) Children were made to carry tiffins to their parents at the latter's work-places.

(v) Location of schools at long distances from working class *chawls.*

(vi) Inability of workers to supervise the schooling of their children. Irregularity of attendance, non-payment of fines and failures at the examinations resulted in the removal of their names from the School Registers.

(vii) Defective system of education itself in which teachers become mercenary and discriminatory in their approach towards the economically backward children.

In any plan of industrial training, therefore, due weightage must be given to such considerations as provision of a sound base of general education. This will mean (i) *an assured supply of enlightened—even if, unskilled —workers,* and (ii) the preparation of a grounding for those unskilled workers who, by dint of perseverance or because of opportunity, seek later to become skilled workers by going through necessary craft training.

As regards the training of skilled operatives, who must have specialised skills as well as an understanding of the processes involved, the approach should be rational and integrated in terms of the following issues—

(i) All the jobs in all the industries must be clearly classified, titled and described. The Directorate General of Employment and Training, GOI, has published the National Classification of Occupations containing standard and alternative titles and definitions and descriptions of all occupations in the country. This must be revised regularly so as to keep it up to date in view of the rapid advances which take place in the scientific and the technological fields.

(ii) All industries—whether in the Public Sector or in the Private Sector—must be required to have their job-designations in conformity with the standardised pattern specified in (i) above. Existing posts should, wherever necessary, be re-designated in terms of the job-requirements, even if this means amending the agreements between employers and trade unions in regard to, say, minimum wages. Newly created job-designations must be reported to the DGET for necessary rationalisation. Continuous propaganda and persuasion would be necessary, initially at least.

(iii) It is necessary that a Census of all types of jobs—both filled and vacant—available on a prescribed date for skilled workers in all industries in the country is immediately taken to *measure the manpower demand-actual.* This alone will give a clear picture of the inter-job balance existing at present among the variety of jobs available for place-

ment of the working population. The manpower demand-potential can be worked out from time to time by projection of net annual increases on the basis of the records to be built up by prescribing the submission of annual returns by existing units as also of the estimates in development projects and programmes.

The Five-Year Plans have been providing estimates in terms of total figures. Thus, for instance, it has been stated that the Second Plan created 8 million jobs out of which 6.5 million were outside the field of agriculture, that the backlog of unemployment at the end of the Second Plan was estimated at 9 million, that the figure of the new jobs to be created during the Third Plan period would be of the magnitude of 14 million (of which 10.5 million would be outside the field of agriculture) as against the estimated 17 million new entrants in the labour market, and that, at the end of the Third Plan period, a total of 1.3 million craftsmen—being 0.81 million in the Engineering Trades and 0.22 million in the non-Engineering Trades—would be required. Such figures may serve to project broadly the employment possibilities on the whole. However, they fail to be specific indicators of the chain growth in the sizes of the job-wise demand-schedules against which creation/expansion of particular training institutions/facilities ought to be planned. Of course, the Government has devised, through DGET, a scheme for the collection of employment market information. It reportedly covers the Public Sector all over India and 148 selected employment market areas in different States. However, this is *no better than patch-work* if it is remembered that the series of three Five-Year Plans have been prepared without any primary data collected by a Job-Census as suggested above and that ours is a vast country with the working population scattered over thousands of spots.

(iv) Provision of industrial training facilities/institutions should be geared to both the numerical and the qualitative needs of industries in all job[1] categories. This would involve ordinary repairs in some cases, entire renovation or modernisation in a few others, and massive expansion in the still-uncharted spheres. The situation here, too, is far from satisfactory.

The existing facilities may be divided into three classes:

(*a*) *Pre-employment Training—Institutional*: 167 Industrial Training Centres[2] with 42,000 seats were started, by the end of the Second Plan period, for imparting training in Engineering and non-Engineering Trades for the award of Trade Certificates of the National Council for Training in Vocational Trades. The Third Plan provides for the starting of 151 more ITIs with additional accommodation for 57,850 trainees.

(*b*) *In-Plant Training*: The introduction of the National Apprenticeship Scheme aimed at the Government attempting, in consultation with the Central Apprenticeship Council, to rationalise the facilities available in industry for imparting practical training in terms of standards, duration, syllabuses, etc. and a target of 12,000 apprentices has been fixed for attainment by the end of the Third Plan period.

(*c*) *Side-Training*: Almost all Government Departments/Agencies and other State enterprises have their own In-service Programmes. Evening classes are being conducted for industrial workers already in employment so as to enable them to take courses (of 6 to 12 months' duration) out-

[1] *Jobs, in this article, would include job-groups.*

[2] Under the Craftsmen Training Scheme of the Ministry of Labour and Employment, GOI, the Craft Instructors needed for these ITIs were to be supplied by the Central Training Institutes, three of which at Calcutta, Bombay and Kanpur were started in the Second Plan period and additional three at Madras, Hyderabad and Ludhiana have been provided for in the Third Plan, the total capacity of the former three being over 500 and that of all the six being 1,780. In addition, one CTI for Women Craft Instructors was started at Delhi in 1955.

side their hours of work. Provision has been made for 11,000 admissions by the end of the Third Plan as against 2,000 at the end of the Second Plan.

An impression is created by the figures printed above that much headway has been made in the field of operative training for industries. However, a closer examination would show the existence of lags and overlaps in terms of a scientifically co-ordinated programme between the demand and the supply lines. It needs to be ensured (i) that the admission capacities are utilised to the fullest extent; (ii) that the successful candidates who come out with Trade Certificates soon get employed on appropriate jobs; (iii) that courses are provided not for the major jobs only but for all operations involved in different processes in different industries in the country so that no field remains uncovered; (iv) that the annual outturn of trained operatives from different institutions is rationally correlated to the turnover of employees in the respective jobs etc. *The guiding principle must be the avoidance of wastages of trained skilled operatives whose surpluses would be created by an unco-ordinated approach.* Phasing of development in the Third Plan seems to have been lopsided. And, when we are determined to conserve all types of resources by a guided economy pattern, it becomes absolutely necessary that no surpluses beyond certain fixed percentages to fill migrational turnover vacancies should be allowed to accumulate in the various employment markets all over the country.

The following paragraphs relating to the Cotton Textile Industry are meant to illustrate the above approach:—

To calculate the effective demand and the need for training facilities for skilled operatives in the Industry, data regarding (i) the total number of mills located in various parts of the country, (ii) the total number of workers employed in each one of these mills classified according to jobs, (iii) the turnovers of labour in the different jobs, and (iv) the estimated net (i.e. projected expansion *less* possible closures) development needs during a plan-period must be available.

Published information regarding (i) above is available (e.g., vide Mill Statement for the year ended 31st August 1962[1]) As regards (ii), though figures of the total number of workers employed are there, no job-wise figures are available. My inquiries show that neither the Government nor any private agencies including the Employers' Associations have collected such data, much less the figures of job-wise annual turnovers. Hence, the figures of average number of workers employed (all shifts) even if separately available for each unit, are of no avail in estimating the job-wise requirements of industrial training either for the industrial centres/regions or for the country as a whole. The lack of figures pertaining to (iii) and (iv) is still more disturbing.

It is found that most of the Industrial Training Institutes concentrate on the provision of training courses for engineering crafts.[2] The only non-Government, non-University Institution worth mentioning which provides courses in cotton spinning and weaving is the Mafatlal Gagalbhai Textile School run by the Social Service League, Bombay. It trained, during the last five years, 65 and 193 trainees for the Lower Certificate Courses in cotton spinning and cotton weaving respectively. (These were started as early as in 1924) It also imparted pre-employment training in weaving (duration—one month) to 1081 trainees during this period, the course having been started in 1947. The Textile Apprentice Courses in spinning and weaving have been introduced since June this year. In so far

[1] Compiled and published by the Millowners Association, Bombay. Figures are also available in the annual Census of Indian Manufactures (upto 1958) and in the Annual Survey of Industries since then conducted by GOI under the Collection of Statistics Act.

[2] e.g., none of the 17 ITIs established in Gujarat State between August 1957 and August 1963 provided any course in pure textile-jobs (non-engineering).

as individual mills are concerned, in addition to the taking of the apprentices in the designated trades under the provisions of the Apprentices Act, 1961, some take learners in certain important occupations, the period of training being three months. For instance, in the New Shorrock Spinning & Manufacturing Co. Ltd., Nadiad, (a Mafatlal Group Unit), an Operative Training Scheme was started in 1956. Currently, in-service training is imparted for six jobs in the Spinning Department, six jobs in the Weaving Department, six jobs in the Process Department and also to the Folders & Stampers.

Two observations need to be made here. Usually the training courses were for spinning and weaving only. More than 80 remaining non-engineering jobs were almost neglected. A majority of the workers used to get themselves 'trained' in related jobs while they were working as unskilled or semi-skilled mill-hands in certain departments. This they did with the co-operation of the other regular workers on the machines and with the connivance or support of the supervisory staff. The consequence was that production suffered both quantitatively and qualitatively, wastages increased and the organisation became corrupt. The learners got haphazard intermittent training at the cost of the mills. Despite this unauthorised, unscientific training, acute shortages have time and again been felt by many units in finding suitable skilled workers for recruitment to certain jobs. I had observed this, in 1949-50, in my survey of conditions of industrial labour in selected centres in the old Baroda State territory. Conditions were no better in Bombay even as late as in 1959 when 36 categories of workers in the cotton textile industry were found to be in short supply.[1]

The situation is indeed tragic if it is remembered that the cotton textile mill industry in India is 112 years old, that in August 1962 there were 503 mills at work with a total paid-up capital amounting to over Rs 1470 million, over 14 million spindles and over 2 lakh looms installed and employing daily an average number of nearly 8 lakh mill-hands. It calls for immediate remedial action in terms of a rationally planned integrated structure of training facilities. The industry has, in fact, throughout been bearing the major part of the cost of employee-training in a concealed manner. It is high time that the Government and the Industry come to terms to organise Textile-Jobs Training Centres at different concentration points in the country according to scientifically ascertained manpower needs of the mills and to rationalise the apprenticeship training scheme taking into consideration all the jobs.[2] Financing of this sort of a training programme may be done through the levy of a Cess of only 1 nP. either per lb. of cotton consumed or per yard of cloth produced by the industry. The former will yield over Rs 20 million while the latter will yield over Rs 50 million annually.

Unless such steps are taken in a concerted manner for all the industries in our country, a steady flow of scientifically trained skilled operatives for the expanding industrial sector and 'a steady rise in the quality of their workmanship' would remain hopelessly unrealised.

[1] Thakkar, Dr. G. K., Labour Problems of Textile Industry : 1962, Appendix to Chapter II, P. 39

[2] This task can certainly be entrusted to the National Council for Training in Vocational Trades, which is the existng tri-partite body consisting of the representatives from industry, labour and Government for the purpose of coordinating industrial training programmes in the country.

66 *Sometime one feels as if he is the only sane person in a lunatic asylum.*"
Harvard Business Review

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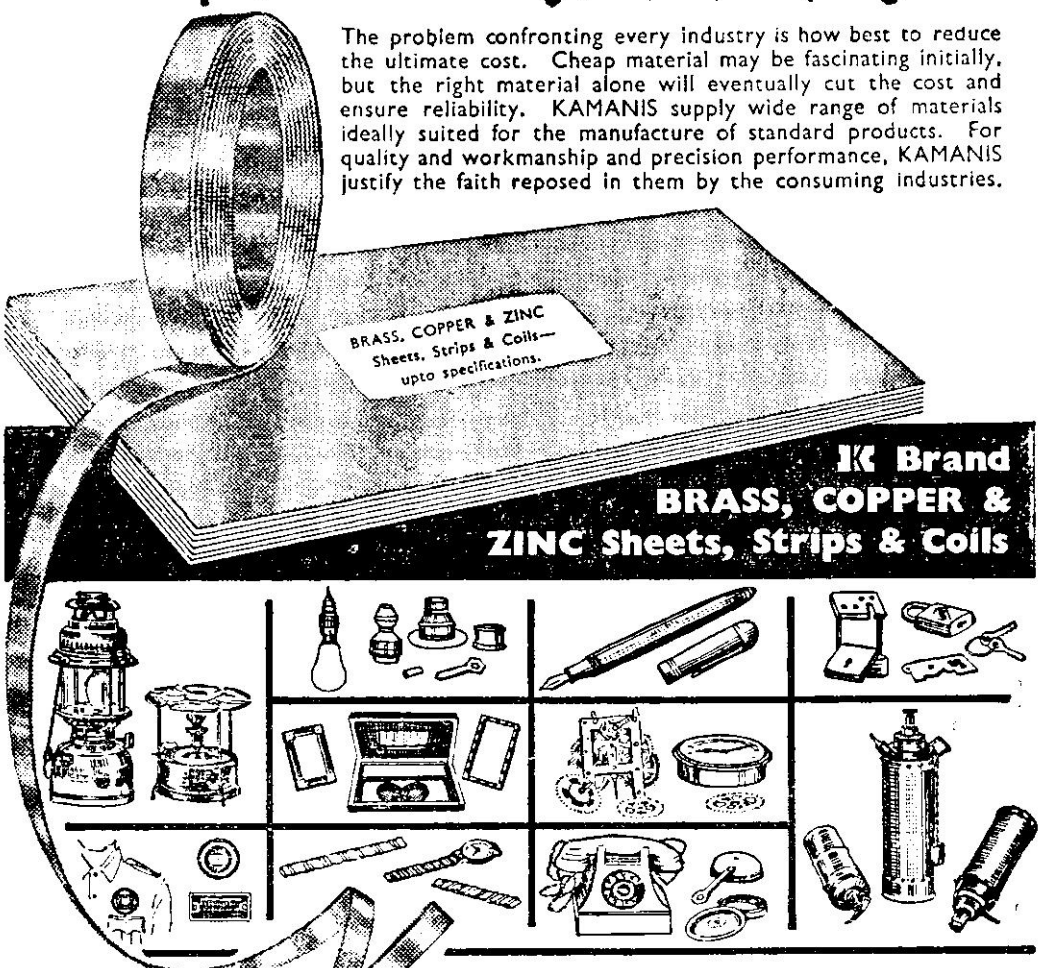

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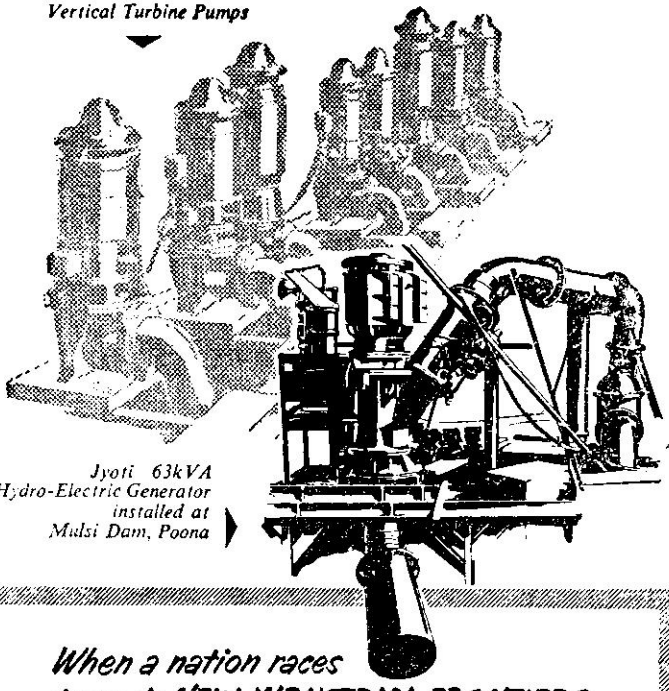

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TRAINING FOR WORK STUDY

RUSSELL M CURRIE

President European Work Study Federation

For people whose motives are benign and constructive, we work study people are rather given to the use of metaphors suggesting summary execution or at least mayhem. We speak of the stopwatch as 'a two-edged weapon'. We consider how we may develop techniques with 'a keener cutting edge'. And we frequently allege that to put the techniques of work study into the hands of ill-selected and ill-trained people is like 'giving a razor to a mentally deficient child'. I hope that with all this sort of talk we do not present a popular image resembling that of Father Time, with our measuring instrument in one hand and a scythe in the other. However, I suppose our liking for this sort of image arises from a praiseworthy desire to make a clean sweep.

I BELIEVE IT WAS BERNARD SHAW WHO ENUNciated the principle '*Those who can, do; those who can't, teach*'! There may, for all I know, be some truth in what he said, but it is quite irrelevant as a comment on the aptitude of the teaching profession: for whoever heard of mowing a field with a whetstone? Having had experience both in the practice of work study and in the control of a department whose substantial task is education in work study, I have been obliged to be scythe and whetstone by turns. I can assure you that *the problems which face the practising work study officer are nothing like those which face the work study educator*, although the latter must necessarily have practical experience of the problems of the former.

This need to be both practitioner and pedagogue is not unusual, but it does create its own special set of difficulties. While we may insist that our practical courses shall emit a smell of 'hot oil', we must at the same time remember that academic techniques and the teaching atmosphere are essential to our programmes of education, since what we hope to do is to convey in codified form to the students the fruits of years of practical experience.

Another difficulty which faces us, which is perhaps not common to other fields is that we are generally held to be responsible for appreciation courses as well as straight practitioner training. In a world where everybody understands the use of a piano and the point of being able to play it, there is no urgent need for courses of appreciation in piano playing. But so little is still understood about the import of work study by management in general, that it is necessary for us not only to train the practitioners, but to create the appetite for their services and to foster the atmosphere in which they may most successfully operate.

In many large European concerns it is recognised that in addition to this dual responsibility, there is perhaps the most important one of training together the teams who are going to apply work study to research and development, design and construction, maintenance and actual production. So that our task is threefold:

1. **Work study appreciation courses at all levels**
2. **Work study training and refresher courses for practitioners**
3. **Specialised courses e.g. design, labour office, maintenance.**

During the first 10 years of ICI work study training in Great Britain, we held 1,500 work study appreciation courses of two weeks or more. In addition we held about 100

'open days' attended by 3,000 senior officials from almost every type of organisation—public and private, industrial and otherwise.

From this experience certain conclusions have been drawn. The first one I think is that *a one-day 'glimpse' is no substitute for the well planned appreciation course.* Pamphlets, posters, individual lectures are all very well, but *prejudice and ignorance will only respond to a course which contains a liberal allocation of time for free discussion* (so that the purpose of work study can be explained in its broadest human sense) and, better still, an opportunity to 'do it yourself'.

In the past the importance of really good appreciation courses has often been underestimated and at first some managements even resented the time spent on them. I think most of us know what the essentials are for success in work study; they have been admirably summarised by a very successful medium-sized company well-known to me personally:

> **Support and drive from top management by word and deed**
> **First rate work study staff with thorough training**
> **Sound appreciation at all levels of work study aims and activities**
> **Close integration with other functions of management**
> **Willingness to accept change**
> **Realisation that 'it doesn't pay' to do work study 'on the cheap'.**

It is not too much to say that 95 percent of the failures which occur in using work study can be directly traced not to inadequacies of the techniques, but rather to the failure to realise the importance of one or the other of these precepts. Each one of them has implicit in it the need for imparting work study knowledge in some form or other at varying levels in an organisation.

Appreciation of Work Study for top Management

Since success in work study depends very much on the way in which it is introduced in Management's activities, it is essential to ensure first of all that those who are concerned with developing the initial policy relating to work study recognise *the potential scope of the techniques* and take steps to provide adequately for its introduction. A suitable understanding of work study for Chairmen and Managing Directors should take a full day and the programme should include such items as 'The need for work study'—'The techniques of work study'—'The Integrated use of the Techniques' and 'The Management Implications of work study'.

Appreciation for middle and lower levels of Management

Once the Senior Directors of an organisation are determined to adopt work study, the next stage is to make this known clearly and unmistakably to all other members of Management. Since those of Director or Works Manager level and below, down to plant and section managers, will come directly in contact with the day-to-day use of work study they must necessarily have a more detailed knowledge of its use. It is here that the real Appreciation course in work study is required. Such a course should run for a period of between 5 and 10 days and, after a general introduction to the subject, would comprise lectures and exercises in the basic techniques of Method Study and Work Measurement, and on particular applications of work study, with appropriate discussion periods.

Training of Specialists

The main consideration in India at the present time, however, must surely be the practitioner proper. It has frequently been stressed in the past that work study cannot be done by amateurs and this has become even more true in the past few years with the rapid developments in technology and the vastly increased scope of work study. People, however worthy, who have 'read up' work study in a book or done a correspondence course do not know their limitations. They cannot be blamed if managements accept them, thus perpetuating *the idea that this is a job for 'stopwatch thumpers'.*

It has always been a fact that Work Measurement can only be done by trained men; but Method Study has been considered

something, which we want everyone to do. Certainly the spirit which it encourages—the restless urge to improve—is universally desirable, but the services of a specialist are essential in all but the most elementary cases.

It was said as early as 1954 by Sir Ewart Smith (a great British engineer and top manager—and an honorary member of the British Institute of Work Study) that Method Study investigations could, in theory, be carried out by the personnel of line management, that is, those who have responsibility for executive action in the production field, but that they were usually better carried out by persons specialising, if only temporarily, on this type of work.

Developments in the training of young technologists have more than justified this view. The engineering director of a large British company has said: "*The value of any young technologist in industry must be multiplied by a factor of co-operation, and if this factor is zero, his total worth to the team is zero.* What work study does for the team is to help increase everybody's factor of co-operation".

It is clearly our duty then to provide the trained work study personnel; but first we must consider what sort of candidate is suitable for training.

We are all familiar with the wide variety of advertisements which appear in the papers for Work Study staff; some specify high technical qualifications, others appear satisfied with merely 'industrial experience'. There is, in fact, a great deal of divergence of opinion on what qualifications (other than work study) are required. Engineering degrees or diplomas are most often stipulated and there is a good deal of ground for this. In industry, work study is mainly applied to the manufacturing processes (although it is used in many other fields such as canteen layout, drawing office operations, transport and warehouse planning) and *an engineering background is a valuable—if not essential—asset.*

In the past, arts graduates have become extremely successful work study officers but there comes the time when they are ready to move up into line management and it cannot be denied that without technical qualifications their scope is somewhat limited in many industries. It has never been advocated that a man should make his whole career in work study—it is an excellent stepping-off point for higher management—but equally it is a big jump from work study to the commercial side, which is where most arts graduates tend to make their career.

It is becoming more and more recognised that work study training should take the form of a post-graduate course—an added qualification—rather than the only one. A period spent doing work study should provide an engineer or mathematician or any other scientist or technologist with an excellent basis from which to move up the ladder.

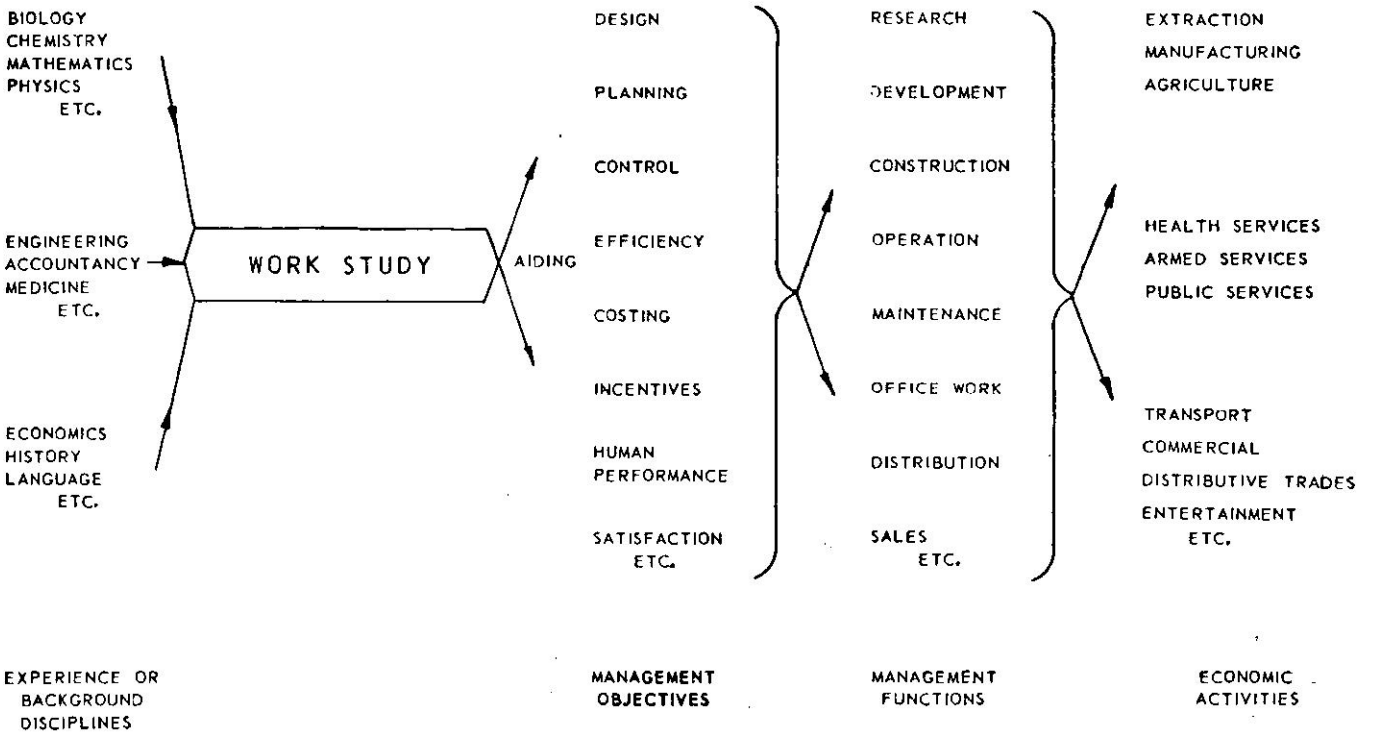
The case would, of course, be somewhat different outside industry—in the hospitals, the retail trades and some of the national services and industries. Though these may bring their own special problems, for which a background knowledge of the field concerned, is necessary.

Furthermore, we have to consider the special needs of those who have 'come up the hard way' but who have been selected for work study because they are *not* 'practical men' in the sense mentioned by Disraeli when he defined *practical men as "those who continue to practise the mistakes of their forefathers"*.

It appears that—while we may always have thought ourselves to be particularly vague on the subject of non-technical qualifications we are fairly indefinite about the technical qualifications we require. However, on the basis of the considerations noted above, we seem to arrive by elimination at a degree in science, associate membership of a professional institution, or perhaps the equivalent of the British Higher National Certificate. The new British Diploma in Technology would provide an admirable basic qualification on the technical side.

It is at this point, of course, that those responsible for Work Study training take up

THE WORK STUDY CONTRIBUTION TO MANAGEMENT



the tale. I think, we can describe what it is we are doing in training people for work study. It is fairly well depicted in the Figure printed on the previous page.

You will see that I have cast the net pretty wide on its left hand side—but this is on the basis of a study of the 2,000 people that we have been employing in the work study departments of ICI. The diagram shows that we have in mind a contribution to management and hence our main task in training seems to be so to shape the experience or background disciplines of the candidate that they can be brought to bear on the management objectives.

The diagram does, I hope, serve as a useful reminder to work study trainers that their programmes need to be broadly conceived, in view of the wide potential uses to which industry and other activities may put the students they have trained.

It is when we come to the non-technical qualifications that seem to be desirable in a practising work study officer that we meet with a lack of precise definition on the one hand and of practical training resources on the other. Some years ago a list of these non-technical qualifications was drawn up as follows

a. Power of logical thought
b. Imagination
c. Determination
d. Tact
e. Integrity
f. Personal acceptability
g. Power to inspire confidence

One has only to look at this list to see that it is very unlikely that we shall ever come across anybody possessing those attributes in equal proportions. While *we are not short of conscious archangels, particularly in higher management*, the genuine angel is very rarely met with here on earth. Let us say that this list of imposing characteristics is intended to represent the ideals after which we strive.

Certainly we can say at once that if a man possessed *all* of these characteristics with the exception of tact he would not make a good work study officer. One can easily imagine a person who had imagination to a marked degree, and who was for that very reason personally acceptable and charming, whose power of logical thought might be deficient and whose determination might only be moderate. In fact, the more we look at this list the more we see that it is very unlikely that we shall find people with all of these characteristics.

I will not deal here with the difficulty of testing people for such potentialities. *The expert in words* would attack this list as being too conceptual and would for example ask us what we meant by 'integrity'. In essence our reply would probably add up to '*what I have, but most other people have not!*' The Personnel Management specialists are, I know, doing their best to devise batteries of tests by means of which we may assess such potentialities in people. The old school stands by personal judgment and is alleged to be largely influenced in the case of men by the social background and sporting record, and in the case of women by vital statistics. On the other hand *the man who passes the psychological tests may turn out to be a very queer person indeed* to look at, so that probably the best way of selecting people for these characteristics is to use a wise combination of personal judgment and testing.

I have mentioned this matter of selection because, having accepted that we shall find no candidate who is ideal in every respect, we have to accept also that the business of training him in human skills will depend very largely on the extent to which we can remedy his deficiencies or develop his latent possibilities.

Training has been something of an obsession —a wise one, of course—with my colleagues in Europe. At every meeting the subject arises, and it is universally agreed that one of the most difficult problems we have is how to conduct human relations training. It is true that we are constantly telling people that work study is 90 percent psychological, and we stress at all points in a course the importance of proper information and consultation

and due attention to the needs of the individual. But it is one thing to set up a principle and another to train people in the practice of it. *How does one give practical training in human relations*?

On our 18-week basic training courses for medium category work study officers in ICI we devote a certain amount of time to human relations and communication. The method we adopt is to present a human relations problem similar to those which may occur in real life, which is discussed by the students with a view to finding a solution. Once they have found it they are often asked to 'role-play' the solution. This certainly ventilates a number of the points we wish to make, and ties the business of human relations down to the every day level. But I would like to leave these questions with you:

How do we develop in people the power of logical thought?

How do we stimulate the imagination and prevent the work study trainee from becoming dry-as-dust—or should we say cut-and-dried?

How can a man learn determination?

How can we develop tact in one who is deficient in this social lubricant?

Can you teach integrity?

How—unless one recommends the ridiculous 'making-friends' type correspondence course—can personal acceptability be learnt?

How can a young man fresh from university and work study training school inspire confidence without appearing brash?

Perhaps the most useful information we have gained on these points has come from the refresher courses of experienced work study officers which we have been running regularly. On these courses we reckon to benefit as much as the students, for they are all people who are practising work study full time and who have much to say on the human side of its application. But over and over again one is impressed by the melancholy fact that the way most practitioners learn the human skills is by making mistakes —and industry is too serious a business for us to accept that elementary psychology can only be learnt on the live bodies, as it were, of the men and women who are doing the work of the world.

However, to sum up, I think we can say that nowadays we have a much better idea of what we were looking for in the form of trainable material; we have a much better idea of how to train people; we have established work study as something which can be imparted academically; and—a matter of great personal pleasure to me—you have now established your Indian Institution of Work Study as the professional body which will watch standards, conduct research, and raise the general level of the profession.

As whetstones, therefore, we seem to be more effective than we used to be. But may I say as a parting shot that *I think we still need the use of the scythe here and there* in the work study training field. I do not mean that we need to cut anything out of the training programmes of reputable and respectable institutions—heaven knows there is little enough time to cover all we need to. I am thinking more of those establishments which offer to teach work study by post in a fortnight, whose activities are not only a menace to our professional integrity, but will undoubtedly do positive harm to industrial relations when their trusting students—in times when there is a grave shortage of work study staff —find themselves working in industry or elsewhere. However, the only way in which we can really attack this kind of organisation is by demonstrating beyond doubt that *ours is the better way.*

THIS TOO IS PRODUCTIVITY !

"In 12 years of Conservative Government the loving standards of our people have risen more than in the whole of the previous half century."—MR. BUTLER reported in *Evening News.*

WORK STUDY TRAINING IN BRITISH RAILWAYS

P CORBISHLEY

Principal, British Railways Work Study Training Centre

The author was invited to write for this Special Issue on TRAINING. Readers of the NPC PRODUCTIVITY Journal will recall that in our last Winter Issue we published an article on *Productivity in the British Railways* by Mr. R Beeching, Chairman of the British Railways Board. This article is really a sequel to Mr. Beeching's article which excited great interest in this country. The article published here gives a comprehensive account of Work Study Training in the British Railways. It also throws light on the general development of Work Study in the United Kingdom from the inter-war to the post-war period and shows how during the last few years there has been a move from the conception of Work Study as a specialist job towards the use of the Work Study approach as a valuable framework for management itself. Those of us who still remain to be converted to the Work Study idea may think over the case referred to in the opening paragraph in which the average time required to carry out the repair of a railway engine was reduced by 96%.

THOUGH THE FULL RANGE OF WORK STUDY techniques was not used in British Railways until after the Second World War, a number of the pre-nationalisation companies applied a form of method study and carried out time studies on a limited scale. For example, in the late 1920s Method Study was used in the reorganisation of steam locomotive repair work at Crewe Works. In replacing the 256 old 'fixed position' engine pits by applying the principles of flow production, *the average time required to carry out a repair was reduced from 60 days to 47 hours!* On the commercial side of the LMS Company large savings were made by method studies in the clerical organisation of the Stores Department and in the sphere of forms design and paper and printing. A well-known consultant, Lewis Ord, was retained to examine the activities of freight handling and a number of incentive and labour control schemes were introduced based on detailed work measurement.

The general economic situation at this time made it impossible to introduce these methods of increasing productivity on a large scale. The level of unemployment was high and there was little incentive for either management or men to apply techniques which superficially at any rate had the effect of aggravating the problem. It was not until after the Second World War when the economic situation was transformed into one of "overfull employment" and labour shortage that there was any revival of interest in work study.

The Civil Engineering Department of the Southern Region of British Railways carried out a number of successful applications, starting in Dartmoor Stone Quarry, a large precast concrete depot and most significantly on the routine maintenance of permanent way. The results achieved were enough in themselves to promote the gradual acceptance of work study in all the civil engineering departments of all regions. Attempts were made with the help of consultants to introduce work study to other railway activities and it eventually became clear that great scope existed in nearly all departments and divisions of the undertaking.

Education and Training are a key factor in determining the rate of technological advance

both in a country generally and in particular industries. Early in 1956 the British Transport Commission, at that time responsible for the activities of nearly three-quarters of a million staff, recognised that work study techniques should be used more widely. A Director of Work Study was appointed at Headquarters. One of his primary responsibilities was the setting up of work study training facilities on a scale consistent with the size of the problem.

It was clear that a considerable proportion of this work would have to be carried out regionally. Early in 1957 a training centre was established at The Grove, Watford, a large house about 20 miles north of London, equipped and staffed to run two residential courses at a time. These courses were to provide for training of senior work study staff and appreciation courses for senior management. Each of the six railway regions set up its own school where courses were developed to cater for the training needs of work study practitioners, junior management and supervisors.

One of the biggest problems in making a start on this scale was the recruitment of suitable staff at the schools. A small number of appointments were made from railway staff trained by consultants or at one of the outside training establishments, but most of the instructors and lecturers had to come from 'outside' the railways. The pressure on the schools, especially in the early years, made it difficult to release instructional staff from time to time, both to bring their practical experience of Work Study up-to-date and also to extend their knowledge of railway problems. It is now generally recognised that *most of the staff of the work study schools should be 'turned over' at intervals of say 2 to 3 years* with a small group for a longer period to preserve continuity.

As a result of the combined efforts of the regional and Headquarters training centres in the last 6½ years over 3,000 staff have received basic training and over 3,000 have attended appreciation courses.

Work Study Basic Training Course

Although there is considerable agreement on the question of syllabus for these courses, some latitude has been left to the various centres in respect of the detailed design of courses. The training courses are designed to provide a sound basic foundation for potential work study practitioners. After the formal course which lasts from 12 to 16 weeks, there should be a period of guided practical work in the field, preferably in the student's own department for at least three months. Unless a man is of very high calibre, he will require a further two years' work under guidance before he can carry out responsible work on his own.

Work Study is obviously not a subject that can be taught solely in a lecture room: all training courses incorporate a large proportion of practical work both in the laboratories which are attached to the training centres and also field work under 'shop floor conditions'. For example at Watford there are fifty to sixty local firms which are willing to accept trainees to carry out training exercises in all the major techniques of work study. Visits are made and work is carried out in syndicates to provide practical experience in such techniques as flow process charting, multiple activity charting, critical analysis, string diagrams and travel charts, time study, activity sampling etc etc and generally to give wider experience of industrial conditions. Many firms have benefited from the work carried out by students and a few have been convinced of the value of work study and have set up their own organisation. When appropriate, each practical exercise results in the presentation of a formal report to representatives of management, who then comment upon and criticise the substance of any findings and recommendations. The 'technical' aspects, in a work study sense, are dealt with by school staff at a separate presentation session. This practical training commences in the second week of the course and reaches its climax in the tenth week when a project is undertaken by students, usually in pairs, during which all decisions

and adjustments must be made without assistance from staff. According to the nature of the problem each group must determine its own approach, the techniques to be employed, the analysis of the problems revealed and finally the report to be presented to management.

A great deal of specialised case material has been developed for use on these training courses drawn from all aspects of transport and covering such special fields as costing and estimating work, planning and control, incentive payment systems, the design of plant, buildings and rolling stock, and maintenance. Most of the special exercises used at the training centres have been developed and adapted from real problems which have occurred within the railways and are realistic and factual within the limits set by the time available for the exercise.

O & M Basic Training

This more specialised form of training is now carried out only at Watford where a 6-week course is offered which provides a basic training for staff who will work in the British Railways O & M organisation.

It should be realised that *there is little difference in principle, basic approach and purpose, between Work Study and O & M study*, but there is less emphasis in the O & M course on problems of work measurement and wage payment. The Headquarters and Regional O & M Officers have participated in the planning and design of the course and provide regular assistance either personally or through their senior staff in the supply of guest speakers.

Although there is a good deal of practical field work built into the course, trainees are subsequently expected to work under close supervision for a minimum period of six months, after which if necessary, they can take responsibility for an assignment. Special short courses are now being provided, in conjunction with the appropriate Headquarters staff on "Systems Study" and Electronic Data Processing.

Appreciation Courses for Management

In the early days the emphasis in all short appreciation courses for management was on work study as a specialist activity and discussion centred on the problem of making effective use of this specialist service. *During the last few years there has been a move away from this conception of Work Study as the province of the specialist and towards the use of the work study approach as a valuable framework for management itself in dealing with complex problems.*

The present management appreciation courses, aimed at District Officer level or equivalent, last for two weeks. A good deal of time is taken up with practical work in Method Study to enable staff to see the general value of its systematic approach.

Some of the early work study schemes were introduced with the primary objective of increasing earnings or taking the place of unnecessary overtime by paying bonus for extra work and so overcoming some of the local shortcomings of the national wages structure. In many areas, management found it very difficult to recruit and keep staff in competition with other local employers. The idea grew up, both on the part of management and staff, that work study was concerned almost entirely with the introduction of bonus payment schemes and confined therefore in its effect to staff at the lower levels of the organisation. It is true that there were considerable short run savings to be gained from this approach—the real difficulty arose from those who came to see this direct labour cost saving as the only application for the work study approach.

It has been the task of appreciation courses to widen people's views about the scope of work study and to let them see that sometimes the greatest savings are made, not by a close and detailed study of what staff are doing, but by first reviewing the chain of management decision as a result of which the job has to be done and those men are there at all. The management staff who attend these

courses are drawn from a wide variety of professional and departmental backgounds. Though there are certain training advantages in running courses for particular departments, it has always been our view that these advantages are more than outweighed by the opportunity present on a mixed course for breaking down traditional inter-departmental and professional barriers.

From the very beginning *it has been the Board's policy to work in very close co-operation with the railway trades unions.* Matters affecting productivity are discussed at national level by the BRITISH RAILWAYS PRODUCTIVITY COUNCIL on which there are principal officers of all the railway unions and this co-operation and consultation is carried down through various levels to the 'shop floor' local committees. Many trade union officials from headquarters and districts have attended the management appreciation courses at Watford and have contributed a great deal to their value. Local staff representatives have been catered for in the same way by the regional training schools. In addition, members of The Grove instructional staff have lectured on Work Study courses at Trades Union Congress Headquarters which included railway trade unionists. Specalised courses for trade unionists at a Railway Work Study Training Centre would undoubtedly provoke the feeling that some special 'story' was being put to those students present and the value of a good mixed discussion across the floor would be lost.

Specialised Courses

There are some training requirements which can only be satisfied by running special courses and as work study has developed in the railways, more and more effort has been put into the provision of a wide variety of special courses.

One of the earliest of these special programmes lasting three weeks was designed to cover the problems involved in applying work study techniques to engineering maintenance work. This course dealt with the problems of planning and control of maintenance as well as the special difficulties of measuring work as variable and in detail as unpredictable as maintenance.

Another early special course was provided to draw the attention of railway staff concerned with design—of structures, rolling stock and equipment—to the possibility of applying the work study approach to certain parts of the design process. Frequently, this meant that the architects or the civil engineer's 'customer' would have to carry out a complete and thorough critical analysis of his requirements, exposing and evaluating the principal alternatives for giving effect to them. These 'Work Study and Design Courses' last for two weeks, the first week being taken up with basic work study instruction and the second week providing a more specialised treatment of the design field from a work study point of view. The case material and class exercises used on these courses have been specially collected from the field. One exercise involves the consideration of a new Freight Sundries Handling Depot, another the design of passenger facilities at a BR packet port; in both cases the background information has been drawn from reality. Models, slides, charts and diagrams are used to support the description of the problems provided. The most serious element of artificiality lies in the very short time allowed to each syndicate for the full critical analysis and the evaluation and development of a suitable solution. This is a common shortcoming of most training exercises—they must pose problems complex enough to merit the rigorous and systematic study to be made and are usually impossible to complete in full in the time available. The emphasis in all these exercises is very much on the process of finding a solution rather than simply on the quality of the solution itself.

The British Railways employ nearly 2,000 full time work study staff. The direct wage and salary cost alone represents a very substantial investment—an investment on which the Board are entitled to expect the maximum return. *The management, planning and cont-*

rol of work study has itself become a work study problem which must be brought to the notice of all senior work study staff. A special four-week 'Advanced Work Study' course is provided to deal with a number of these problems of work study efficiency and also to bring staff up-to-date with any new developments in technique. In particular, 'an up to the minute' treatment is given of critical analysis, simplified predetermined motion time systems, quality control, time study, rated activity sampling and network techniques. One of the most useful aspects of this course has been the practical exercise on survey techniques and report writing. Short surveys are carried out in local business undertakings and reports are presented to and discussed with senior management. Survey work is of great importance in providing senior management with the necessary information for developing a proper strategy in making use of work study. In some railway regions surveys have been made which have indicated the way ahead for the employment of work study at all levels. They have enabled realistic predictions to be made of what can be achieved, and at what cost in men, material, capital and time.

In recent years a large number of working parties or project development teams have been set up to advise the Board and its senior officers in implementing the plans for the 'Reshaping of British Railways'. Whilst it is natural that at the moment public attention will be focussed mainly on the negative aspects of these plans for cutting back uneconomic services and closing branch lines, many railwaymen are involved in the formulation of positive steps to improve and develop the services that will remain.

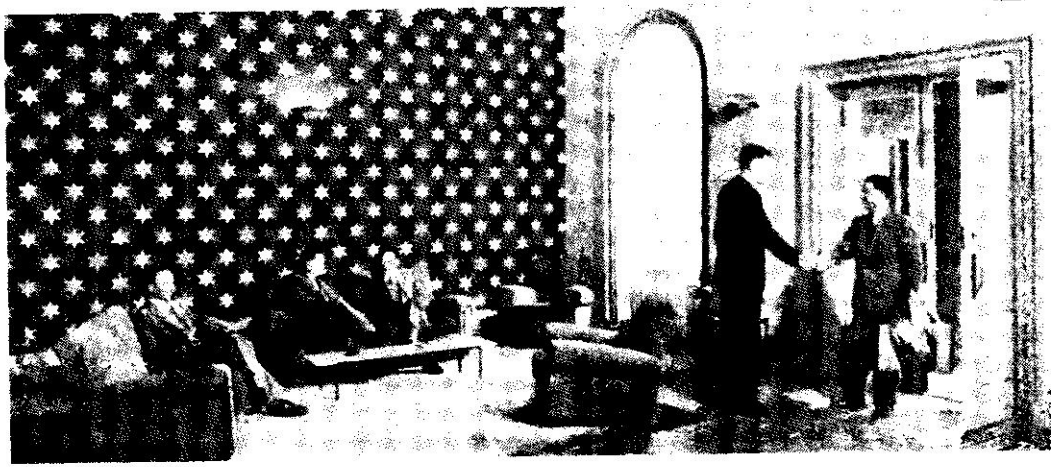
These plans involve a great many departmental and professional interests and the teams set up to consider them are therefore drawn from a wide variety of different backgrounds. In a number of cases senior work study staff have been contributing to this work but a much more important development has been the gradual acceptance by management of the basic approach of method study as a logical framework for dealing with these large scale and complex problems. A number of 2-week courses have been put on recently to provide instruction for senior staff who may find themselves involved in these projects. A large proportion of the time on this type of course is taken up with critical examination, and syndicate work is carried out on a number of exercises including one drawn from the work which has actually been done by the working party on the 'Liner Train Project'. A brief treatment is also given of the principal methods of evaluation for dealing with the many alternatives brought out by critical analysis.

Network Analysis Techniques

There has been a great deal of development recently in the field of planning and control of complex operations made up of a series of linked stages in a predetermined order. The various methods which have derived from American experience in planning the Polaris Project may be called 'Network Analysis Techniques'. British Railways staff are applying these methods in a wide variety of work from the rebuilding of Euston Station to the overhaul and maintenance of diesel locomotives. Fundamentally, the methods employed are simple and are a logical extension of the long established work study approach to time balance problems in team work. So great has been the interest in these techniques that special arrangements have had to be made to provide short courses of instruction for staff both 'in the field' and also at Watford. These courses have been mounted with the full co-operation of the B.R. Operational Research Department and the regional work study officers.

In a number of British Railway Regions, Work Study, Organisation and Method Study, Traffic Costing, and Electronic Data Processing, have been brought together into a common management services organisation. In practice, problems must be tackled using a number of specialist techniques together—it is unrealistic to suppose that they can be tidily classified to fit in with the organisational separation of these departments. Similarly,

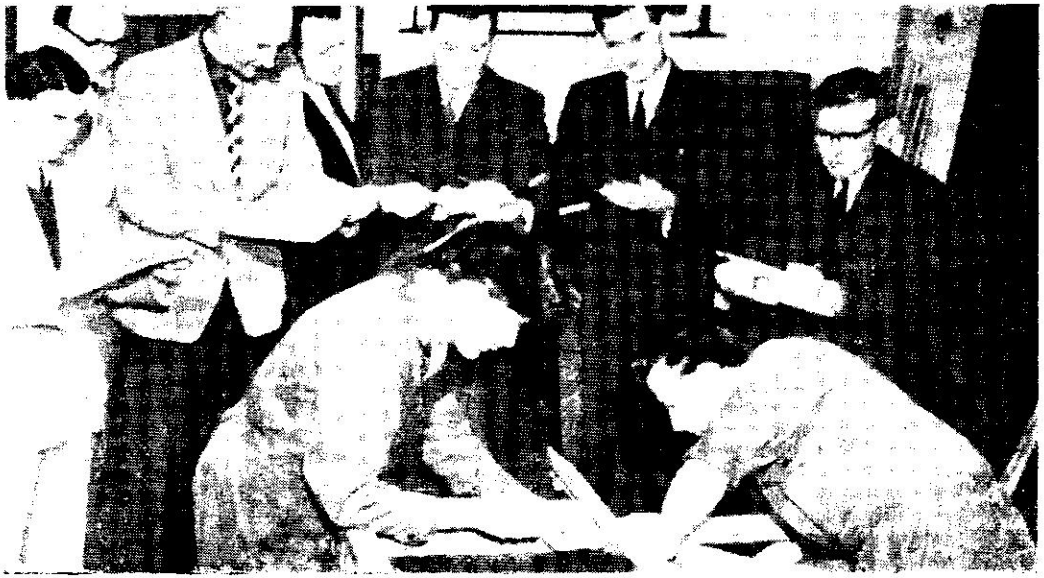
The Training Centre at The Grove, Watford, about 20 miles north of London, which caters for the training needs of Work Study practitioners and junior management on British Railways



The entrance hall to The Grove

The Main Conference Room where trainees get their lessons

Instruction in Method Study which has been well developed by planning engineers on British Railways



Trainees practising work measurement

Here are trainees reading up literature on Work Study techniques in the library room

in training, the emphasis in the future will be on the whole range of 'productivity' services and not on only one aspect of it. The emphasis in training has gradually moved away from straight forward courses for practitioners and management appreciation courses aimed at justifying work study towards the development of a wide variety of specialised courses to deal with particular aspects of the problems.

It is of vital importance for those engaged in industrial training to remember that *staff trained today must be in a position to deal not just with today's problems but also those that will arise in the future afterwards.* The one consistent feature of modern life is the ever accelerating pace of change in our affairs. Industrial processes must keep abreast of technological development; work study and management services generally can help to do this on a relatively continuous basis and so help to avoid the periodic 'agonising reappraisals' which otherwise become *the only alternative to extinction.*

The ability of a country, and of every undertaking in it to respond to this challenge, depends in the end upon the effort it is willing and able to make to educate and train its people. Work Study training has its part to play in this effort. The experience of British Railways has shown that work study itself and the work study training needed to support it, has to be mounted on a scale consistent with the size of the problems involved. Without doubt, British Railways have one of the biggest work study problems of any organisation in the world—this fact and the results now being achieved by management making use of work study provide the justification for the scale of the work study training arrangements which I have tried to describe.

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Industry *vs.* Jupiter

"...it is much more important for a school boy to understand something about the tools of modern industry than it is for him to learn about Jupiter's love life, or to study the properties of Greek and Latin verbs which, to the delight of the pedagogue, are irregular to the point of impropriety in their behaviour."

—Principal Bowden, Manchester College of Science & Technology

—★—

Short of Brains!

"A boy may be described as a 'practical type' — a term which invariably means that he is short of brains!"

TRAINING & WORK STUDY

BRIGADIER K PENNATHUR

Training is not a 'once for all' process. It is a continuous one, applicable during each programme and also programme after programme. It is here that Work Study, one of the most effective tools of management, can play a very profitable part. Work Study and Research could provide satisfactory answers to some of the vital aspects of training. The five governing factors of Method Study, the Purpose, the Means, the Sequence, the Place and the Persons, will lead to increased training efficiency.

SOME OF THE ASPECTS FOR WHICH WORK Study and Research are employed by the Defence Institute of Work Study are: what should be the proportion of lectures, films, discussions, practicals and so on; what should be the optimum duration of a lecture, taking into account the receptivity, the subject matter and the training content; appropriate training aids for different types of subjects; optimum working hours, depending on the season and climatic conditions; the best method of putting across a lesson; peak periods of receptivity; effective sequence of training periods; method of conduct of discussions; layout of the class-room; environment and surroundings conducive to the assimilation of training; illumination level; distraction factors; colour dynamics; heating, cooling and ventilation; quality of the staff required; the training of the staff; balancing of training organisation for effective performance; resources needed correlated to the type of training; optimum strength of a class; optimum strength of syndicate groups; degree of supervision required for practical and project work; scheduling of courses; dovetailing of programmes of concurrent courses; balancing of training effort against the average intelligence of a specific batch; design of class rooms and auditorium; layout and design of living areas; time schedule for various events and activities; mental loading factors and mental relaxation expedients; psychological factors governing imparting and assimilation of training; and a horde of other subjects which have a vital bearing on the efficiency of the training activity.

It is obvious that in planning a training programme, the management has to draw heavily on the results of work study and research. Planning would take into account the overall annual requirement of training. This is then broken down to the numbers that must be trained in the various fields. Thus the requirement is arrived at for each type of training course. This requirement against each field is then matched against the optimum number of participants at any one time, to arrive at the number of courses that should be run during the year for that type of course. Thus a broad pattern of the number of courses to be run for each subject emerges. This is compared with the availability of resources in the form of classroom and living accommodation, instructional staff, training aids, and so on. The sequence of course is then worked out and a schedule of courses drawn up. After this broad planning, each individual course programme is worked out so that maximum utilisation of resources is ensured. Individual programmes are adjusted and rearranged till finally the complete and detailed programme for the whole training activity is evolved. Further details are worked out, to give the schedule of utilisation of training areas, living areas, aids, instructors and so on.

Having arrived at the finalised picture of training events and activities, the Organisation of the training is then carried out.

The organisation of the training will firstly refer to the training staff: their establishment, earmarking of duties and allocation of responsibilities. Then will come the organisation of the administrative staff needed to support the training activity. The next step is the fitting up of the training and living areas, messes and so on. Attention will also be paid to the office equipment, machinery and training equipment needed for the conduct of the training programmes.

Having organised the institution to cope with the commitments, the Direction of the training is then made. This pertains to the issue of instructions for the preparation of the administrative and training cover. Production of pamphlets, literature, exercise papers, training aids, engagement of caterers, contractors and domestic staff, and allied activities will be ordered for execution according to a time schedule. Coordination and control of activities are important management functions, if the directions issued are to be successfully executed.

In the context of industry, training in order to be efficient, must provide the maximum amount of skill and knowledge with the minimum possible utilisation of resources. Apart from conventional resources, the greatest resource of all is that precious commodity time. In a fast-developing economy, it is imperative that the greatest number of people are trained to the specified standards, in the shortest possible time, with the minimum utilisation of resources. How can one aim at the optimum use of resources? Here again, the management can rely very heavily on Work Study to produce satisfactory answers. In the field of training, Work Study has given the lie to the common complaint against the latter—that Work Study's sole aim is economy. Work Studies carried out in the sphere of training have warned time and again against a false sense of economy.

The reason for this is fairly obvious. It must be realised that it does not pay to train 'on the cheap'. The instructional staff must be carefully selected and thoroughly trained both in theory and practice. This costs money. Again, they have to be paid adequately if we are to ensure that they can devote their full time to their work and not be vexed by worries. If the wages are not commensurate with the responsibilities, there is the danger of the right type of people not coming forward for the job. There is also the temptation of training a large number of participants in a particular programme. There is an optimum limit to the number of participants in any course. If this is exceeded in the name of economy, the value of training imparted may be lowered out of proportion to the savings effected. No saving is worth mentioning if the ultimate aim is not fulfilled: that is, training the participants up to the required degree of efficiency and proficiency. The tendency to economise creeps into minor things like stationery. *Precis* and pamphlets can be cyclostyled on cheap brown paper instead of white paper which costs more. If the student is not motivated to read the pamphlet because it is not rendered in a presentable form, the aim is again defeated. A few rupees may have been saved but we could as well have saved the effort of the instructor in writing the *precis*, if the student is not going to read it. *Presentation plays a very big role in motivating students on training.* Any measure of economy, which lowers the power of motivation, can only be a measure of false economy.

Work Study would therefore advise you that the staff must be of the best quality available. Their practical experience and theoretical knowledge should be like an iceberg—one-tenth visible and nine-tenth submerged. In other words, their standard of proficiency must be several levels higher than that which the participants are expected to achieve by the end of the curriculum. The days when a fresh graduate went to take up the post of Principal of a polytechnic are, fortunately, gone. The instructional staff must also be

trained in social psychology and methods of instruction. *Any 'techniques' subject can be taught as interestingly as the classics can be.* Mere knowledge is no adequate passport for an instructor. He must have the dynamic ability to impart that knowledge in an assimilable way.

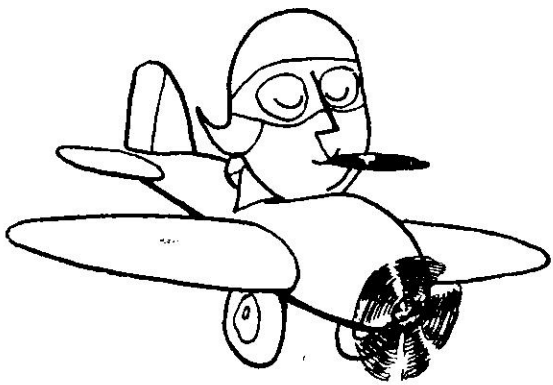
Methods of instruction offer a rich field for effecting improvements. Instead of elaborate charts, slides may prove a very mobile and handy substitute. *Less of lectures and more of syndicate and group discussions* may prove valuable in certain types of training. Some subjects can be taught better with the help of class-room exercises than by mere academic lectures. In certain cases, syndicate work produces better results than individual exercises. Training is not a one-sided game where the lecturer talks away for an hour and then retires to his chambers. He has to establish communication with each member of the class and maintain it throughout the duration of the session. Only in this way can he carry the class with him right through. Hence *cybernetics in training is an important factor for the stimulation and maintenance of interest.*

Work Study can also help in effecting economies in the utilisation of space and buildings and the administrative support. A Naval educational institution in the United Kingdom had a blueprint plan for a magnificent and imposing building, whose estimated cost was £ 400,000. On detailed analysis of the project, as a result of Work Study, it was revealed that the utilisation of the classrooms was of the order of 18% only. By rephasing the various training courses and readjusting the training programmes, it was found possible to reduce the accommodation requirements. The revised design was estimated to cost only £ 150,000 a saving of £ 250,000, at the very design stage. At a Work Study training institution, one common projection was made to serve four lecture halls resulting in great savings in training equipment and aids. At a military academy in the United States, the living accommodation was so streamlined as to take the minimum space while providing a great deal of comfort and convenience.

It must always be borne in mind that administrative support for a training establishment is required solely to ensure the efficient conduct of a training programme. It *must never be allowed so to enlarge itself that it becomes an impediment to efficient training.* In a few cases, it has actually happened that *the 'administration' had become so powerful as to dictate to the 'training'.* This has invariably resulted in irreparable damage to the training function.

—: o :—

THE EXECUTIVE IN WONDERLAND !



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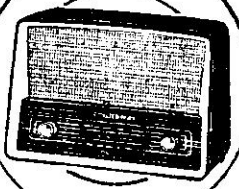

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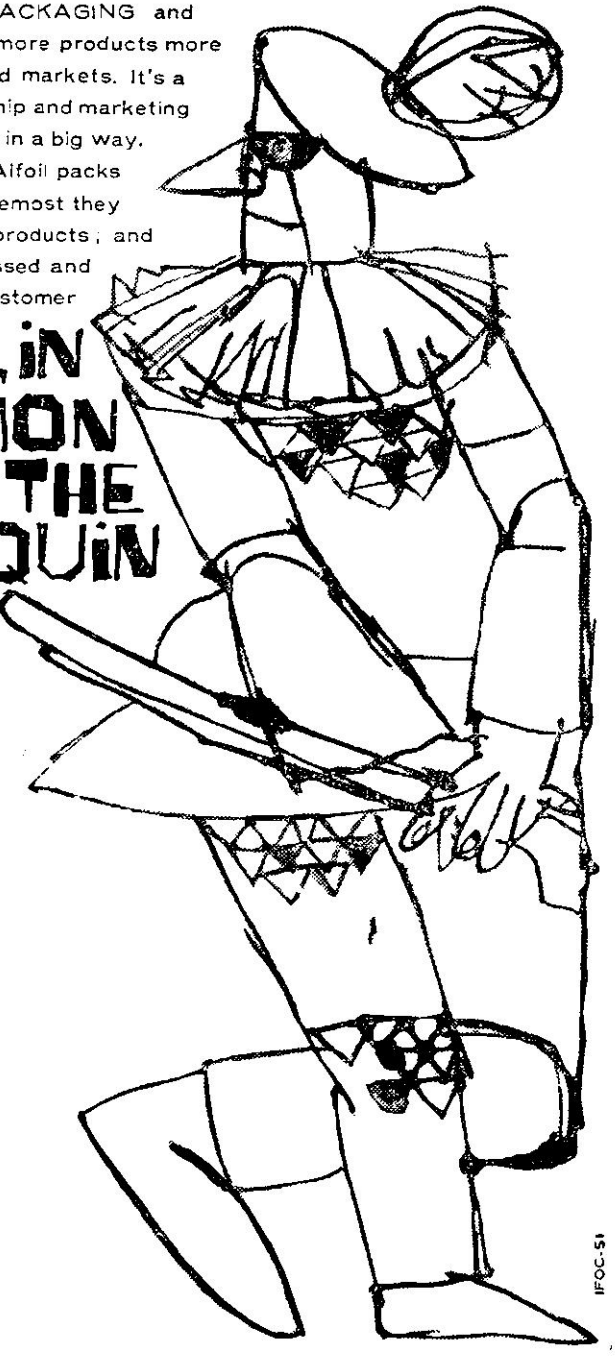

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IFOC-51

TRAINING AT HINDUSTAN LEVER

PL TANDON
Chairman Hindustan Lever

Although founded by the genius of one man, our parent company has always been professionally managed. This has been a strong tradition with us and one we have valued in Hindustan Lever. We have always bestowed a lot of care on the proper selection, training, development and promotion of men and women: we have looked ahead at our needs, foreseeable and unforeseeable, and tried to provide for them before they arise. Nearly twenty years ago, as an instance, we appreciated the need for Indianising our management, and the process was handled with care but with boldness till it ceased to need any further impetus some years ago. Over twenty years ago we began our Management Trainee selection scheme, which over the years has, with attention and assimilation of new techniques, improved until today it stands high by international standards. Opportunity for men from the general staff to rise to management has been another of our conscious efforts.

We have today 341 managers, of whom 178 or 52 percent have risen from the ranks; a total of 11 or 3.2 percent are expatriates; our selection and training department in 1963 recruited 26 managers and put through training courses 25 managers as well as 17 non-management staff; 5 from the staff were promoted to management. Our management strength forms 5.2 percent of our total employees. Although essentially a manufacturing and marketing company, we have 27 women managers, who interestingly possess a diversity of specialised skills like psychology, operational statistics, scientific research, accountancy and home economics.

Management development with us is a complex of activites whose purpose, simply stated, is to ensure three things. First, to anticipate our requirements over the next five to ten years; second, to select, recruit and train men and women to fill those requirements; third, to develop attitudes and values in individuals that prepare them to meet their responsibilities at the standards we consider desirable.

Whatever the methods and techniques followed in the selection procedure, personal interviews, group discussions, psychological tests, etc., selection is only the first stage in the total process of acquiring and developing managers. After selection begins our real task.

Training is given individually and on the job. We have found from experience that young intelligent trainees do not like to spend months in circulating around the various departments of the Company watching how others do their jobs: instead they like to get down to a job themselves and so our training programme is now job-oriented. Also, this is the best way of judging their performance and potential at an early stage. After a very quick familiarisation programme lasting only about four weeks in a Division, they are put to work in it. Let us take the marketing side, which absorbs the largest number of trainees. The young man will go into the field and work under a salesman for a month, after which he will work independently as a salesman for three months. He then works under a sales supervisor for a month and then independently as a supervisor for another three months or so. By now he has been "blooded" and can hold his own in the field. The men who work under him later should recognise that behind what he expects them to do lies experience and ability to do it himself, and well. After this spell of about nine months in the field he works in a junior management capacity in branch

administration where he learns to deal with the field work from the office end. After some months of this he is seconded to a sales manager and helps him run an area. At the end of one and a half years of all this training he is given his first managerial responsibility and appointed as Area Sales Manager. From then on he will go as far as he deserves.

All through the training his seniors devote a good deal of their time and attention to his progress, and the Board constantly receives reports on his progress. His Director will meet him regularly, and the Chairman occasionally. The progress reports are discussed in detail in a committee of the Vice-Chairman, his own Director and the Personnel Director. His training finished, a recommendation will be put up for confirming him in the covenanted grade of management; and the Chairman will usually personally hand him the covenant. He is from now on the Company's most valued investment, and we are deeply disappointed at our occasional failures, though they have to be faced in the interest of the company as much as for his own sake.

Training never really stops. We have designed our own courses, principally to give the managers a broader picture of our operations and its environments and to sharpen their managerial skills. These courses are always residential and there they meet men and women from other sides of our business. The courses can be general or functional, as in marketing, finance, O & M. To many of them we invite as participants men from our associate Unilever companies in Africa and Asia. We also send our managers to courses, seminars and conferences held outside the company to provide the stimulus of meeting people from other organisations and particularly from Government and its undertakings. We send them to the Administrative Staff College at Hyderabad, the new Institutes of Management at Calcutta and Ahmedabad, the regional and the All-India Management Associations, the National Productivity Council and to other more strictly functional courses.

Unilevers' training facilities in the United Kingdom and its specialist courses in Australia and America are also open to us. We have sent men to Henley and Harvard. Lastly, we send a few men every year to the United Kingdom for specialised training with Unilever companies in that country and in Europe.

We find all this training, carefully planned for both its content and timing, an integral part of the growth of a manager. It has to be judiciously controlled though, to stop it from becoming a fad. Each name for outside training is examined carefully by the Board and each manager is made to realise that he can get out of a course only in proportion to what he himself puts in.

WHY OUR PRODUCTIVITY IS LOW

If a piece of paper drops from the table, neither the boss nor the typist who may be with him would think of picking it up; the bell has to be rung, the peon summoned and instructed to pick up the piece of paper. In small offices in western countries, it is usual for the typist or clerk to make tea for the boss. But stenographers in India would be horrified if they were told that making tea was part of their daily routine—even if they were capable of making it.

PRODUCTIVITY AND SOCIAL ENVIRONMENT
K Sreenivasan

TRAINING AT THE ICI INDIA

P VASUDEV

Training Officer ICI Calcutta

The concept of Training in Industry is quite recent in India, though with rapid industrialisation the consciousness of its need and effectiveness is fast growing. In the UK, the in-Company training schemes have been in operation for several years but with the reconstruction and revival of industry following the war, their activities have been vastly extended and their pattern is growing in size and complexity all the time. Training in Industry in the UK now embraces all levels of management and work-people. In fact, there is so much profusion and variety of this education that there are now courses for everyone, from top executives to young employees, fresh from school and college. Many of these are residential, and others are conducted within the four walls of the factory or Head Office. Subjects taught have a bearing on practically every commercial and industrial activity from the use of capital to safety on the shop floor.

TILL THE INDEPENDENCE OF INDIA, ICI (INDIA) was mainly a trading company though its subsidiary company, The Alkali & Chemical Corporation of India, formed in 1938, had a small plant for manufacture of Caustic Soda and Chlorine at Rishra near Calcutta. In the 'fifties, the Board of ICI decided to extend the manufacturing activities in India and the organisational needs of expansion focussed the attention of management to the problem of training, especially as there was a *shortage of good people at all levels.* Besides, as national technological facilities were limited and adequate supervisory personnel with necessary practical experience and background were not available, the need for training of such personnel was particularly urgent in our plants.

As a result, management decided late in 1958 to carry out a survey of the training needs of the ICI group of companies in India and a training policy was evolved which was based on the following considerations.

1 **Training was to be related strictly to needs as defined by operational management.**

2 **Training to be carried out simultaneously at all levels.**

3 **Training to be a continuous process throughout an employee's career.**

4 **Stress to be laid on training on the every day job supplemented by formal courses.**

In addition, training of Foremen, Process Workers and Craftsmen was to be systematically planned. In pursuance of this policy, we carry out training for the following categories of personnel in our organisation.

1 Process Workers
2 Craftsmen
3 Foremen & Supervisors
4 Managers

It will perhaps be helpful if I briefly explain why we carry out this training for these categories of personnel, what exactly we try to cover and how we go about this training.

Process Workers

Why do we try to train process men systematically on the job?

There are three reasons.

Firstly, because we consider induction training to familiarise people with their

environments, as of primary importance. Not only does it enable people to settle down quickly, but we believe that people respond more quickly to proper training if they know they are welcome to an organisation.

Secondly, training on the job systematically given, has obvious benefits in terms of shorter training time and leads to more effective performance on the job. And finally, in the chemical industry, there is a very high ratio of capital to labour. There is lot of money invested in the equipment and the labour cost is rather small in proportion. It is therefore vitally essential to train our labour in the use of our expensive plants.

For imparting this training on the job, we rely mainly on our supervisors: foremen and charge men. We therefore train our supervisors in the systematic way of doing it: breaking down the job into steps and key points and making a training time-table. In other words, we ask them to *think systematically* about their job, analyse it, analyse the skills in it, break down the skills and then use it as a foundation for training.

Craft Training

We carry out Craft training because of the shortage of skilled craftsmen and the low standards of skill in relation to increasing complexity of the plants and of the process control which nowadays demands work to its closest limit. Another reason why we concentrate on Craft training is to build up a pool of experienced craftsmen who with their practical workshop background, will be our Foremen of Tomorrow.

There are two types of Craft training that we carry out. First of all, we have the upgrading courses for improving skills of existing craftsmen and secondly, the rather longer courses for boy apprentices. Both the courses have two parts—the basic part which takes place in the Craft centre and the training on the job afterwards in Works/Plants.

Supervisors' Training

Why do we do it?

The first reason is that as an organisation gets larger, its lines of command tend to get longer and the distance between the men on the top and the men on the shop floor becomes greater, and therefore, to an increasing extent, the last link with the man—the supervisor, becomes particularly important. The foreman or supervisor in a big organisation with a long line of command represents management to the man, and therefore, he has to be trained to act and think as a member of the management.

Secondly, when a big organisation becomes more specialised, foremen need to understand what specialist functional departments—Work Study, Personnel, Accounts etc do. After all, these functional departments can only be effective as the foremen permit them to be, because they have to *apply their specialised techniques through the foremen.* So, unless the foremen as junior managers understand what these specialist departments are trying to do, they will not be able to get very far. *Foreman is the focal point of the line management* and therefore, he needs to understand what these departments are doing to appreciate and use these service and functional departments.

For training our foremen on the job, we have a comprehensive scheme in our plants. Depending on our requirements, we select every year a specified number of graduates with a degree in Chemical Engineering or with Chemistry as their main subject as apprentice foremen. These apprentices undergo 18 months' training before they are appointed foremen.

The training schedule includes working as processmen on shift on all jobs on the process. As their training progresses, they carry out specific job assignments for the plant superintendent or foremen which have carefully graduated responsibility. Before taking independent charge of a shift, they understudy the foreman which involves an increasing amount of supervisory work. This training is spread over 12 to 14 months depending on the plant to which they are attached.

As part of their training, they also spend 2 months in the Work Study Department and

another month in the Engineering Department where they work as part of a maintenance team. In this way, we try to train our foremen and help them to assume their responsibilities with greater confidence and success.

Finally, there is the need to *train foremen in leadership* to get their way not by force, but by *persuading people to do things because they want to do it.* For this purpose, we run formal courses for supervisors in Works and Offices and we concentrate on subjects of three kinds.

First of all, subjects connected with human relations, training in dealing with people, handling grievances, reprimands, corrections, introducing new workers and finally, in speaking and writing—communications. Secondly in study of work, improving methods, understanding the job and role of Work Study Officer and Work Measurement Standards. Thirdly, information is given about the organisation as a whole, its activities, policies, and organisation both of the wider company and the particular works in which the supervisor is working.

These are some of the ways in which we are trying to improve both the skills and the knowledge of the supervisors in the ICI Group of companies. In this training we use the participatory methods of training: discussions, cases, role plays, filmstrip cases, visual aids and so on, which we find most valuable.

Training of Managers

In an age when *management technology* is forging ahead almost as rapidly as other branches of technology, some form of training for Executive development is absolutely essential.

Training a manager is making him a better man by exposing him to certain types of experience which will help him in overcoming his weaknesses, and strengthening his strong points. In this process, the focal influence must necessarily be the senior manager above him.

Formal courses play an important part in training of managers and we run a number of them to suit various levels of management, from the newly appointed manager to senior departmental heads. Besides the in-Company courses which we conduct ourselves, we also send managers to outside courses run by National Productivity Council, Calcutta Management Association, Indian Institute of Management and Administrative Staff College of India, to broaden their experience. We also take advantage of the training facilities offered by ICI in UK (Warren House), and at Henley, though these have been very much curtailed due to foreign exchange restrictions.

All our courses for managers are residential because we consider the influence and *impact of mind upon mind* in an informal atmosphere an important part of the process. Moreover, a residential course can act as a forum for analysing ideas and experiences and for broadening understanding of each other.

In these courses we make use of participatory methods, that is, project work, case studies, syndicates which we consider particularly important, because in the process of analysing a problem or a situation the participants learn a good deal about their own defects in dealing with other people, in leading other people, reaching decisions and making judgments. Besides, in this process, they have their own judgment tested and challenged, which can be quite rewarding and revealing.

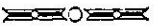
So, apart from the subject matter of the course, such features are of great importance in developing managers. The other aspect of management training on which we lay lot of emphasis, is the importance of training in leadership—in leading others, dealing with others, discussing and reaching decisions with others and carrying out analyses in collaboration with others.

Despite the importance we attach to training of managers, we by no means pretend that we have found the answer to management training, because *there isn't an answer.*

We are *still experimenting* with different methods, different techniques and different approaches, and though we are constantly trying to improve, we have a flexible approach in this matter.

Conclusion

In this article, I have tried to show what considerations led us to evolve our training policy and what methods and techniques we follow to improve the skills of our workers and foremen and to develop our managers. The tremendous growth in business and industry in India and the complexity of plants being installed under the 5-Year Plans demand the highest standards of efficiency and skill at all levels. To improve the efficiency of the Industry, management must promote, advance and encourage education and training of its employees. Training in Industry has, therefore, a significant role to play by improving basic skills of tradesmen, training supervisors in leadership and in ensuring succession of efficient managers and administrators.



THIS TOO IS PRODUCTIVITY !

On April 14, 1964 the water-hungry city of Calcutta saw the opening ceremony of the new 72-inch water main. The schedule of its completion has a deep lesson for all of us, interested in the country's rapid development. It works out as follows

Period	*Time*	*Action*
1948-52	*4 years*	*Scheme drawn up*
1952-56	*4 years*	*Discussion as to who should get the contract*
1956-60	*4 years*	*Time necessary to get work started*
1960-64	*4 years*	*Completion of work*
1948-64	*16 years*	*A 72-inch water main*

16 years to complete a single 72-inch water main in the city of Calcutta! At this rate of Productivity Growth, when do we reach the Moon?

TRAINING PROGRAMMES OF HEAVY ENGINEERING CORPORATION

MAJOR GENERAL HABIBULLAH

Director Heavy Engineering Corporation Ranchi

The problem of training is a serious one today: it constitutes the largest single bottleneck in the projected growth of our national industries. Indeed it is possible to import machinery and to start using it. It is also possible to start using whatever machinery is manufactured, but unless the manpower that we produce for production is really productive manpower, it is going to be a problem; and it will become more and more acute as we thrust forward in our effort to expand industry...The question of training is circumscribed by a tremendous shortage of proper instructional staff available in the country. We may therefore have to depend on foreign countries for organised accretion of such personnel. It is for serious consideration whether we should not work out the entire national demand, and then, with the assistance of ILO and other international organisations, train up teachers at various levels for a nation-wide training programme.

AT THE MOMENT THE PRIMARY TARGET OF THE Heavy Engineering Corporation is to secure an adequate number of workers to man plants, which are by their nature somewhat unique. It has not yet been possible to give concrete thought to the training of Managers. Training of Foremen will be undertaken before we reach the serious production stage. At the moment we are trying to obtain from the market such people as have had adequate supervisory experience.

We cannot say at this stage whether, in our organisation, training has any effect on productivity. We have found that whereas many of our workers and supervisory staff have come to us with a good record, it is often difficult to fit them in. They are the product of their own backgrounds and these backgrounds tend frequently to clash with the compulsions of organised, heavy industry, such as ours. For this reason, if organisations such as the National Productivity Council were to bring into being on a regional and national basis, certain reorientational courses, such 'disco-ordinated' but useful personnel could better be properly integrated.

So far as our own efforts are concerned, we are running courses for trade apprentices who have been at industrial training institutes. Such courses are run for 9 months and we expect the trainees to undergo a further training of 9 months in their respective plants.

We have also courses for Graduate Engineers taken fresh from universities. They do a year of training and another for being confirmed. We are also running a fairly extensive course (through evening classes) for AMIE. We have Departmental Training Courses for Stenographers, Accountants, Typists, Stores Officers etc.

It is too early to judge what effect such training courses will have in the long run. In any case, the progress of these courses has not yet had time to have the desired impact. We are in fact in the initial stages of manning our plants. We are trying our best to fit 'construction' personnel into production jobs.

"I find to my delight that I can make my dog happy by wagging its tail for it."

PERSONNEL TRAINING

R MUTHUSWAMY

Superintendent Bhilai Technical Institute

A million ingot ton steel plant requires about 700 Engineers and Metallurgists, 1400 Senior and Junior Operatives and 3000 skilled workers, besides unskilled and semi-skilled personnel. To find personnel on this scale for 3 plants, coming up almost simultaneously, would have been a very difficult task but for the help received from friendly countries: USSR, USA, UK etc.

FOR THE BHILAI STEEL PLANT, 336 Engineers and 385 Operatives received intensive training at different steel plants in the USSR, for periods varying from 6 to 15 months. TISCO, IISCO and MISCO offered training facilities for about 250 Operatives. With the kind assistance of the Indian Engineering Association, about 665 skilled artisans were trained at the Engineering Industries at Calcutta, Bombay and Madras. In addition we ourselves trained about 550 men of different categories during the early construction phases of the Project. This totals roughly to 2200 skilled personnel: a considerable part of our present skilled force at the Works.

The Bhilai Technical Institute, built at a cost of about Rs 4.5 million, started functioning in June 1959. At present, we have 923 trainees of different categories on roll for the Steel Works, 102 for Alloy Steel Project, Durgapur and 16 for the Ceylon Steel Corporation. To meet our requirements of personnel for the 2.5 million ton expansion, we have to train 100 Graduate Engineers, 250 Senior Operatives and 300 Junior Operatives and 300 Artisan Trainees every year, for the next four years. Two additional hostels, an additional Training Shop and some extensions in the main building of the Institute are being put up at an additional cost of about Rs 3.6 million.

After an initial orientation training at the Institute, of 2 to 6 months, the various categories of trainees do in-plant training for periods up to 22 months according to detailed training manuals, under the supervision of Shop Line staff and the departmental Training Engineers.

The Institute is broadly divided into two sections: the Institute Training and the In-plant Training sections, staffed by suitably qualified Training Officers, Engineers and Training Shop Staff, with an Assistant Superintendent in charge of each section. It may be added here that our Instructors are being trained at the Central Institute for Instructors, Calcutta. We will shortly be starting the regular TWI courses for all our supervisory staff.

All our artisan trainees are enrolled in the NCC Rifles Company of the Institute. All facilities are provided for the trainees to take part in indoor and outdoor sports and other cultural activities, to make them good citizens of the country.

In addition to the training of new recruits we have started re-training of the existing employees of the Works. This consists of both theoretical and practical on-the-job training for periods up to six months on individual and group basis. Trade testing of employees is being regularly done.

Other Training Activities

We have also started organising and conducting courses for plant supervisors in Work Study, Work Sampling, Statistical Quality Control, Industrial Safety, Personnel Management, etc. We sponsor our Middle Management Personnel for different courses conducted by the National and Local Productivity Councils, Refresher courses at Roorkee University, Indian Institute of Social Welfare and Business Management, Calcutta Management Association, Administrative Staff College, Hyderabad, etc.

The Bhilai Technical Institute is fully aware that the productivity of the Steel Works depends to a large extent on the efficiency of the training imparted to the new recruits as well as to the existing employees and every effort is being made in that direction.

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NCDC TRAINING SCHEME

JM DHAWAN

Joint Chief Mining Engineer (Production)

National Coal Development Corporation Ranchi

The National Coal Development Corporation (NCDC) came into existence in 1956 when it took over 11 old collieries of the Indian Government Railways' Coal Department. These 11 old collieries were situated in different States of India such as Bihar, Madhya Pradesh and Orissa. The production capacity of these 11 collieries was about 3 million tons. The NCDC was assigned the task of producing 13 million tons of coal within about 5 years from the date it came into existence. This was quite a task and it involved several problems, including training the required manpower for operating new and costly machinery.

TO ACHIEVE THE TARGET SET FOR THE NCDC by the end of 1961, a number of mines were opened in virgin areas, both open-cast and underground. New types of machines were ordered for the open-cast mines such as big size Electric Shovels of 6 to 8 cubic yards capacity, large size Draglines of 15c yds capacity, large size Rear Dumpers of 32 tons capacity etc. For underground mines also, new types of machines were ordered and introduced, for instance, Shuttle Cars, Conveyors, Coal-cutting Machines etc. Many of these machines were hitherto unknown in Indian mines. These new and costly machines required skilled persons for operating, maintaining and repairing them. Besides, new mines and the large production target created by themselves a demand for a large number of skilled and trained personnel.

Right at the onset of the 2nd Plan, it was visualised that it would not be possible to get by open recruitment, the technicians, maintenance men, mechanics, fitters and supervisory staff; and so the need for setting up Mining Training Schools to train the required number of skilled personnel and supervisory staff was felt. The Corporation set up at its own expense five Mining Training Schools at various places in different States. Three of the schools are located in Bihar at Bhurkunda, Jarangdih and Giridih Collieries; 2 of the schools are located in Orissa and Madhya Pradesh, at Talcher and Kurasia Collieries. The annual intake capacity of these schools, on which NCDC incurred a capital expenditure of over Rs 3·5 million, is 532. The recurring cost of running these schools is nearly a million rupees. Training is given to the new entrants in the schools in the following trades

(*a*) *Course I-Fitters (Elec/Mech)*
(*b*) *Course II-Supervisory Personnel (Elec/Mech)*
(*c*) *Course II/IA-Overman/Mine Surveyor*
(*d*) *Course II/IB-Assistant Surveyor.*

The Training Schools and the Training schemes have helped NCDC in training the required number of personnel for various jobs which otherwise would not have been possible. The schools not only cater for the requirements of the new collieries but also provide trained personnel for the existing mines for recoupment on account of retirement, wastage, etc.

To attain a high rate of production in an efficient manner, and to produce coal at a lower cost necessitate mechanisation of mines. The introduction of new and costly machines alone cannot give the desired result unless there is a proper and efficient organisational set up. We in NCDC are conscious of the

fact that progress cannot be maintained unless people within the Industry are trained to deal with the complexities of new techniques. Skills must be commensurate with the requirements of the jobs.

Days are past when untrained and unskilled workers were taken on the job on low wages and learnt the job by working as helpers or by intuition, and by their own efforts, came up to a certain standard which was thought good enough by the employers. This was all right for the times, when the machines and the methods and the targets did not make excessive demands on men and managements. Now it would not be possible to get the required tempo of production and the desired level of productivity, if untrained persons are employed. It would defeat the very purpose of mechanisation. Job training is closely linked with productivity and one cannot be separated from the other.

The object of providing trained and skilled technical personnel is to keep the machines in proper working order, to maintain the machines properly, to reduce down-time to the barest minimum so that machines may be available for production for the maximum amount of time. So Training and Targets are inter-related.

NEW DELHI TECHNIQUE OF PRODUCTIVITY

So he went into action as everyone must if he wants to get anything done in Delhi: he got somebody to talk to somebody. The first 'somebody', who was most helpful, regretted that a certain astrologer was away in Nepal and so could not be 'contacted': '.. he can get anything he wants anywhere in Delhi, including Rashtrapati Bhawan'. Less influential contacts worked; and my friend got a booking, while another, who had asked for a seat to Jammu ten days in advance, gave up and bought a railway ticket instead. (This too needed 'pull'.)...The point is that an ordinary citizen in India today cannot get even what he is prepared to pay for unless he knows 'somebody'. My friend, eventually a beneficiary of the 'old boy' network which operates by telephone, is naturally reluctant to expose the evil in greater detail. I have, still, taken the liberty of writing this piece because I think it should be widely known that *the ordinary man, which my friend tried to be, has no future at all nor any rights despite the Constitution.*

—From The Ditcher's Diary, Capital, Calcutta

TRAINING AT HEAVY ELECTRICALS

BRR RAO

Controller of Training Heavy Electricals Bhopal

AT THE TIME OF CONSIDERING THE PROJECT for manufacture of Heavy Electrical Equipment in the country, the Committee appointed by the then Ministry of Production observed: "Since the manufacture of Heavy Electrical Equipment requires a high degree of skill and precision, it would be necessary to create new training facilities and phase the programme in such a way that adequate technical staff were available at different stages of development of the State factory".

The lesson embodied in this observation proved only to be too true: In order to man an entirely new engineering industry for large scale manufacture of Heavy Electrical Equipment it was not possible to find from the open market a sufficient number of experienced technical men for the positions of Managers, Foremen and Junior Supervisors. It was even difficult to get skilled artisans to cope with the variety of machining and assembly work of high degree of precision.

It was therefore necessary to establish a Training School and Workshop as an integral part of the project for manufacture of Heavy Electrical Equipment. In fact a decision was taken to establish the Training set-up as a forerunner to all other activities connected with the execution of the Project at Bhopal. Accordingly, an integrated scheme for imparting specialised training was formulated on the basis of the experience of our British technical consultants, who had over fifty years' experience in the line. It may be mentioned here that the projected manufacturing activities covered large-scale production of power transformers, switchgears, capacitators and rotating machinery like traction motors, large industrial motors, steam turbo-generators, water-wheel generators and other associated equipment.

In planning the Training Scheme, it was necessary to formulate appropriate programmes for the following personnel

a. **Senior Supervisory personnel at the middle management level in the Engineering Design & Manufacturing departments**

b. **Junior Supervisor personnel like Foremen, Inspectors, Planning Engineers, Tool Engineers, Process & Production Engineers**

c. **Draughtsmen for the Engineering Design Offices and Jig & Tool Drawing Offices**

d. **Artisans with knowledge of manual skills like Machining, Turning, Fitting & Assembly, Sheet-metal work, Welding, Pattern making and Sand Moulding.**

In order to provide training for qualified, senior supervisory personnel (of the various production departments) like Superintendents, Design Engineers, Chief Draughtsmen, Senior Planning and Production Engineers, it was necessary to depute them for 2 to 3 years' specialised training in the well-established factories of our technical consultants in the United Kingdom, as there was no such facility available in our country. During their training, they were provided opportunities to learn about the nature of the work corresponding to their future duties in our factory after their return to India. They had thus the facilities to acquire knowledge at the hands of specialists and experts with long experience in the various specialised fields of

design and production and get the confidence to use this valuable knowledge with success in our factory, after making allowances to suit the local conditions. Under this overall scheme of training abroad, which commenced in early 1957, nearly 300 engineers were deputed for training in the UK. A large majority of them have already returned and occupied various positions in the factory for which they were trained. About 80 of such engineers are still in the UK, working in different factories associated with the manufacture of heavy electrical equipment.

In order to cater to the training demands of a very large number of men in the three other categories like Junior Supervisory Personnel for the Design and Manufacturing Departments, Draughtsmen and Skilled Artisans a Training establishment was inaugurated at Bhopal in January 1959, with a capacity to impart workshop training to nearly 1000 men in a single shift. The Training Workshop with about 350 modern machine tools and all other facilities has been designed to provide ample scope to impart training of a high degree in the various engineering trades associated with the type of manufacture in which we are engaged.

After a careful analysis of the various activities associated with the production in the factory, training for selected men to occupy the above mentioned positions has been planned under four broad and distinct categories, namely,

1. *Graduate Apprentices for engineering graduates from Universities*
2. *Technical Apprentices for engineering diploma-holders from Polytechnics*
3. *Junior Draughtsman Apprentices* | *for young men with training in Industrial Training Institutes*
4. *Trade Apprentices* |

Recruitment of young men in the above categories is regulated on the basis of the phased (pre-planned) production programme of the various departments.

In general, the Training Programme for all the above four categories of apprentices is planned to cover a period of two years. The content of the Training Programmes for the various categories is designed to meet the requirements of the ultimate jobs in the factory to be occupied by the trainees at the end of their training. This is briefly indicated below:

Graduate Apprentices get about 40 weeks in the Training School Workshop for practical training in various engineering trades, combined with instructions in trade theory and mathematics. The rest of the 64-week period is spent in different factory departments for in-plant training, drawing office and sections of the various factory departments: Manufacturing, Engineering & Commercial. The Graduate Apprentices are also given specialist lectures by experts from the factory personnel during the training according to a planned programme.

Technical Apprentices are given 6 months' practical training in the Training School Workshop coupled with instructions in trade theory, mathematics, strength of materials, machine design, applied electricity and magnetism, reading of drawings, and English; and 18 months' training on the shop floor.

Junior Draughtsman Apprentices get 18 months' training in the School Workshop: 6 months' practical training and the remaining period in the Drawing Section of the Training School and in the Drawing Offices of the Engineering Department in the main factory.

Trade Apprentices (*B-Grade Artisan Trainees*) receive 2 years' training in the Training School Workshop: 18 months' practical plus 6 months in the factory in in-plant training. 18 months at the Training School are split up into three phases.

(*i*) *3-6 months basic practical training in the engineering trade sections allied to the main trade;*

(*ii*) *3-6 months intensive practical training in the main trade sections mostly on exercises; and*

(iii) *5 to 12 months' training in the main trade section on production jobs.*

During the period of training in the Training School Workshop, theoretical instructions are given in trade theory, workshop calculation, reading of drawings, social studies, English and Hindi.

In addition, training is given in Electrical & Mechanical laboratories and also Physical training in Gymnasium.

6 months' in-plant training is given on-the-job in the factory departments in which the trainee will ultimately be absorbed, with internal rotation around various sections of the department to give a thorough knowledge of the skills of the trade.

In addition to the regular Training Scheme for the four categories of technical personnel a large number of Junior Supervisory Staff recruited from the open market had to be posted to the factory in independent and responsible positions. They were given a specialised course to fit them into the new environments. A Training Programme specially developed for this category of supervisory personnel included specialist lectures on subjects like

1. *Factory Clocking System*
2. *Factory Expense, Manufacturing Order numbers and their significance*
3. *How to draw materials, SRV Procedure, Inspection, Pricing and Adjustment of Cost Accounts*
4. *Interim Incentive Scheme*
5. *Grievance Procedure, Standard Standing Orders, How to take disciplinary action, etc.*
6. *Factory Paper Work, Production Planning & Control, Works Management Instructions etc.*
7. *Cutting Tools, Jigs & Fixtures*
8. *Machine Tools*
9. *New Techniques of AEI Transformer Division*
10. *Costing System*
11. *Store Keeping, Factory Main Stores & Departmental Stores and*
12. *Functions of a Tool & Development Engineer.*

In addition to the above company-operated Training Schemes, selected persons at the appropriate level were given training assignments and they participated in the programmes conducted by the National Productivity Council. Two of our Senior Executives had the opportunity to participate in the Advanced Management Programmes held under the auspices of the NPC at Nainital and Bangalore.

As a matter of policy, training of technical and managerial personnel at Heavy Electricals has been looked upon as a very important activity right from the very inception of the whole project for setting up an industry for the manufacture of heavy electrical equipment in the country and there is no doubt that this enlightened policy has paid ample dividends. Our engineers, designers, manufacturing supervisors and above all the skilled workers who have all passed through an organised and pre-planned training programmes have proved equal to their respective tasks and produced the various specialised FIRST IN THE COUNTRY type of electrical equipment complying with the rigorous standards of tests and performance. Heavy Electrical Equipment manufacture was an altogether new industry in our country and it can confidently be said that it is through the successful implementation of a planned training policy adopted by this establishment that it has been possible to achieve the targets of production in this specialised field of manufacture. It will again be through this policy alone that increased productivity of trained individuals is possible. Under this policy, new schemes for refresher courses, promotional courses, courses through the help of specialised agencies like the National Productivity Council are constantly being planned with a view to keep pace with modern techniques of industrial production and to achieve increased productivity of trained individuals employed in our organisation.

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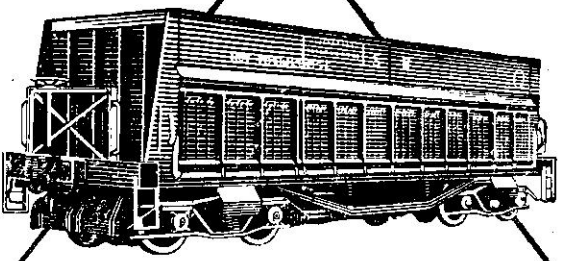
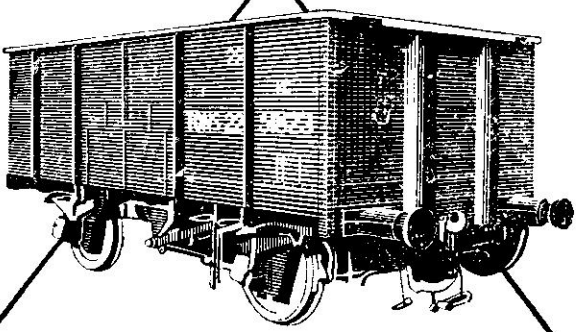


Type BOBS Side Discharge Mineral Wagon fitted with Automatic Couplers, Roller Bearing Axleboxes and Clasp Brakes.



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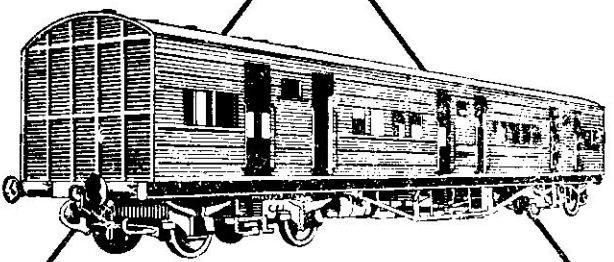

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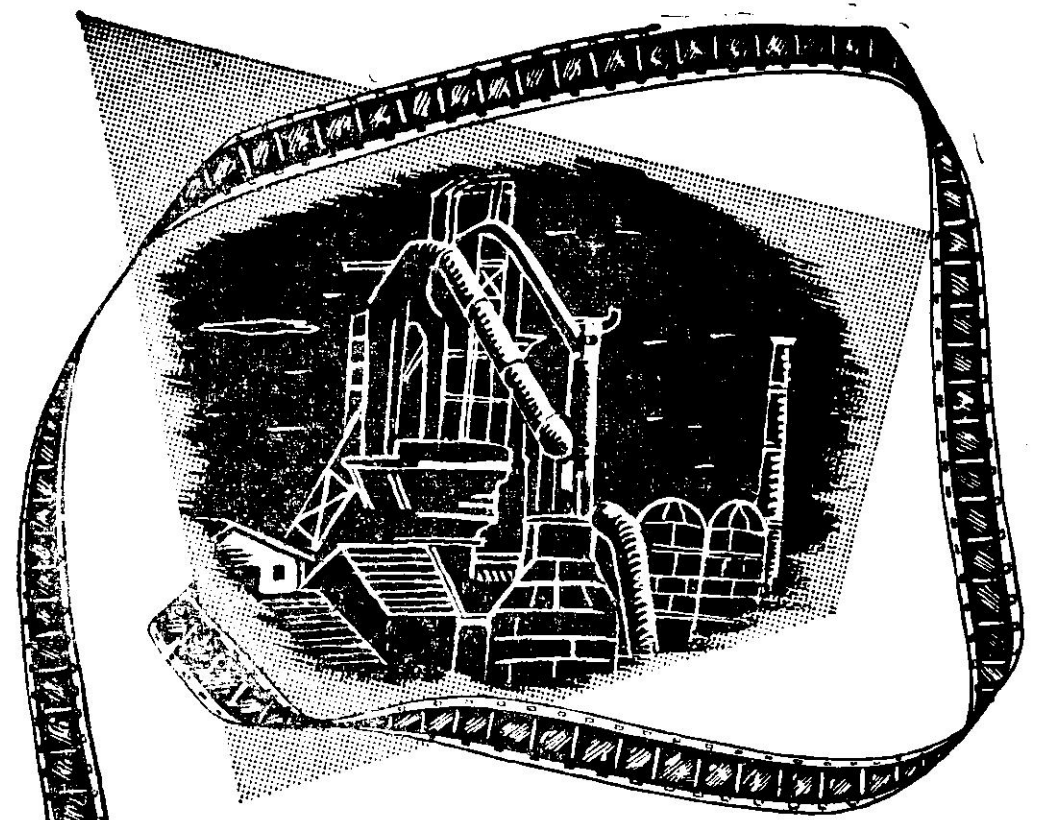

PROMOTION OF INDUSTRIAL DEVELOPMENT THROUGH FILMS

In order to promote industrial development in the country, the Directorate General of Technical Development has organised an Audio-Visual Library consisting of about 300 industrial films in 16 mm. The Industrial Undertakings/Technical Institutes who are interested to know various industrial techniques such as material handling, time and motion study, plant layout, production and process control, and have projector facilities of their own can enrol themselves as members of the library on payment of an annual membership fee of Rs. 25.

Further particulars regarding the membership of the Library can be had from the Assistant Director (Admn.), Directorate General of Technical Development, Udyog Bhavan, New Delhi.

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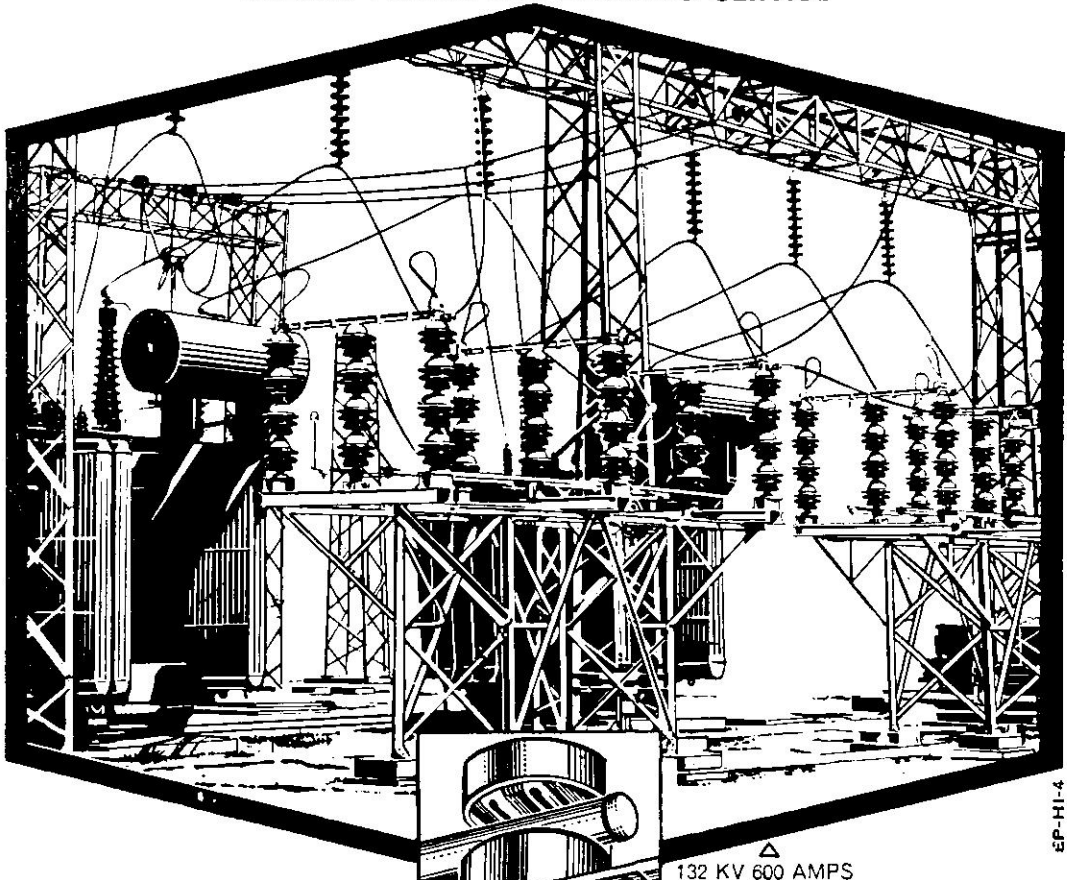

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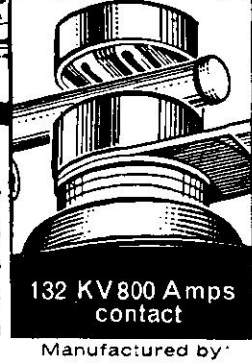

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INDUSTRIAL TRAINING IN UK

In a White Paper presented in December 1962 to the United Kingdom Parliament, the Minister for Labour reported that the shortages of skilled manpower were an important factor in holding back the rate of economic expansion: "It will be impossible to secure the objective of a steady and more rapid rate of economic growth unless skilled manpower is available on a growing scale. This means that the rate of Industrial Training must be increased." The authorities also felt that the export drive of the United Kingdom was greatly handicapped by the quantity and quality of training facilities at the disposal of competitive industry abroad.

As these fundamental facts apply, in fact, with greater force to the Industrial Economy of this country, the Editor of this Journal got in touch with the relevant authorities in the UK whose replies have been printed in the Editor's Correspondence in this issue of the Journal, as they throw light on how productivity questions are handled in the United Kingdom.

The major fact at the moment is that there is before the British Parliament an Industrial Training Bill* which was expected to become Law by this time. It embodies with few changes the proposals put forward in the White Paper on the subject. It is a matter for some significance to record that in the course of its discussions with the employers, trade unions and educational organisations, the Ministry of Labour encountered little opposition to the plan outlined in the White Paper.

THE TRAINING ACT IS DESIGNED TO SECURE THREE MAIN OBJECTIVES: an adequate supply of trained workers; an improvement in the quality of training; and a more equitable distribution of the cost of training between firms. The Act empowers the Minister to set up industrial training boards for particular industries; and it lays upon these boards the responsibility for securing the provision of sufficient training courses to meet the needs of their respective industries. Boards will also have a duty to publish recommendations as to the nature, length, content, etc. of training for occupations in their industries. The scope of the industry for which a board is established will be set out in an industrial training order, which will be a statutory instrument. Before making an Order, the Minister will be required to consult representative organisations of employers and employees.

Industrial Training Levy and Grants

The Act provides two main instruments by which the boards will be able to secure sufficient training of a reasonable standard—the levy and the grant. The Act requires boards "from time to time and whenever directed by the Minister" to submit proposals for raising a levy from employers in their industry. If the Minister accepts these proposals, he will make a levy order giving statutory effect to them. Every employer in the industry, who has not been specifically exempted by the levy order, will then be required to pay a levy at the specified rate. Those employers who provide training of an approved standard (that is, in accordance with the "recommendations" published by the board) will, however, be eligible for grants from the board. In this way, those employers who provide no training will contribute, through the levy, towards the costs of those who do. Moreover, by tying the payment of grant not only to the amount but also to the quality of training, the board will provide a considerable inducement to firms to raise their standards of training. If sufficient training is not provided by individual firms, the board will be required to make arrangements for others to make good the deficiency; or it will be able to provide training in its own centres

**It became law on the 12th March 1964—Editor*

(the cost being met out of sums raised by levy).

Composition of Industrial Training Boards

The Bill lays down that boards "shall consist of equal numbers of employers and trade unionists", and of educational members "appointed after consultation with the Minister of Education and the Secretary of State for Scotland". The chairman must be a person having industrial or commercial experience. The Bill does not say how many members a board is to have, nor how many educational members. The Minister will therefore be at liberty to vary the size of boards between one industry and another. He has, however, made it clear that he wishes the boards to be as small as possible—perhaps, in a typical case, consisting of a chairman, 5 employers, 5 trade unionists and 3 educational members. In addition to these, the Minister and the two Education Ministers (and other Ministers where appropriate) will have the right to nominate an officer to attend the meetings of boards.

Boards will be required to submit to the Minister not only levy proposals, but also proposals as to the way in which they intend to exercise their other powers. If a board made no real effort to improve training in an industry, the Minister would have an ultimate sanction.

Voting

The general policies of the Board will be decided by a vote of the whole Board, but only the equal groups of employers and trade unionists may vote on matters relating to the imposition of the levy. This is to ensure that, while the employers do not have a sole voice in decisions about the levy, they cannot (if they are of one mind) be outvoted in such decisions. The levy will, however, have to be high enough to enable the Board to secure sufficient facilities for training in its industry; and the Minister would almost certainly wish to reject levy proposals which were too low for this. Thus the effect of the restriction on voting on the levy is to ensure that expenditure over and above that needed to enable the board to discharge its basic responsibilities cannot be imposed by the rest of the board on unwilling employer members. If the union members wished to press a point which the employers opposed, they could use their vote to produce a deadlock; and the Minister would in the last resort have to intervene.

Training and Education

The Bill makes a *distinction between training and further education.* Boards are not empowered to provide, approve or pay for courses of further education as such, nor may they lay down the content of courses of further education. These matters remain the responsibility of local education authorities. What Boards can do is to approve a scheme of training which includes attendance at a particular course of further education; and to make such attendance a condition of grants to firms. Where, however, training courses (as opposed to courses of further education) are provided by a local education authority, on behalf of a board and to standards set by the board, the board will have the power to repay the local education authority the full cost. Thus courses which are, properly speaking, the responsibility of local education authorities will be provided and paid for by local education authorities; whilst courses which are the responsibility of industry may in some cases be provided by local education authorities but be paid for out of the levy.

Government Grants

The Bill enables the Minister to make *grants or loans to training boards up to a limit of £ 50 million.* This limit may be extended by an order approved by both Houses of Parliament. Conditions governing grants to boards are not laid down in the Bill but will be subject to negotiation with each board. The Minister has, however, made it clear that he intends to *relate grants to expenditure calculated to bring about the most rapid and substantial improvement in training in industry—*

that is, not to total expenditure by boards, but to expenditure for approved purposes. He has also said that *the greater part of the cost of industrial training should be met by industry, through the levy.*

Occupations in More Than One Industry

The Bill envisages the organisation of training on an industrial, not on an occupational, basis. This will create some problems, particularly in relation to those occupations (notably engineering and building, and commercial, clerical and administrative occupations) which are to be found in almost every industry.

Since each board will be responsible for all occupations in its industry, there is some danger that a wide variety of standards may be established for the same, or similar, occupations in different industries. It is partly to guard against this that the Bill provides that each board's proposals must have the Minister's approval: he will be able to encourage boards, so far as practicable, to adopt uniform standards. In addition, there is provision in the Bill for the establishment of joint committees of several boards; and these committees could be charged with responsibility for working out a suitable pattern of training for the several industries concerned. Finally, the Bill enables one board to provide training on behalf of another. Thus, for example, a board for the chemical industry might come to an arrangement with the engineering board under which the latter trained engineering craftsmen for the former. In each of these ways it is hoped that standards of training in different industries will be kept as uniform as possible.

Central Training Council

The White Paper contained no suggestion that there should be a Central Training Council, but the idea has been urged most strongly by the TUC and has been widely supported. The Council will consist of a Chairman and up to thirty-three members, including six employers and six trade unionists, up to six Chairmen of Boards, two representatives of the nationalised industries, six educational members, and six independent members. The Council is to advise the Minister on the exercise of his powers under the Bill and on industrial training matters generally. It will not be, as some have suggested, an executive body; nor will it have its own staff and finances. Responsibility for implementing the Bill will rest with the Minister (and, in their turn, with the boards).

The Immediate Future

The Bill was expected to become law this Spring. The Minister had in fact said that he hoped to set up the first Boards, to cover the engineering and construction industries, within three months of the Bill becoming law. Discussions with these two industries on the major issues to be decided (e.g. definition of the industries) have been under way for quite some time. A programme for the setting up of further Boards is being worked out and exploratory discussions have been held with a number of industries (notably iron and steel, and woollen textiles).

The Training Department has been expanded to deal with the Bill and with work arising from it. A Technical Advisor on Industrial Training, Col. AL Work, has been appointed; he will advise the Ministry on training matters generally and on the proposals submitted by industrial training boards, and will head a small inspectorate which will have the major responsibility for satisfying the Minister that the boards are carrying out their functions effectively.

★

The British Are Really A Productive People !

"We have a natural gift for making things work, particularly social systems—and we have many of the aces."—*John Wellens*

TRAINING OF RUSSIAN MANAGERS*

JOSEPH P SCHWITTER

Dr. Joseph P. Schwitter, Professor of Industrial Administration and Production, Kent State University, Ohio, United States, is a knowledgeable person, with an exceptional understanding of management at the international level. Apart from participation in discussions regarding the Soviet system, he has himself studied it on the spot in the USSR itself. The piece presented below is an original contribution. It has however been somewhat abridged partly for reasons of space, but mainly to eliminate the political *obiter dicta*, not essential to an objective analysis of Soviet management practices and traditions.

IN MANY WESTERN COUNTRIES, THE TOP managers might be owners or entrepreneurs. As such the management functions consist of *deciding* upon short- and long-term plans, of formulating policies, and of controlling employee performance. But in Russia, the managers, for the most part, execute plans or policies that have been set by higher administrative agencies or by laws or by people above the factory level.

Thus the functions of the Russian industrial managers seem more one of implementing than of determining plans and policies and more one of executing rather than controlling, and more one of technical rather than entrepreneurial or top-management character. This difference in function may explain why today the majority of Russian managers are engineers, and why technical competency is emphasized in their education and training programmes.

Training of professional managers in the Soviet Union has undergone many phases from the idea that the *management is no job at all*, through its being considered a largely political business, to the present position of the Russian Manager being a highly competent, differentially paid and deferentially treated member of the Soviet Society.

The whole position needs to be considered against the relevant historical background. In the last 40 years, Russian education has been characterized by a rapid expansion of educational facilities and by frequent changes and new programmes. Views and experiments ran from an idealistic 'labour school', where practical knowledge of nature, labour, and society was emphasised and general education neglected, to a strong, sober training in the fundamentals of physics, chemistry, mathematics, native language, geography, etc., upon which specialized vocational and higher education could be built.

In recent years, it was found that education on all levels had serious shortcomings. The main ones were a certain divorce of schooling from life and the insufficient preparation of young people for practical work. Thus in 1958 a law was enacted to establish closer links between schools and life and to further develop public education in the USSR. The main feature of this law is 'polytechnical education'.

This concept means generally that all subjects should be taught with practical illustrations from farm and factory work. Specifically, production or farm training is to become a part of the curriculum. This training

* Readers of this Journal would be well advised to read an authoritative exposition of Technical Training in the USSR, by H Zelenko (Chairman of the State Vocational and Technical Training Committee of the USSR Council of Ministers) NPC PRODUCTIVITY Journal, Vol. I No. 4 page 194.

might be given in school workshops, on experimental farms, in nearby factories, shops, or stores. Also under the new law, primary and secondary education has been extended by one year. Now, *eight years of schooling is compulsory throughout the country.* The extension allows time to build the polytechnical requirements into the course programme at all levels and to deepen the general discipline.

In the last three grades of the old 10-year school in Russia, the percentages of hours devoted to different subjects vary from over 18 percent for mathematics, nearly 12 percent for physics, over 9 percent for foreign languages, nearly 9 percent for chemistry, around 6 percent each for physical education, shop work, geography, 3 percent for engineering drafting and 1 percent for psychology, etc.

A new trend is under way—establishment of boarding schools. Old secondary schools may be converted into boarding schools as new ones are opened. When in Russia several of us visited one, that comprised, besides the nursery and kindergarten, all 11 grades. The Deputy Minister of the Tadzhik Republic told us that within ten years, 75 to 80 percent of all children up to 18 years of age would be educated in boarding schools. The reason was, as he said: "We want to help the parents who work and cannot properly take care of their children".

Since *Russians like to experiment*, experimental schools are not unusual. A visit to a so-called Prolonged Day School showed that the children remained there from eight in the morning to six in the evening. Lessons, meals, recreation, homework, shopwork are under the watchful eyes of the teacher.

In the Russian universities the usual faculties are physics, mathematics, biology, history, philosophy and geography. Emphasis is on the training of researchers, scholars, and scientists. The overwhelming number of institutions of higher learning are, however, independent institutes, for a large number of subjects we call applied sciences. The purpose of these institutes is to train professionals for industry, agriculture, administration, hospitals, schools, etc.

The diploma of an institute of higher education is somewhat comparable to our bachelor's degree. But students of Soviet education place it between a bachelor's and a master's degree. To advance to a candidacy or doctorate a student must be of high calibre and must demonstrate independent study and research.

Entrance to higher education is possible only through competitive examination. This is the means of controlling the enrolment of the higher institutions of learning in accordance with anticipated or planned demand for the various skills.

It is significant that these institutions can accept only 20 percent of the freshmen quota directly from the 11-year secondary schools. Evidently this is the cream of the graduates. The others must first complete two years' labour in industrial, commercial, agriculture and other enterprises. Then these students may apply, and if they pass the examination they may proceed in their academic training.

This is a part of the polytechnical training. Those that are among the lucky 20 percent receive their practical labour training during the first two years. They work on a nearby factory or construction site and go to their classes on certain days or evenings.

Where are the managers trained in this system? The answer is everywhere and nowhere. This generalization does not necessarily mean that the importance of education for industry and for the economy is not recognized. It means rather that the emphasis is placed on technical competency. Once this competency is acquired through formal education, how to work with people is then best learned on the job.

In addition, extra curricular activities play a very important part in Soviet education. Group activities in sports, music, theatre

languages, hobbies, excursions, and so on are numerous. They are purportedly developed to occupy the students in the evenings, over the weekends, and during vacations. Summer camps are numerous. Again, these activities offer opportunities for the development of leadership abilities. In particular, however, the Communist youth organisations, the Pioneers and Komsomol, are the training grounds for the future leaders in any phase of the nation's life.

If we search the Russian educational system for places where managers might be trained, we come to the economics faculties in the main universities of the republics. Typical is the University of Alma Ata in Kazakhstan where I interviewed the Dean. The faculty offers training in five different curricula: industry, trade, accounting, financing and economic planning.

Economics Institutes

To a certain extent these curricula appear to be the equivalent to those of our business administration colleges. There are courses in organization principles, and planning in the enterprise might be covered in one or two chapters in a textbook on economic planning.

Graduates of these economics faculties join the millions of clerical workers in huge governmental administrations. Some might be employed as staff personnel in industry, but generally they do not emerge as the line of top managers of industrial firms.

Besides the economics faculties are a handful of special economics institutes such as the Moscow State Economic Institutes or the engineering-economic institutes such as that of Leningrad. Those of the former type are similar to the economics faculties. The student gets to know formal organisation patterns. He learns something about chain of command, procedures and paper flow, etc., but not specific managerial problems. Here, as elsewhere *in Russian education, the emphasis is on facts and not on thought, technique, and decision-making.*

The economics-engineering institutes of Russia might have some similarity with our industrial engineering departments. Production planning and scheduling personnel planning, and some operations research are added to general courses and statistics. Again, education appears to lead not to line or top managers, but to staff managers in the country's industrial establishments.

Warner and Abegglen found that in 1952, 57 percent of top managers in America had college degreees. In a 1956 *Business Week* survey, the percentage was 62.2. Evidently there has been a slight increase since then. In the Soviet Union, according to recent studies by Granick, *the percentage of Russian enterprise directors with college degrees is in the nineties.* And practically all Russian managers have engineering degrees. It is safe to assume, too, that in the future such a degree will be a prerequisite to managerial advancement.

Alexander G Korol, in his "Soviet Education for Science and Technology", makes a comparison of the Mechanical Engineering curriculum in the Moscow Higher Technical School with the curriculum at Massachussets Institute of Technology. Briefly he found that the Moscow School had a five-year course of instruction, as compared with a four-year course at MIT; had 153 weeks of class instructions, as compared with 120 weeks at MIT; had 4,848 scheduled class hours as compared with 2,610 at MIT; and had an average of 31.7 class hours per week as compared with 21.7 at MIT.

The longer term and the heavier study load in the Russian school reflect the practice of combining basic science, engineering theory and fundamentals with training in specific applied skills. Specialised subjects such as machine tools, hydraulic equipment, electrical equipment, materials handling equipment etc., take up 1,149 hours of instruction or 45 percent of the scheduled time. At MIT such subjects might be electives.

In Russia the programme shows the emphasis on technical and practical training and also reveals the vocational character of engineering education. This emphasis is further testified to by the fact that the Russian student's share of scheduled time in science and engineering theory is only 21.5 percent as against 37.4 percent in the MIT curriculum. But while the MIT student has more class hours in physics and chemistry, *the Russian student has 388 hours of mathematics versus 180 of the MIT student.*

Another difference between the two curricula is in the humanities and the electives. *The Russian student has no electives;* the MIT students have electives 10.3 percent of the scheduled time. At MIT a student may take 13.8 percent of the scheduled time in any subject of the humanities. At the Moscow school the student must take 252 hours in Marxism-Leninism, 140 hours in political economy (economics), and 134 hours in foreign languages.

There is no room in the Russian curriculum for psychology or sociology, both of which are valuable for any manager. The subject closest to management is a course of 93 hours in organization and planning. This course is rather intended to familiarise the student with the organizational structure above the enterprise and with the mechanisms of general economic planning.

"Products" of the Russian engineering training are specialists that satisfy the immediate needs in the industries in an expanding economy. In recent years, Soviet critics of education have attacked the narrow specialization as being inadequate for higher managerial jobs and have demanded a consolidation of special subjects.

For example, in an article entitled "The Horizons of Our Future Engineers Must Be Extended", published recently in a Russian journal, the author demands that the training ought to be broadened into allied fields which would equip the graduate with knowledge in organizing and dealing with people in industry. This trend might well assume greater momentum in the future as the number of graduates increases and the need for specialists becomes less pressing than in the past.

Mention should be made that a Russian worker may over a prolonged time acquire a high school degree, and, subsequently, an engineering degree by attending evening schools or correspondence schools both of which are widespread and are promoted intensively. In the case of correspondence lessons, employers must give workers free hours with pay for studying and leaves of absence with pay for preparation immediately prior to the final examinations.

To conclude, in our industrial enterprises, management is sales-and-profit oriented. *In Russia, the management is production and output-oriented.* Here, management is basically still self-determining; there, management must fulfil the quota that has been set outside the enterprise.

In Russia, the aim of general education is to develop managers who fit into the complex machinery of a collective industrial organization. Engieering training provides them with technical competency, while experience on the job shapes the professional managers.

A study of and personal contact with Russian managers give reason for making this appraisal: Russian industrial managers of today and the future are qualified professionals. They are confident of their endeavours, proud of their achievements, and devoted to their tasks. They may quite frankly admit their weaknesses, yet they believe that their system is working and that they are moving ahead.

The Russians, as well as we, are convinced that political strength is based on economic strength and that progress in the economic field is possible through qualified, devoted managers of industrial enterprises. In this sense, the Russian manager is our competitor. And what has been said about the education and training of the Russian managers might be regarded as a stimulus towards "improving our own management organization".

AN APPRAISAL OF TRAINING IN UK*

OF THE BOYS IN THE AGE-GROUP 15 TO 17 INCLUSIVE, only one-third — those entering the skilled or apprenticeship trades—start on a formal system of training. More than half —the non-apprentices—enter the so-called semi-skilled occupations for which, apart from a few worthy exceptions, they receive little or no training. The remainder, making up less than 10 percent of the total at this level, take up clerical work for which there is no nationally accepted system of training.

For girls, a figure often quoted is that one girl in six within this age range receives training for a period approximating to one year, but, in actual fact, this figure is greatly inflated —one in sixteen would seem to be a more accurate estimate.

In fact, for girls generally, commercial workers and the non-apprentices, which together make up about 3 quarters of the intake at this level, there is practically no formal or recognised training at all, and certainly no compulsory training. There are however rare instances where members of these groups do receive training comparable to training abroad.

Later school-leavers receive better treatment. Large numbers of the direct entrants at this stage enter some organised system of training which combines a formal academic course—at a technical college, for instance—with practical training inside the company. How this combination is brought about, whether by day-release study, or evening study, by block-release for periods of six weeks or so or by sandwich courses of longer duration, depends upon the vision of the company—and its financial resources.

We do this type of training very well. Where we fall down at this level is that we do not train enough young people for our national needs. A conspicuous weakness is that the system is remarkably insensitive to new requirements: it has been very slow to generate that type of employee who combines a training in engineering with a training in business—one of today's great needs. Training, the device by which the industrial society should keep its established labour force uptodate, arouses little or no interest.

A large proportion of late school-leavers proceed to further full-time education in universities and colleges—for training as teachers, doctors, engineers, architects, lawyers and some with no chosen profession. Even at this level, academic instruction is coupled with practical occupational training: a teacher will do his school practice, a young doctor will pace the wards. It is, in fact, in the teacher group that we find one of the best examples of the techniques employed in occupational training—the Hunter College Experiment.

However unsatisfactory may be our arrangements for 'initial training', the arrangements for 'promotional training' and the 're-training of established workers', are far more defective. As new techniques, new equipment, and new materials come into use, there is a need to re-train employees in their use.

The 're-training of manual workers' is a microscopic problem compared with the problem of training for management. A craftsman has his apprenticeship, however inadequate, but most of our managers in industry and commerce are doing their jobs without having received any training whatsoever in the art of management...Our top management people think that *management training is for boys not for men.*

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* *For this article dealing with Training in UK, USA, France, West Germany and Australia, we have drawn on Mr Wellens'* TRAINING REVOLUTION—*Editor*

Between the inadequately-trained 15-year-old entrant and the hopelessly-trained manager lie several strata which, if this is possible, receive even less training. Of these, our vast army of foremen and supervisors is the most outstanding example. On the bench today, part of management tomorrow, well over 95 percent of Britain's foremen do their jobs without being trained. And the situation in industry is mirrored in every other section of the economy.

In USA

AMERICANS have been the most ready to throw overboard the old, failing system. The year 1920 saw the start of a concerted effort to develop a uniform national system of apprenticeship, although it was not until 1937 that the Fitzgerald Act brought in the modern system in the shape of a national apprenticeship law. Thus, starting off with the classic form of apprenticeship the Americans have shown a remarkable readiness to adapt, particularly since 1920.

The American system is noteworthy in that the length of apprenticeship varies in the different trades—two years for a barber, four for a moulder. There is no upper or lower age limit: apprentices in their thirties are quite common in the States. Indeed, a British productivity panel on a visit to the States came across one apprentice aged 60. Apprenticeship in adult life accords well with the American desire for movement—from place to place, from job to job, from trade to trade.

Americans raise a training levy, with which the unions are very closely involved. Some unions, on their own initiative, spend large sums on training. The Americans have tackled the training syllabus problem effectively. A training syllabus exists for every trade: in the quality of these individual syllabuses and the wide range of trades which they cover the Americans are pre-eminent. They have completed the business of defining jobs and prepared a *Dictionary of Occupational Titles* and a numerical method of codifying jobs—so have we (the British), of course, but our hearts are not in it.

The system of occupational training in America covers the whole field, too: there is good foremanship training, excellent management training and probably the best training and re-training of adults in the world.

The Americans solve the problem of management training very well: their solution gives them what they want—very large numbers, at many different levels, with two or three very advanced forms of training, for example the Harvard Business School, at the apex of their national system.

In France

THE FRENCH, THANKS PARTLY TO NAPOLEON BONAPARTE, have a system unique in the world, which produces, in appreciably large numbers, the top level, international-type manager, who, in his forties, can move freely between board room, manager's office, university and government administration.

Apprentice training in France is centred on the *colleges d'enseignement technique*, previously called the *centres d'apprentissage*—in which the Technical Section of the Ministry of Education provides complete theoretical and practical training for over 200,000 young people, in a three-year full-time course, terminated by an examination and subsequent certification. The De Gaulle administration has welded these apprentice training centres very tightly into the five-stream system of State education. This system maintained by the Ministry runs alongside an industrial system in which the boys are trained inside the firms. Renault has a particularly impressive training system.

The French have a widespread and effective system for training the workers in very small family businesses. All forms of craft and elementary commercial training, both initial training of juveniles and the re-training of adults, are terminated by national examinations.

In West Germany*

IN WEST GERMANY the period of apprenticeship is from three to three and a half years. Attendance at technical college is compulsory throughout apprenticeship or for three years, whichever is the longer. There is a final examination at the end of apprenticeship. If he succeeds in this examination the apprentice gains a skilled worker's certificate. If he fails the first time, he has a second and final chance six months later. Failure at the second attempt bars him from achieving skilled status, though not necessarily from a skilled job. The possession of a skilled worker's certificate is important because employers attach great weight to it. An unqualified man, for instance, is likely to be discharged before the qualified man in the case of redundancy, irrespective of length of service. German trade syllabuses are good and they are kept up-to-date very methodically. There is a great deal of flexibility on age of entry; training for promotion is well provided for, and follows immediately the initial crafts training in many cases. Small firms are catered for by a system of collective training workshops, though this system is in need of considerable expansion.

In Australia

THE VICTORIA (AUSTRALIA) SYSTEM—in many ways the model of the modern approach—rests on the Apprentice Act of 1928. This requires the Government to appoint a State Apprenticeship Commission, which is then responsible for supervising, guiding, and controlling all aspects of apprenticeship with the exception of wage negotiation.

There are three other types of body which, together with the Apprenticeship Commission, make up the complete pattern: State Trade Council in each trade to set out syllabuses, determine standards and deal nationally with matters in their own trades; Local Apprenticeship Committees to reflect, at the local levels, that general interest in apprenticeship which the State Apprenticeship Commission shows at the national level; and also Local Trade Councils for each trade.

In Victoria further provisions make for a very effective system. The Chairman of the State Apprenticeship Commission is the Chief Inspector of Technical Schools. In other regions the chairman of the local apprentice committee is always the head of the local technical college. All apprentices are required to attend technical college classes, or follow approved correspondence courses, so that the Chairman of the Apprenticeship Commission could have direct contact with every apprentice in the country within a few days.

This is the system which for many years has been organising a Victoria State Training Week, of which the 1961 Commonwealth Technical Training Week was a copy. In Victoria the main policy for its training week devolves on the Commission, which farms out its local duties to the local apprentice committees. The chairmen of the latter, since they are also the heads of the local technical colleges, and since *attendance at technical college is compulsory*, guarantee to contact all their apprentices and organize them. Thus a perfect system for arranging such an activity exists.

This Victoria model, though already slightly outdated, provides a complete framework which can produce results quickly. A feature of the system is that academic instruction and occupational training, both tend to come within the ambit of the Ministry of Education—a good thing for a system starting up. It is a system capable of giving leadership and that is why it is so relevant to the newer countries.†

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* *An interesting feature of the German apprenticeship system is that an indentured apprentice who fails at the national proficiency examinations can sue his employer, if his training has been inadequate.*

† *In 1961, India repealed its outdated pseudo-British system, based on an Act of 1850, and introduced a new system which owes its main inspiration to the model developed in Victoria, Australia.*

TRAINING OF INDUSTRIAL TECHNICIANS IN ISRAEL

J LEVITSKY

Head, Industries Department, Israel Institute of Productivity, Tel Aviv

FIELD TRAINING IN INDUSTRY HAS ALWAYS been one of special importance in the development of the Israeli economy. The rapid drive towards industrialisation in areas and among groups which have never before known industry, confronted the economy with the difficult problem of providing the necessary manpower with the appropriate skills, to man the full structures of organization required for a modern industrial plant. The large vocational training programme, both within industrial plants themselves and within special schools and training centres for both youth and adults, has been vigorously conducted by a special division of vocational training at the Ministry of Labour. The youth programme in vocational training has been carried on in conjunction with the Ministry of Education.

While a special division of the Ministry of Labour dealt with the vocational problem, the Institute of Productivity saw its main task in the field of training, in that of providing for the various managerial levels, from supervisory training to top executive development programmes. However, management development programme could not in itself be adequate; in the early 1950s most management techniques were strange to the country; there were not sufficient personnel trained and experienced in the application of these techniques to answer the needs of management, even when the top executives had been convinced of the need to introduce various managerial techniques into the running of their factories.

One of the important lessons learnt early in the history of the Institute of Productivity was that it serves no purpose and that it even has negative effects to whet the appetite of top management and raise their enthusiasm for modern methods only to find that when they seek the personnel with the necessary background to implement these techniques there are none available in the country. The Institute of Productivity, therefore, resolved in 1953 to train technicians with suitable backgrounds to specialize in the application of modern management techniques.

In addition to providing supervisors and executives with appreciation courses on such subjects as work study and production control, materials control, financial analysis, marketing, etc., a programme was laid down to train personnel in a few essential fields of specialization. The first major course of this nature was that for industrial engineers and technicians of whom nearly 1,000 are being trained in full-time and part-time courses in the major towns of Israel. The original courses were for 6 months full-time, and covered about 800 hours of tuition with major concentration on work study and industrial engineering techniques. Nearly 200 hours were devoted to training in time study and method analysis, with a further 100 hours devoted to production planning and control, and problems of plant layout and materials handling. The remainder of the course was devoted to such subjects as factory reorganization, incentive schemes, human relations, costing, elementary statistics, quality control,

maintenance, and some industrial law concerned mainly with labour relations.

Right from the start these courses were integrated with practical training specifically in the field of work study which was carried out by short projects in factories. At the end of the course, before receiving the certificate, each technician is required to carry through a larger project in the field of method study usually lasting 3 months and supervised by an engineer who also guides the trainee in the carrying out of the project.

In course of time it was found necessary to expand the course, adding more material on basic subjects like mathematics, engineering, drawing, materials and processes, machine tools, jigs and fixtures, and financial accounting, to provide a more basic grasp on the part of the technician of fundamentals on which his experience could be built. *Experience has shown that the training course is most successful if the participants have a reasonably good secondary technical education and have worked in industry for 2 or 3 years.* Their recognition as trained technicians by the local association of technicians usually requires a further 2 years of practical experience as technicians after the end of the course and the completion of the practical project. The yearly courses were for the most part full time. Later it was found that *it becomes difficult, without providing suitable financial help to the participants, to get together sufficient good candidates* who are able to attend a full-time course which, together with the practical programme is now a 12 months, course being over 1,200 hours of theoretical work apart from the practical work. The course is therefore conducted in the main as a part-time course with 12 hours of instruction during the week lasting over 2 years. The practical project is planned to take place at the end of the 1st year, the course being now divided into part I and part II with the practical project. Part I is devoted more to basic subjects but it has been found advisable to continue some of the basic subjects on a higher level in part II. Examinations are held at the end of part I and inevitably there is a fall off, but experience has shown that with proper selection procedures the fall off of participants is not more than 10 or 15 percent. Selection procedures include psychological tests which show the candidates' aptitude in mechanical matters, their grasp of mathematical problems and give some indication of the mental stability of their personality.

Two Ways of Looking at Productivity

Government

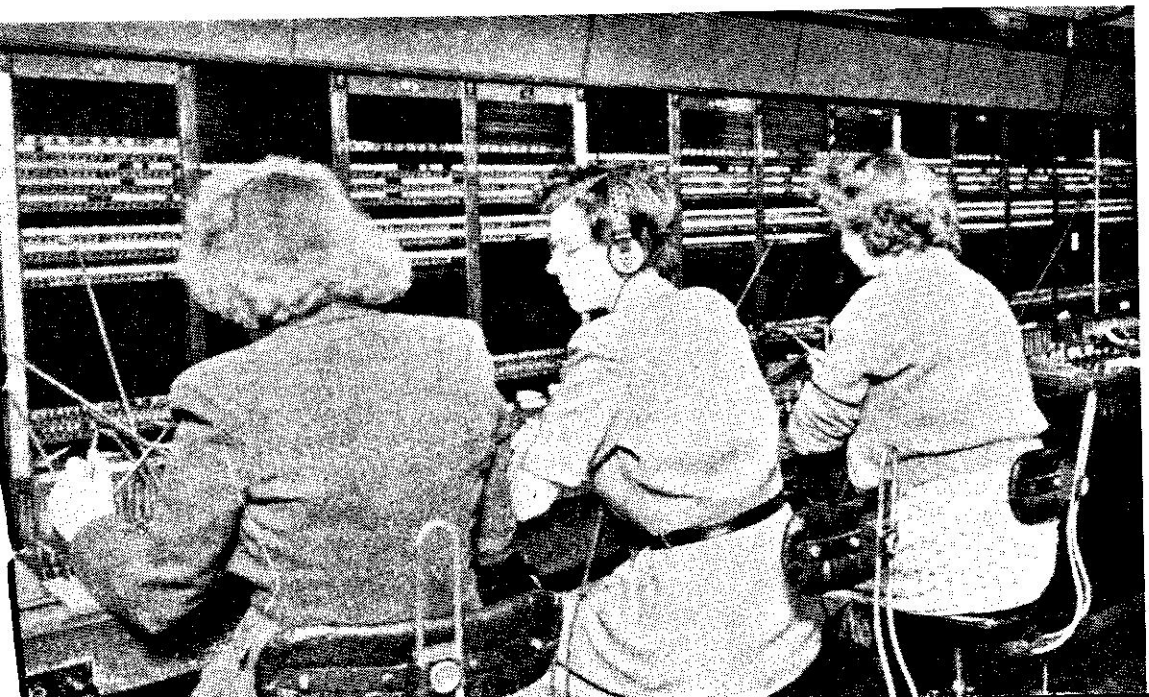
"...It has been an accepted fact, with few exceptions, that whenever any work is done by Government departmentally, it invariably turns out to be inefficient from all angles. Road construction offers, rather paradoxically, the first scope for practising stringent economy as well as creating wanton waste, depending on the agency undertaking the work..." *Indian Builder, Journal of the Builders Association of India, March 1964, Vol. 12 No. 3.*

Contractor

"...Before I close I would like to refer to one other matter relating to construction and engineering works generally. According to me, engineers all over the country should seriously consider the question of eliminating the contractor and getting works done departmentally. The benefits of this are well-known to you. The cost would go down, the work will be done better, the chances of corruption will be removed and the workers will be benefited." *From the inaugural speech of the Governor of Punjab (Sri Thanu Pillai) at the 27th Annual Session of the Indian Roads Congress held at Chandigarh.*

The importance of foreman training is now receiving some attention in the United Kingdom. Photo shows foremen trainees participating in a lively discussion during one of the classes

New telephone operators in UK learning their lessons from their instructress



A training class in progress for women employees of British Railways who sit at inquiry desks

A Syndicate settles down to Work at the Administrative Staff College in UK

Specialised courses for training in catering have been recently introduced in India. Photo shows a class in progress (By Courtesy of The Statesman)

Training courses are held for Hotel Managers in UK. Photos show issuing of stores from the kitchen (left) and learning of correct procedure at the bar (right)

Lessons about textile fabrics being imparted to a newcomer in a Department store in UK by an experienced colleague

Training classes in progress in UK for the new bank clerk (left) and the new post office clerk (right)

BELGIAN PRODUCTIVITY CENTRE

In the Field of Management Training

F VERLINDEUR
Adj. Delegate General
Office Belge Pour L'Accroissement de la Productivite to Rue La Concoide Brussels

The Belgian Productivity Centre (*Office Belge pour l' Accroissement de la Productivite*) of which the author is the Delegate General, was requested to contribute to this Special Issue on Training. It is interesting to record that the Belgian Productivity Council considers it its special obligation to "operate on the qualitative factors of growth", and very particularly on attitudes to work! The Training of Managers and Executives (including Union Executives) is a secondary aim: what is more important is the development of social sciences and their application to the working of enterprises.

THE "OFFICE BELGE POUR L'ACCROISSEMENT DE LA PRODUCTIVITE" pledges itself to contribute to the social and economic development of the country, essentially by *operating upon the qualitative factors of growth.* These factors are, on the one hand, the dynamism of the economic agents, in other words, the attitudes of men in the accomplishment of their work, whatever it may be, and more particularly their willingness to operate, their aptitude of adjustment to changes: on the other hand the optimum utilization of the available resources for the production of goods and services, in other words, the improved management of companies and organizations.

To fulfil this task, the general action programme of the Centre involves three different aims: the development of knowledge, the training of employers *and union executives*, the information and realization of the results within industry.

This article refers only to the second aim, training of managers and executives. It seems however necessary to link this aim with the first one, namely *the development of social sciences applied to the working of enterprises.* The introduction of the Activity Report 1962 of the Centre is devoted to this subject.

In the field of executive and management training, two types of education are to be developed. The first one, of a more general kind, aims at *situating the executives' responsibilities within the economic and social context*, at furnishing them with a general view on the problems put forward by the working of economic organizations. Such programmes are meant for managers and senior executives of the companies, on the one hand, for union executives on the other hand. For several years, considerable efforts have been made by the Belgian Productivity Centre.

Another type of training involves the techniques of commercial management, of production, of personnel management, etc.

In a general way and in both these cases, *the need for some links with research*, the anticipated influence, on a long range, upon the traditional education, require more or less *a marked participation of high schools to the realization of these programmes.*

These programmes were initiated in 1954 with the help of the universities. They have been given a *substantial aid from private industries through the Industry-University Foundation.* Each year some 300 enterprise managers and senior executives attend training seminars which have an average duration of 4 weeks. The university centres, created in this respect, have proved to be also able to respond to the need for training of public officers. In the future, the general kind of this training will be more and more emphasised and the training will also include young future executives. The scientific personnel within the University management training centres involve about 50 persons, hired and trained according to criteria which are the same as those applying to research centres.

Training Programmes for Union Executives

These programmes are meant for the different levels of the union organization. They aim at enabling the union officers to get an exact idea of the problems of economic and social development, seen from the point of view of qualitative factors, problems which they have to face in their action. Each year, about 5,000 participants attend these programmes, the duration of which varies according to the level they are meant for.

Unions themselves are responsible for these programmes, though the Centre coordinates them. Within its framework, university professors give lectures and lead conferences. The contents of the programmes may vary; their scope, however, remains the same: the enterprise, productivity and its economic, social, psychological, technical implications, industrial relations within the move for more productivity and expansion. In the future, the programmes will be enlarged, as a result of a study of needs. Furthermore, better contacts will be made with higher education.

Practically there is no educational institution, adapted to the actual development of management techniques. The accelerated evolution of the same requires a periodical re-training of executives, a re-training which does not exist either. So, *it's necessary to operate progressively upon the structures of high school education* through some specialized training programmes meant for specialized executives of enterprises, public services or unions. This action, however, requires a global policy, which enables to take initiatives, according to the anticipated needs and to avoid repetition. It will now be up to the Centre to play this part, after the Centre had had some kind of experience within limited fields, as there are:

—**Work organization for executive mine-engineers : for more than 6 years the *Faculte Polytechnique* of Mons has been given a full time extensive training of 6 months' duration linked up with practice in the mines.**

—**Production management: meant for engineers, production managers; the training is also given at the *Faculte Polytechnique* of Mons since 1961 and at the *Ecoles Speciales* of Ghent University since 1962. Furthermore, from this year on, a degree of 'scientific civil engineer in industrial management' will be created at the *Faculte des Sciences Appliquees* of Louvain University.**

—**Commercial expansion: a first initiative limited to the problems of forecasting and commercial research. The programme has been realized with the aid of a specialized institution and will afterwards give rise to a complete and extensive programme, to set up with the aid of Higher Commercial Schools.**

—**Personnel management: a special group deals with the problems of the contents of a specialized personnel management training programme.**

Why Foreign Policy is Unproductive

"We are clinging to old myths in the face of new realities...We must dare to think about unthinkable things..."

—Senator William Fulbright

DEVELOPMENT OF SKILLS IN CHINA

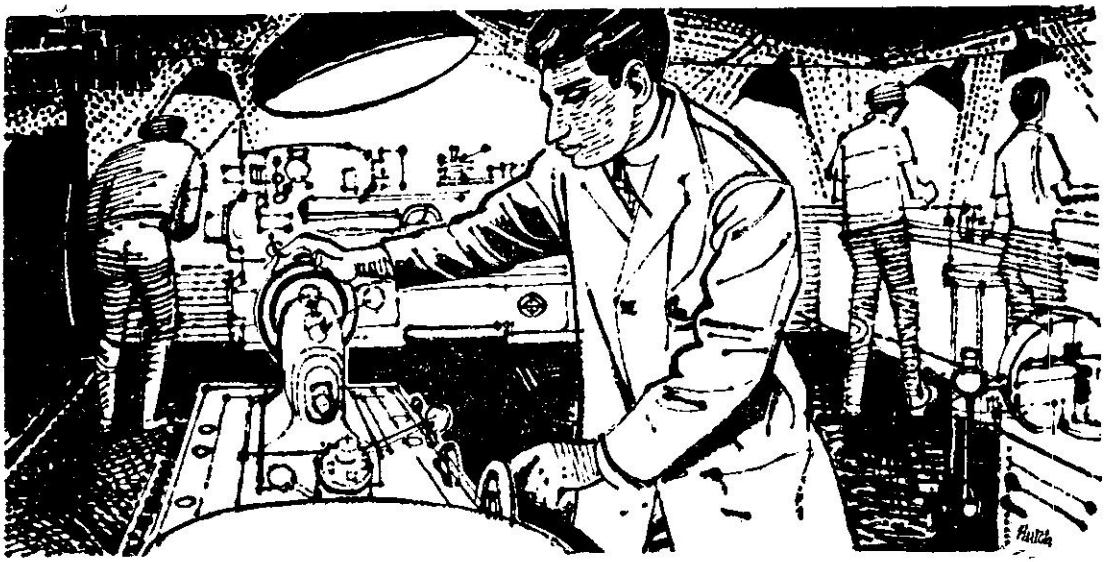
FOR A DEVELOPING COUNTRY, THE IMPORTANCE of skilled labour is obvious. In the case of China the dearth of skilled labour has been a particularly acute problem. Even when the Chinese had technical help from the USSR, they were hard put to it to staff their new plants. It was not uncommon for steel workers to get a few weeks'—and sometimes a few days'—training at Anshan and then to be put on as skilled labour.

Despite the 'Great Leap Forward' the vast mass of Chinese labour however could not be trained overnight. There were farmers, fishermen and herdsmen in plenty but few who could do more in the technical field than mend a domestic tool. The 'quick-training scheme' did not even touch the fringe of the problem.

The major consequence of the recent shake-up in the Chinese economy is a realization that the real handicap in development is the paucity of skilled labour. To get over the difficulty and to ensure all-round, sustained industrial progress, the authorities have now launched a movement to 'compare with, learn from and catch up with the advanced units and to assist the backward units'. This is something like a Chinese adaptation of the technique of Inter-Firm Comparison. In the Peking-oriented approach to industrialisation, the 'not so efficient plants' have been forced to take positive steps to catch up with the better ones. According to the *People's Daily*, groups from each 'backward' enterprise should visit the advanced ones to pick up tips on how to improve production. The NCNA reported recently that about 10,000 workers from coastal cities and industrial towns in inland provinces had trekked to Shanghai to learn from the methods in use there. These included plant directors, engineers, skilled workers and ordinary labourers from the steel, machine-building, power equipment, chemical and textile industries. This only means that the Chinese are only doing on a larger scale what we are doing through In-country Teams, Circuit Schemes, etc.

To emphasise the importance of the movement, the workers back from training are usually accorded public welcome which is attended by top officials of the State. According to Radio Sian, the Sian Municipal Party Committee and the People's Party Committee and the People's Council held a public reception on December 27 to 'welcome home the first batch of workers who had gone to Shanghai to study progressive experiences'. This meeting and other meetings convened for the purpose 'called on Sian workers to launch an upsurge of learning from Shanghai and catching up with the progressives'. All these meetings were attended by the top officials of the Northwest Bureau and the local rulers.

The gravity of the problem was brought to the fore by the Shensi People's Congress which concluded on December 30 last. The Congress declared that 'industry still needs to make adjustments. The quality and production costs of many products still lag behind progressive areas. Management still needs to be improved...we must make all kinds of steps to solve these problems'. The movement is inevitably given ideological justification by discussing the differences between the 'advanced' workers and the 'backward' ones in terms of Mao's theory of 'contradictions among the people'.



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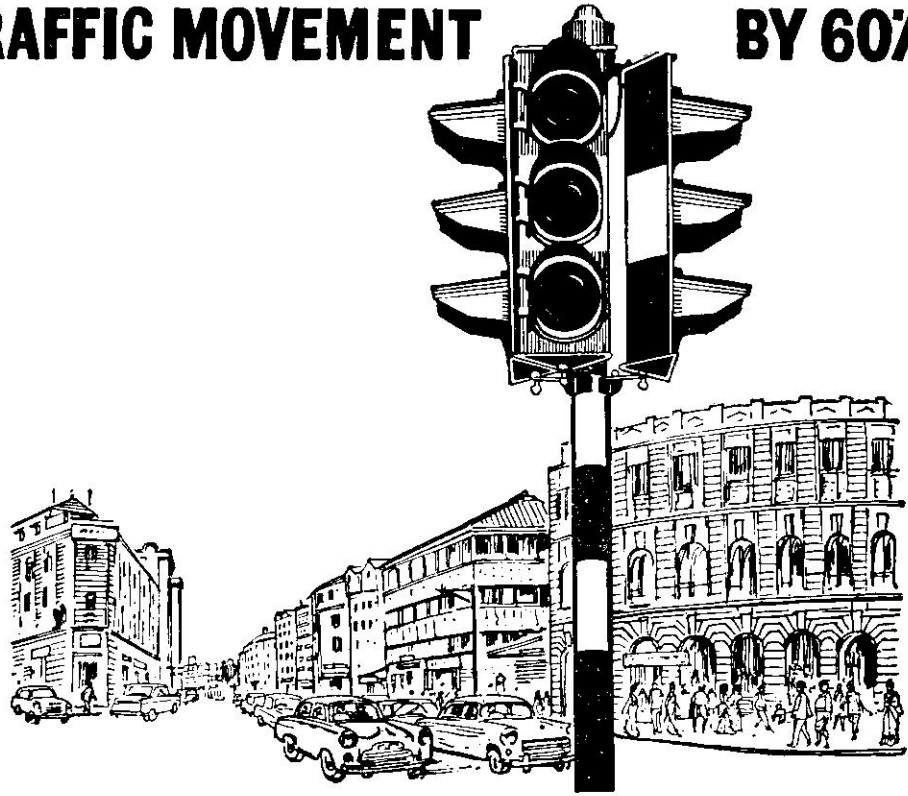

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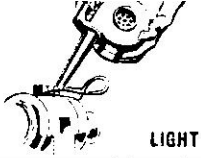

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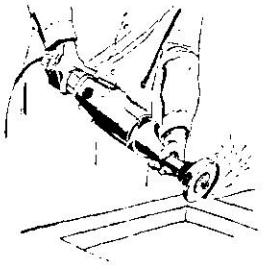

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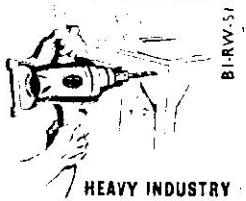

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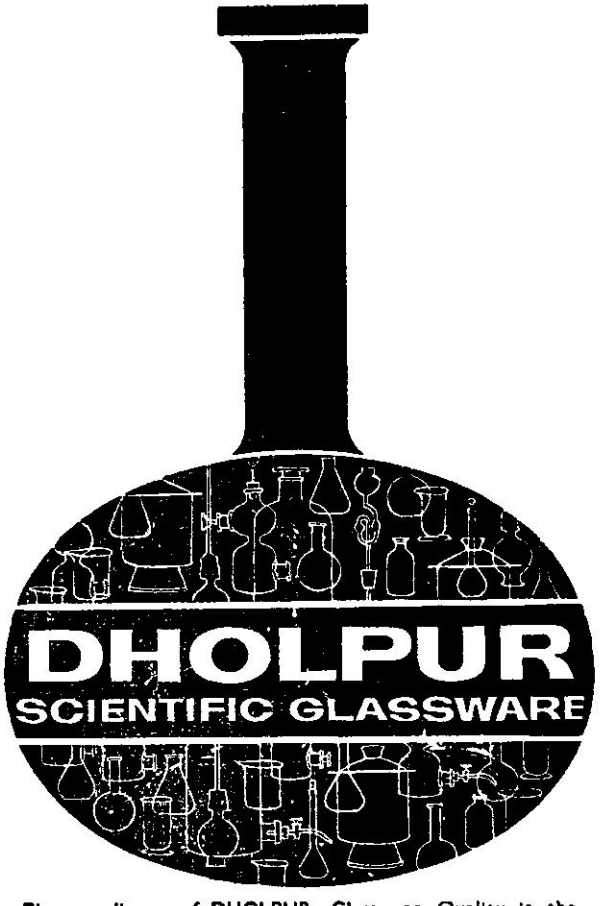

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While paying a tribute to the hands that are busy constructing a bigger, better Tata Chemicals, Mr. J. R. D. Tata said "...there is youth, there is an enthusiasm, there is a zest about the people here, there is morale, a belief in themselves—a confidence in themselves...".

THE HANDS THAT CREATE AND CONSTRUCT

Yes, it is this zest, morale and confidence which has transformed Mithapur, a township which owes its existence and prosperity to Tata Chemicals. Today it is a living example of what our young, enterprising men can do on their own, if given a chance.

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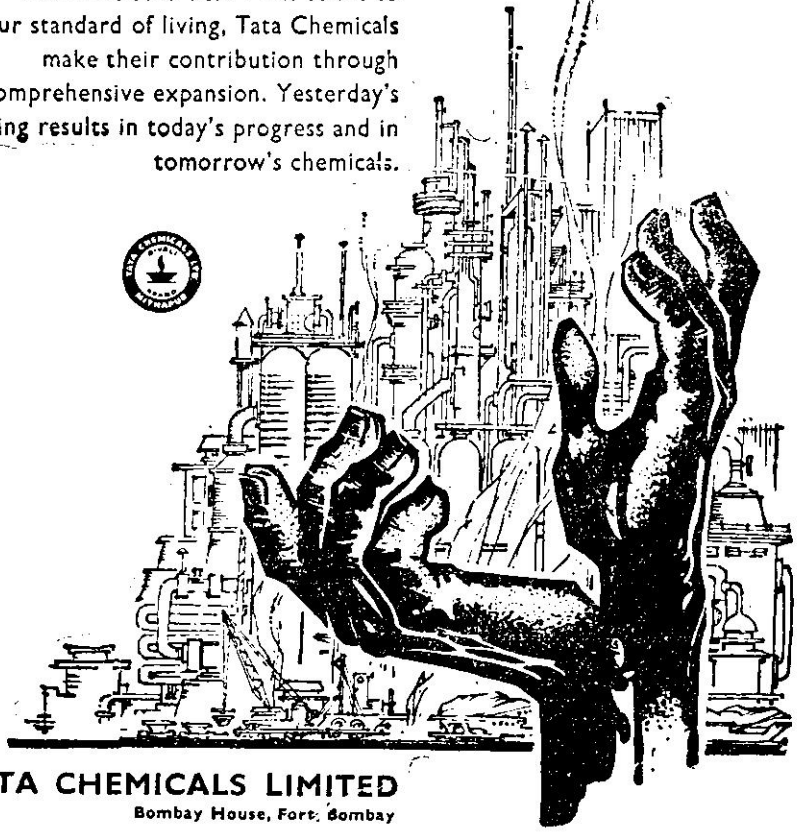

TATA CHEMICALS LIMITED

Bombay House, Fort, Bombay

THE BRITISH APPRENTICESHIP SYSTEM

In Great Britain, the traditional system of apprenticeship as it now stands has six main characteristics:

1. It is, with very few exceptions, of five years' duration, whether the trade is a simple one such as house-painting or a complex one such as cabinet-making.

2. There is no certification of the qualified craft-worker at the end of apprenticeship—all who enter the system at one end emerge from the other victorious and equal. So far as can be ascertained, it is the only training course of its importance in the country with *no failure hazard.*

3. There are rigid age limits above and below—a condition relieved by certain escape clauses which are only very rarely applied. Even in those cases where later admissions are permitted, the relaxation is normally for one year, possibly two in exceptional cases, never more—and this for young men with half a century of working life to offer to society. The escape clauses can be requested or granted by an employer in association with the union, but no boy can claim them of right.

4. It is not *necessary* to follow an academic or theoretical course alongside the practical training in order to become accepted as a qualified adult worker.

5. There is no national control of apprenticeship, nor any supervisory authority, and therefore no agreed standards and no inspection.

6. Training is invariably uni-craft, hence we fail to develop certain types of craftsmen for whom we have an urgent need. Of these, one of the most prominent is the skilled engineering craftsman able to service modern automatic machines actuated by a variety of servo-mechanisms.

Other weaknesses in the apprenticeship system are more chronic. Because there is no national control over apprenticeship and therefore no inspection, there is no uniformity. In the best firms training is magnificent, but this should not blind us to the fact that some apprentices—most, in fact—get no effective formal training whatever. Some engineering firms train their apprentices in special full-time training schools for as long as three years, at the end of which time the boy will be a craftsman of tool-room quality. This is training second to none in the world. Here in the very same works, the visitor will come across 18-year-old boys, selected because of their competence in trigonometry, being taught the highest craft job of all in the engineering field—that of jig-borer. It is not necessary to go to Europe to see this—simply to Birmingham. Yet a stone's throw away, in a firm near-by, a boy will be learning by being attached, for five weary and unprofitable years, to an adult craftsman from whom he picks up his craft as best he may.

Without doubt, the greatest single weakness of the traditional system of apprenticeship is that too few young people are trained in special full-time apprentice schools, and too many are expected to learn by standing next to an established craftsman, a practice ridiculed by the description 'sitting next to Nellie'.

One particular change, however, above all others, has destroyed whatever claim to efficacy the procedure of sitting next to Nellie ever had: the change in the method of wages payment to artisan workers from day-rate to bonus earnings. If a man is paid according to his output the attachment of boy to man can be an embarrassment to both. The boy is not in a correct learning environment; he tends to fight shy of asking questions for fear of reducing the man's wages. 'More output, more money' can come to mean 'more training for the boy, less bonus for the man'.

THE APPRENTICES ACT OF 1961

COL SG PENDSE
Central Apprenticeship Adviser and Director of Training
Directorate General of Employment & Training, Union Ministry of Labour & Employment

Systematic apprenticeship programmes are in operation in a very few industrial establishments in India. While there are some outstanding examples of apprenticeship training schemes administered on a systematic basis in establishments like the Railways and Defence establishments in the public sector and in certain leading undertakings in the private sector, Indian industry in general has not yet organised systematic apprenticeship training programmes.

TO MEET THE DEFICIENCY OF SYSTEMATIC apprenticeship training programmes the Government of India appointed in 1952 the Training and Employment Service Organisation Committee popularly known as the Shiva Rao Committee, to consider the basis on which Training Schemes should be organised to meet the needs of industry. Its recommendations were:

1 **Steps should be taken for the organisation of full-term apprenticeship programmes, in addition to the short-term in-plant training to be provided under workshop conditions in factories to those who complete successfully their training in the Industrial Training Institutes.**

2 **Efforts should also be made to encourage employers through voluntary methods to take in apprentices.**

3 **If voluntary methods do not succeed, Government may enact necessary legislation.**

On the basis of these recommendations, a scheme called the National Apprenticeship Training Scheme was prepared in consultation with the Indian Engineering Association, Calcutta. The scheme provided for direct financial and other aid to employers. This was for implementation on a voluntary basis.

As the voluntary measures failed to produce the desired result, the question of enactment of an appropriate Apprenticeship Act, to regularise and control the training of apprentices in industries, engaged the attention of the Government of India and the State Governments. Accordingly, the matter was discussed with the representatives of the Employers' Federation of India, the All-India Organisation of Industrial Employers and the All-India Manufacturers Organisation. The representatives of these organisations agreed that legislation should be undertaken for regularising the training programmes in the industries and also for ensuring the training of adequate numbers to meet the felt needs of the country. It was, however, considered that the proposed provisions should be examined in detail with a view to removing difficulties in administering the programme and achieving the required objective. A Special Committee consisting of the representatives of the three organisations and the Ministry of Labour and Employment was accordingly formed under the Chairmanship of the Minister of Industries. This Committee worked out certain draft principles, on the basis of which Government framed appropriate legislation for apprenticeship training. The purpose of the proposed legislation was

1 **To regularise the programmes of practical training in industry in such a way as to conform to standards, syllabus, period of training, etc.**

2 **To utilise fully the facilities available in industry for imparting practical training.**

With these objectives, the Apprentices Act was enacted in December 1961. This Act repealed the existing Apprenticeship Act (Act No. XIX of 1850) the provisions of which were outdated in the context of the situation arising out of our fast-expanding industrial economy. *THE APPRENTICES ACT—1964* authorises the Government* to specify, from time to time, the industries in which apprentices would be trained as also to specify and designate the trades in which training would be imparted, prescribing the age, the educational qualifications and standards of physical fitness for each designated trade for being engaged as an apprentice. The contract of apprenticeship between the employer and the apprentice would be registered with the Apprenticeship Adviser before the training actually starts. Government would also prescribe the period of training for each designated trade for an apprentice without previous trade training. In the case of apprentices who having undergone institutional training in a school or other institution recognised by the National Council for Training in Vocational Trades, had passed the trade tests conducted by that Council, the period of apprenticeship training would be such as may be determined by that Council.

Government would determine in consultation with the Central Apprenticeship Council for each designated trade the ratio of apprentices to the workers other than unskilled. Again in consultation with the Council, Government would approve the syllabus of practical training including basic training together with the list of equipment for basic training in each designated trade to enable an employer to make suitable arrangements in the workshop for imparting practical training to every apprentice engaged by him.

Recurring costs (including the cost of stipends) incurred by an employer in connection with practical training imparted to apprentices other than those who having undergone institutional training in a school or other institution recognised by the National Council for Training in Vocational Trades and have passed the Trade Test conducted by that Council shall be borne

(i) If such employer employs 500 workers or more, by the employer;

(ii) If such employer employs less than 500 workers, by the employer and the Government in equal shares up to such limit as may be laid down by Government and beyond that limit, by the employer alone.

Recurring costs (including the cost of stipends), if any, incurred by an employer in connection with practical training imparted to apprentices who having undergone institutional training in a school or other institution recognised by the National Council for Training in Vocational Trades and have passed the Trade Test conducted by that Council shall, in every case, be borne by the employer.

Where an employer employs in his establishment less than five hundred workers, the basic training shall be imparted to the apprentices in Government training institutes. On the other hand, if an employer employs in his establishment five hundred or more workers, the basic training shall be imparted to the apprentices either in separate parts of the workshop building or in a separate building which shall be set up by the employer himself. Government would approve in consultation with the Central Apprenticeship Council the syllabus for related instruction for each designated trade. The related instruction would be imparted at the cost of the appropriate Government but the employer would, when so required, afford all facilities for imparting such instruction. Government has authority to lay down the minimum rate of stipend to be paid to the apprentices under training, as also to prescribe the weekly and daily hours of work of an apprentice, the leave entitlement, and the form in which the records of the progress of training of each apprentice are to be maintained by the employer etc. The National Council for Training in Vocational Trades has been authorised

**Government means the Central Government, unless otherwise indicated.*

to conduct trade tests of the apprentices after the completion of training to determine their proficiency in their designated trades and grant certificates of proficiency.

Regarding Health, Safety and Welfare of Apprentices, the law lays down that

> Where any apprentices are undergoing training in a factory, the provisions of Chapters III, IV and V of the Factories Act, 1948, would apply in relation to the health, safety and welfare of the apprentices as if they were workers within the meaning of that Act and when any apprentices are undergoing training in a mine, the provisions of Chapter V of the Mines Act, 1952, would apply in relation to the health and safety of the apprentices as if they were persons employed in the mine. As regards employers' liability for compensation for injury, the Apprentices Act contains modifications in the Workmen's Compensation Act, 1923, in its application to apprentices. In this connection, it is important to record that except as otherwise provided in the Act *every apprentice undergoing apprenticeship training in a designated trade in an establishment shall be a trainee and not a worker and the provisions of any law with respect to labour shall not apply to or in relation to such apprentice.* And it is not obligatory for either the employer to offer employment or the apprentice to serve the employer after the completion of apprenticeship unless such terms are included in the contract of apprenticeship and such terms are considered reasonable by the Apprenticeship Adviser.

The Apprenticeship Act, analysed here, was brought into force on March, 1962, but its actual implementation commenced from January, 1963. The Act has established certain Authorities which have already been referred to. These are

a The National Council for Training in Vocational Trades

b The Central Apprenticeship Council

c The State Council for Training in Vocational Trades

d The State Apprenticeship Councils

e The Central Apprenticeship Adviser

f The State Apprenticeship Advisers

The names of these Authorities are self-explanatory. The authorities at (a) and (c) had been constituted some years ago. The Central Apprenticeship Council under the Chairmanship of the Minister of Labour and Employment was established in June 1962. The State Apprenticeship Councils have also been constituted in each State. The Central Apprenticeship Adviser who is the Secretary of the Central Apprenticeship Council is responsible for the implementation of the Act. The State Apprenticeship Advisers who are the Secretaries of the respective State Apprenticeship Councils, are responsible for implementation of the Act within their respective States, in respect of those establishments which come under the purview of the State Governments.

There are two types of apprentices under the Act: full-term and short-term. Short-term apprentices (ex-trainees who have completed 18 months' course in a Trade at the ITI) get six months, practical training on the shop floor, without any class-room instruction. They can however also be admitted as full-term apprentices in which case they undergo class-room instruction, as freshers without trade experience have to do. The latter's practical training includes basic training as also shop floor training, besides class-room instruction for seven hours per week: two hours in workshop calculations including science, two hours in engineering drawing, two hours in Trade Theory and one hour in Social Studies.

In its Notification dated the 12th February 1962, Government made the Apprenticeship Act applicable to the following broad categories of manufacture: sugar, cotton and jute textiles, wood and wood products, rubber, petroleum and coal products, chemicals, paints, fertilisers, medicines, cosmetics, soap manufacture, cement and cement products, iron and steel, non-ferrous metals,

hardware, armaments, machinery; electrical equipment, radios etc; transport equipment of all kinds; electricity and gas, transport services, watches and clocks; scientific, optical, surgical instruments etc. It is intended to cover the remaining industries stage by stage.

Government also laid down the minimum qualifications for the various kinds of trainees, their periods of training (six months for short-term appointments, three years for freshers, 18 months for ex-ITI trainees) and laid down in considerable detail, the qualifications for various industrial job classifications relating to work in machine shops, foundry trades etc. 23 trades have been so far designated.

Government had in the first instance designated only 14 trades*. For these trades, a minimum ratio of 1 apprentice to 7 workers (other than unskilled) has been prescribed. The requirements of industry are, however, enormous particularly in view of our expanding economy. This problem is further aggravated by the present emergency. Employers would therefore be well advised not to limit themselves to this ratio but train as many more apprentices as possible to aid the national effort.

The law has also laid down the recruitment procedure for employers. Full-term apprentices have to be recruited in the prescribed ratio with respect only to skilled workers. For example, if there are 70 skilled workers in a designated trade (not counting semi-skilled and unskilled workers) the number of full-term apprentices to be recruited will be 10. The employers may recruit either ex-ITI trainees or freshers or both as full-term apprentices. It is open to the employer to recruit all the 10 apprentices from ex-ITI trainees only, but the recruitment of all the 10 apprentices should be completed by January 1964, and thereafter the number should be 10 at any time to maintain the ratio of 1:7. If an employer desires to recruit all the 10 apprentices from freshers, the recruitment may be phased and completed before the end of December 1965. The law permits permutation and combination, the main point being the maintenance of minimum ratio of apprentices to skilled workers being attained by a certain date and thereafter maintained.

The recruitment of short-term apprentices has been similarly proportioned to the employment of semi-skilled workers and the prescribed ratio is the same 1:7, that is to say, there would be one apprentice to 7 semi-skilled workers, skilled and unskilled workers not being counted in the context; and the phasing and dating are on similar lines.

In this context we need to know how a skilled worker is defined: a skilled worker in a designated trade is one who possesses all the diverse skills in the trade, can read blue-prints and work independently according to blue-prints within the prescribed limits using the correct measuring instruments. He may be also defined as one who can perform all the essential operations etc as appended to the syllabus for designated trades.

A less-skilled worker in a designated trade is one who does not possess all the diverse skills but only one or two skills in the trade, can do work in his trade of a repetitive or simple nature, and that under guidance. He may also be defined negatively as a worker other than skilled and unskilled in a designated trade.

Expert technical bodies known as Trade Committees drawn from engineering establishments and Training Institutes have been formed to formulate and recommend each syllabus. This has been done and Government in consultation with the Central Apprenticeship Council, have approved the syllabus for practical training including basic training, syllabus for related instruction and list of equipment for basic training. Government have also prescribed the minimum rates of stipend and the forms for maintaining the progress of the apprentices. The object is to ensure that the training is imparted as per the prescribed standards. ● ● ●

* 9 more trades were designated in June 1963

APPRENTICE TRAINING AT HINDUSTAN INSECTICIDES

Hindustan Insecticides is the first organic chemical manufacturing factory in India. As such, it can reasonably claim to be a training base for the future requirements of the organic industries which are springing up from day to day. A step in this direction was taken in 1956 by inaugurating an Apprenticeship Scheme.

THE SCHEME WAS PRIMARILY INTENDED to provide trained men to man the expansion of the Delhi plant of Hindustan Insecticides and its second plant at Alwaye. It will in future serve the needs of replacement in the two factories and for any subsequent expansion.

The Scheme is being expanded to include vocational training for staff employed in the factory, to equip them with better knowledge of fundamental science and thereby help them to contribute to greater efficiency in plant operation.

The Apprentice Training Scheme provides for training to three types of apprentices

(1) Grade I Apprentices: Chemical Engineering Graduates.
(2) Grade II Apprentices: Diploma Holders and Science Graduates.
(3) Grade III Apprentices: Matriculates with Trade Training.

The duration of training for all the three cadres is fixed as one year.

The maximum eligible age for recruitment is 27 years. The recruitment is made after scrutiny of the applications, personal interview and medical examination. The number usually taken per year is twenty: this may be altered depending on the requirements of the Company. The candidates on joining are supplied with a blue-print copy of the flow sheets, a copy of the rules and regulations, and a bound register which they are to maintain as a diary of their daily work. These diaries are submitted by the apprentices once a week to the supervisor trainee, and once a month to the head of the section. Questions relating to the plant and general technical knowledge are put in their diaries every week by the Supervisor trainee, and these questions are to be replied by them during next week's submission.

Apprentices Grade I

The qualification for admission to this course is a degree in Chemical Engineering or a Master's degree in Technology. The Grade I Apprentices are trained in a manner so that after completion of training they may well fit in as Operators Grade I and later on in a supervisory position.

During the first month after joining, the apprentices are asked to make a study of the general layout of the plant, its different sections and the general process used in the manufacture. Along with this, the apprentices are given instructions regarding safety practices, first aid, fire-fighting and common hazards in the manufacture.

After this, the apprentices are assigned to different sections. Every apprentice is by rotation sent for a month to the workshop where he makes a study on the maintenance jobs carried out in the Factory. During this period, he is under the direct control of the Assistant Engineer (Mechanical) and a final report on the candidate's progress is supplied by him to the Supervisor trainee. He is then put for definite periods in various sections on shift duty under a Shift Engineer. During this

period the apprentices work for a few days under the guidance of an experienced Grade I Operator. They may then be given independent charge of the section if the Shift Engineer feels satisfied. Reports on the progress of the apprentices from the Shift Engineers are obtained once a month. These reports furnish an assessment of their initiative, capacity for work, leadership and team spirit, aptitude, diligence, attendance, punctuality and conduct, and care of materials and tools.

A study of the statements given by the Assistant Engineer, Shift Engineer and a final report of the Supervisor trainee is made at the completion of one year or earlier and the candidate's absorption into the rolls of the factory depends entirely on successful completion of training and this report.

Apprentices Grade II

The qualification for admission to this course is a degree in science or diploma in Chemical or Mechanical Engineering. Candidates with some industrial experience are preferred. On successful completion of training, Grade II Apprentices are taken as Operators/Fitters Grade II.

During the first fortnight on joining, these apprentices are treated exactly as Apprentices Grade I. They are then sent by rotation to different sections of the plant in shifts. They work under experienced Grade I Operators or Grade II Operators. An apprentice may be asked to take independent charge of the work by the Shift Engineer if he feels confident. Reports on the progress of an apprentice from the Shift Engineer are obtained once every month on lines similar to Grade I Apprentices.

Apart from the actual training in the plant Grade II apprentices are given an opportunity of attending twice a week the classes conducted for the Graduate Operators of the Company under the vocational teaching scheme.

Apprentices assigned to the Engineering Section are similarly given training in various sections of the workshop and then in the actual plant maintenance practice. Periodic reports are called for from their Supervisor/ Assistant Engineer.

The fitness of the apprentice to be taken as an Operator/Fitter Grade II depends solely on the reports given by Shift Engineers and the Supervisor Trainee. His promotion to higher rank is contingent upon his passing the trade tests conducted under the vocational training scheme.

Apprentices Grade III

Any candidate who has passed the Matriculation Examination can apply for this course. Candidates with a trade training certificate are given preference. Grade III Apprentices after the one-year course of training are absorbed as Operators/Fitters Grade III of the Company.

After spending a fortnight in the general shift getting instructions regarding safety practices, first aid, fire-fighting and common hazards of manufacture, the apprentices go into shift to be trained in actual working in different sections of the plant. Reports on the progress of the apprentices as in the other two cases, are obtained from Shift Engineers, every month.

Apprentices assigned to the engineering section are similarly given training in the various jobs in the workshop and thereafter in actual plant maintenance practice. They have to keep diaries, and periodic reports are called for from the Supervisor/Asstt. Engineer. These apprentices attend twice a week the classes conducted for the matriculate Grade III Operators of the Company under the vocational teaching scheme.

The chances of an apprentice being taken as Fitter/Operator Grade III depend on the reports given by the Shift Engineers. His promotion to higher position is contingent upon his passing the trade tests conducted under the vocational training scheme.

General Rules

Selection as an apprentice does not constitute a guarantee for employment in the Company. The apprentice, however, has

to enter into an agreement to serve the Company for a minimum period of 3 years in case of Grades II & III, and one year for Grade I Apprentice if a job is offered, failing which he shall refund all the money received by him during the period of training subject to the conditions of the Bond executed by him.

The period of training is normally one year. The apprenticeship period stipulated may not be rigidly adhered to. It may be reduced or enhanced according to the capacity and progress of an individual.

No hostel or any other residential accommodation is provided by the Company. The apprentices are to make their own arrangements for staying, messing and conveyance.

The stipends and pay-after absorption are as given below for the 3 different cadres:

Grade I: Stipend Rs. 200/- p.m.
Pay if absorbed: A total salary of not less than Rs. 200/- p.m.

Grade II: Stipend Rs. 140/- p.m.
Pay if absorbed: A total salary of not less than Rs. 140/- p.m.

Grade III: Stipend Rs. 100/- p.m.
Pay if absorbed: A total salary of not less than Rs. 100/- p.m.

At the time of joining, every apprentice is required to produce a surety of Rs. 1,000 (Grade I), Rs. 800 (Grade II) and Rs. 600 (Grade III).

Four

pretty maids in a row

The Tata group of four cotton textile mills, equipped with 316,000 spindles and 6,850 looms, is one of the largest in India, manufacturing in grey, bleached, dyed and printed varieties a total of 160,000,000 metres of cloth annually, out of which 21,000,000 metres are exported to the world.

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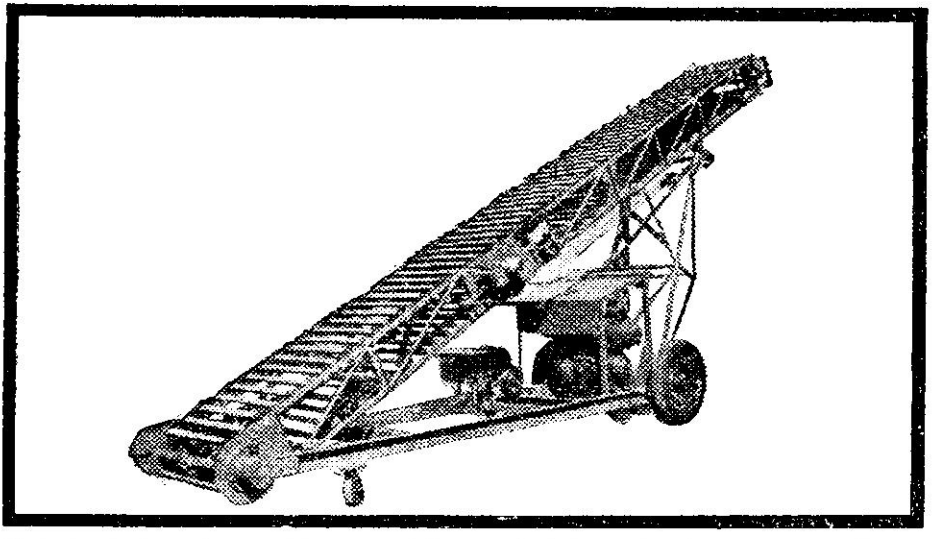

Photograph above is one of the several Dynacraft Portable Slat Conveyors supplied to the Director General, Border Roads. The slat conveyor is used for the movement of bags weighing 200 lbs and over.

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NPC CRASH TRAINING PROGRAMME AT THE B.E.L.

BULLOCK & VARDHAN*

In the wake of the National Emergency, the NPC was called upon to do a bit of a job at the Bharat Electronics: rapidly training their boys to operate modern tools and equipment to enable the Company to achieve more than a doubling of their production target. It was the first serious challenge to the talent and resources of the NPC to demonstrate on the shop floor the possibilities of productivity techniques. Actually, it turned out to be something more—really a lot more—than a mere demonstration of techniques. It was something like a front-line military operation with the Crazy Bullock* as our then Chairman (Sri HVR Iengar) called him—rolling up his shirt sleeves, with eyes all on fire and his tongue in the cheek—going over from one production machine to another and directing the boys (often in military language) to mount up an offensive. It was an army attitude: costly production equipment had to be safeguarded; boys had to be trained not only to use them but to turn out usable goods and the whole system was to be marshalled into an efficient machine, not only for the short-term results demanded by the Emergency but also the long-period end of making the BEL as a model productive organization, with a highly efficient tooling system, an organisation of Production Planning and Control, a Preventive Maintenance System, an effective and economical system of on-the-spot Quality Control and much else: a rather long story which forms an integral part of the full narrative of Bullock & Vardhan but to the regret of the Editor, has to be cut out here; as also the richly deserved praise showered upon this rather modest venture of NPC, by observers from sister institutions: ITI, LRDE, HAL, REMCO, MICO and others. The story printed below relates largely to Training which is the main interest of this Special Issue.

IT IS PROBABLY NOT TO THE POINT TO SAY that we have, for six months on end, literally enjoyed the Midnight Crash Training Programme at the Bharat Electronics. It is the results that are really gratifying.

It has been feasibly demonstrated to Industry that the dynamic approach to the variety of problems faced by them in the training of skilled personnel, increased utilisation of equipment and men, effecting better methods of operation, improving efficiency—

*The cut photographs in the Cover Design and on the leading article (page 215) as also the full photographs interspersed with this article, have Mr Bullock as the centre piece, during the NPC Training Programme at the Hindustan Aircraft at Bangalore.

all could be successfully accomplished through the media of such training and in minimum time. The declaration of emergency had in its wake generated a host of problems for Bharat Electronics, mainly in the area of tools and skilled personnel required to cope with a sudden expansion from Rs 30 to 70 million worth of production per year dictated by increased Defence requirements. Among many other needs, the most important were:

1. Training skilled personnel for manning the expanded Tool Room activity.
2. Increasing production of Tools. This could be done only by stepping up the utilisation of the available capacity and by new and better methods.

The integrated programme was designed to meet these exacting requirements, and by its performance did achieve the aims and objectives established for it. The results substantiate the fact that a *well-designed, and properly executed plan could achieve the desired results in a condensed and constricted time period, with an intensified and militant approach.*

Concepts, Application & Results

The whole concept of integrated training is focussed on the actual requirements of the factory, and has been so designed to offer a projection to the training set-up, based on actual Factory establishment so that immediately upon completion of the training period without loss of time for orientation, the trainees in the various areas can start functioning efficiently. The areas of training in the integrated set-up included production control men, Inspectors and maintenance men apart from regular supervision and operatives.

The application of this concept was particularly illustrated by the MINICLAMPS Project, where a sub-contract for 124 miniclamps which were needed in the factory was accepted. This was manufactured at an estimated cost of Rs 16.20 nP (which included 250% or half of normal factory overhead) against the lowest outside quotation of Rs 140 per set.

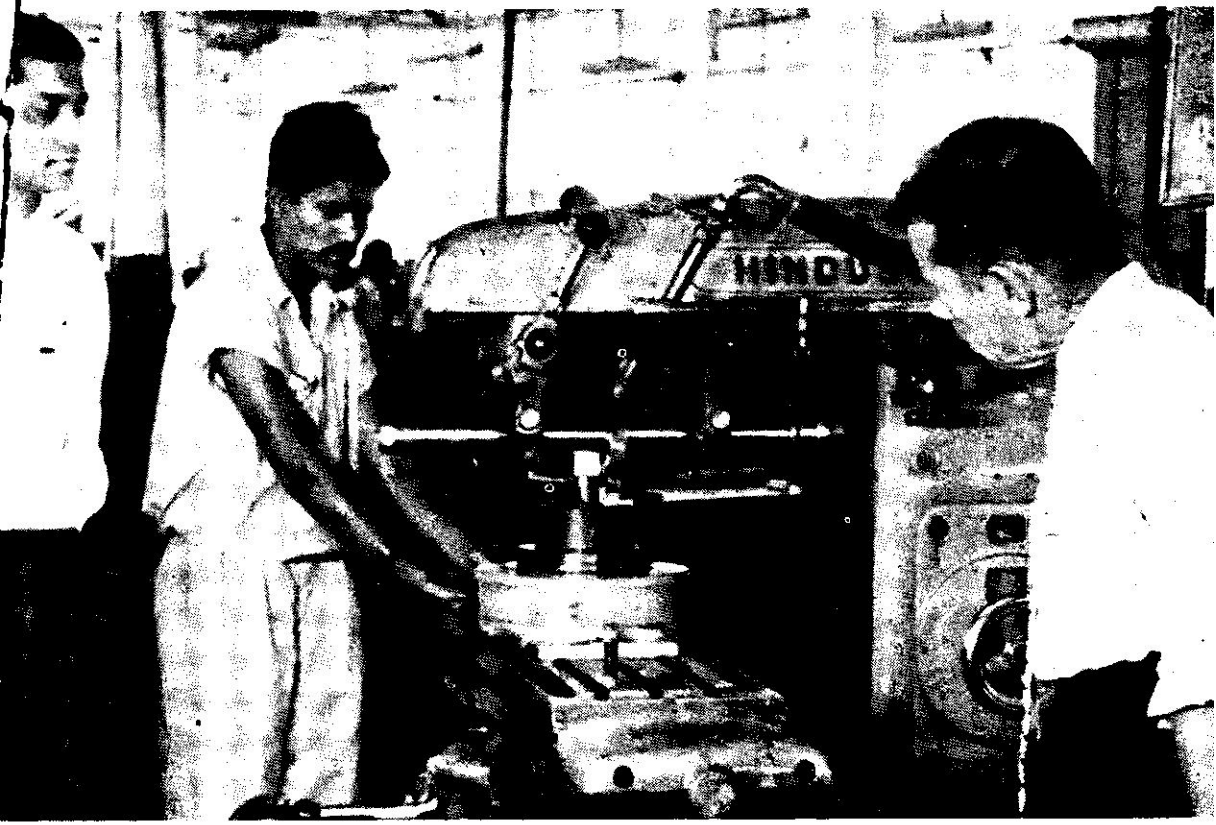
In the project miniclamps, the Production Control men were trained in planning the project, scheduling and loading in the shop; the Inspection men in drawing up inspection procedures and carrying out necessary stage inspection for interchangeable parts manufacture; the operatives in processing parts from the beginning to finished products; the maintenance men in maintaining the equipment; and the supervisors in *aggressive and effective supervision*, thus fully applying the concept of training an integrated team for the factory which equips the team with the necessary knowledge to function in the most efficient manner. The results of the application of this concept have convinced management to the extent of decreeing that all their future training programmes will be conducted on this basis.

Accelerated Training

The accelerated technical training programme was designed as an answer to specific problems faced by BEL for meeting their shortage of trained skilled personnel required for their expansion plan in a relatively short period. The theme of the programme was emphasis on specialisation with intensive and extensive training in the indicated area in a condensed manner over a period of 3 months during which time by rotation, every trainee spent two-thirds of his time in the shop and one-third in the theory acquiring the necessary basic and fundamental practices and knowledge in each.

The generally accepted concept of set exercises for training was entirely discarded, and in its stead, actual utility jobs which were useful to the factory and assisted in relieving their own load were taken up, particularly tooling jobs which offered a variety of operations and were well-suited for training purposes. In this manner, the trainee was not only trained in a variety of operations but was also soundly oriented simultaneously in the type of jobs he was expected to do in the factory. This approach thus equated the problem of finding extra capacity for producing the sorely needed tools for the expanded

NPC AT HINDUSTAN AIRCRAFT



The NPC has been associated with training programmes at the Hindustan Aircraft Ltd., Bangalore. Photos (above and below) show Mr Bullock and Sri Varadhan studying the performance of workers handling machines

A view of HAL Workshop

NPC Trainees assembling machines at HAL

Mr Bullock and Sri Varadhan conducting a class for trainees at HAL as part of the NPC Programme

activity and at the same time provided *an excellent no-cost media for training.*

Midnight Training

A revolutionary concept was introduced in the choice of hours for training, particularly during the first phase in the Factory. The standard accepted orthodox idea of limiting training to daylight hours was abandoned, as the situation created by the emergency demanded and decreed maximum usage of all available machinery to the utmost, both day and night. Regular Tool-Room and manufacturing machinery during the idle hours (10.00 P.M. to 6.30 A.M.) were used for training purposes, and to good advantage. This required very *effective and militant supervision* to avoid possible damage to valuable production machinery. However with a close watch on the performance of the trainees, this was to be avoided.

In the above system, a trainee coming on the midnight shift continued with jobs run on the machine by the regular operative of the previous shift *without changing the setting* thus avoiding the loss of time normally associated with change in settings. This also provided and afforded a sound orientation to the trainee in the actual type of jobs he will be required to perform in the factory, after his acceptance.

At the end of the first training phase, the personnel required for a complete shift operation in the Tool Room and Machine Shop had been provided, and the capacity available for additional training eradicated. However, at this time the training centre was made available with a stated complement of 15 machines.

The second phase of training commenced at the Technical Training Centre from May 1963. On the basis of 3 groups rotating through 2 shifts in the shop, 45 operatives on machines could be accommodated simultaneously, with each trainee spending a third of his time in theory and two-thirds in the shop. Apart from this, *the training centre operating as a miniature factory* and a sub-contract facility for the main factory, was utilised to train the integrated group containing the Production Controllers and Inspectors in their regular and anticipated sphere of activities.

The scope of the training activity was thus enlarged and expanded to train staff technicians besides training the maximum number of operatives, efficiently utilising the available equipment, to the ultimate.

Technical Training

The training methods used were developed entirely to suit the changing needs of the trainees, and from time to time. *Any means by which the trainees clearly indicated complete understanding of the underlying facts relating to various operations were adopted* and such training aids as films, handouts and other media giving various details were made use of. Small manuals of the much-needed Shop Mathematics, Engineering Drawing and Heat Treatment were published to help the trainees *comprehend the theories they were practising and which contributed immeasurably in making them analytically minded* and skilled at their jobs.

Inasmuch as *Tool Grinding* forms an important basic part of the business, this area demanded and received more attention. To give a clear picture to the trainees, sample tools were made of Hardwood $1'' \times 1''$ square shank and 6″ long ground with the proper geometry, painted and displayed by the side of Tool Grinder. This gave them an idea and a means of contrast as to what constituted properly ground tool, a worth-while adjunct.

Practical Shop Mathematics

The problems in Shop Mathematics were designed primarily to develop the thinking and observation powers of the trainees and as such were diversified, never falling into any set pattern. *The main theme of the whole course was to build up this ability in the trainee,* to compel him analytically to tackle

any problem presented which related to his work on the shop floor, in a sound and sensible manner. The method of instruction was in conformity with this approach, *stimulating the thinking of the trainees* along proper lines, rather than presenting them with ready-made answers for set problems. The role of the instructor was to lead the discussions in the class, drawing out the thinking of each trainee and stimulating a free discussion, thereby building up the power of self-expression, along with which does come the degree of confidence so badly needed but rarely found.

The results of this approach proved highly gratifying and were a continual point of observation noted by all, and which commanded the appreciation and comment of all the executives in the factory who continually expressed amazement about the degree of confidence the trainees had acquired at the end of the training period and which had already manifested itself in their approach to their jobs and which could be directly attributed to the development of their creative and analytical thinking capacity.

Mechanical Drawing

'King Size' wooden scale models were extensively made use of, particularly in the initial stages to help the trainees form a clear mental picture of the theory of orthographic projection. The next stage was drawing projections from isometric views of objects and then on actual scale drawing of views.

In drawing, as in the case of other subjects, *the approach was entirely towards practical application* since the objective was to give a thorough understanding in reading blueprints.

In the second phase of training conducted at the Training Centre, the trainees were required to draw all the views of the 'minic-lamps', which they were actually producing in the shop.

In Tool drawing, the first step was the producing of actual scale drawing of the details of the tools that were made in the shop, and finally the assembly drawings of the same. In the area of Tools, drawings were required to be made at least one each, in the areas of Drill Jigs, Drill Fixtures and Dies.

Heat Treatment

Case studies were extensively made use of for effective instruction in this subject. After imparting instruction in the fundamentals, the application of the principles to actual jobs, with their effect on the machining aspect was highlighted, and then case studies were presented on which discussions followed. Here again, the emphasis was on stimulating the thinking towards application of the principles since *each job has its own peculiarities* in respect of Heat Treatment and the desired end-result.

Machine Theory

The operational aspects were more predominently highlighted than the constructional and design aspects. Inasmuch as this required practical demonstration also, instruction in this subject was done both in theory classes and in the shop. Case studies were also used to induce in the trainees more self-reliance in understanding the intricacies of the proper chronological sequences in the processing of any given detail or job.

Discipline

Discipline always had the first emphasis. The effect of this was so profound that according to the reports from the factory, the *absenteeism rate in the new group was far less than in the regular force.*

Every Saturday marked an exam, to test and substantiate the rate of progress with records meticulously maintained. Home work was a continual and perpetual part of the training with continual evaluation taking place to indicate any need for correctional action in respect of those whose progress was unsatisfactory.

Technical films were made use of for aiding instruction in machine theory, cutting tools (Carbide tools in particular), Measuring instruments (Gauges) and Safety. The method adopted was to run the film at least twice, the trainees observing the films closely the first time, and taking down important information from the films the second time, followed by comprehensive discussion particularly of any area not understood.

It can be seen from the facts assembled that the whole aim and objective of the course was *to make the trainees 'participate' actively in the fullest sense* of that term, thus in turn developing the initiative and self-confidence in them which are paramount necessities for skilled tradesmen. During the starting period when the trainees were being introduced to the machines, a list of instructions of Dos and Don'ts were given in order to ensure that the trainees deserved correct procedures. This is given in Appendix A.

Production Control, Inspection, Maintenance

The integrated Training programme also included training of Technical Assistants in Service functions. These Technical Assistants formed a part of the entire team under training in the *Training Centre*, which was *in essence and application a miniature factory*. The areas of training, and the details of it are outlined in brief and are as follows:

The Production Control trainees first received theoretical instructions in the areas of Material Control, Process Planning, Routing, Scheduling, loading of the shop and the machines, and also the follow-up work on Progress. Emphasis was laid on these particular areas since the type of work they would be required to do in the factory after training, related to all of them. After preliminary instructions, and to prepare the trainees for project work, three typical case studies were given in the areas of Loading and Scheduling for solution by the trainees with group discussions being held to give a thorough understanding of basic practical implications of the same.

The next stage was *practical application of the principles* learnt to actual Project work which was facilitated and enhanced by the 'miniclamps' contract, and which offered an opportunity for treatment as a project for purpose of Planning, Scheduling and Loading the shop and Progress Control. The trainees were given target dates for completion of the miniclamps based on which they had to plan, schedule and load the shop. Once the project was launched, they were required to compile progress reports every week-end and compare actual progress with their projections thus helping evaluate the degree of accuracy and realism of their planning, and for future guidance in similar and allied work. A continuous procedure of this nature assisted the trainees to visualise in a clear manner the practical difficulties that would be encountered in the shop and thus refine them in their effectiveness and practicability as Production Control men.

Inspection: The Technical Assistants in Inspection received theoretical instructions in Inspection, Quality Control techniques, procedures and measurements, and measuring instruments. Particular emphasis was laid in the area of Shop Mathematics since this does constitute its keystone, and is generally its most neglected area and without which, the science of inspection cannot function in any shape, form or manner whatsoever.

The project work of the Inspection group again related to the miniclamps contract, where the Inspectors were required to compile comprehensive inspection procedures for interchangeable parts manufacture, introduce stage inspection and be responsible for Quality Control procedures and their implementation, in the passage of this work to its completion. An elementary manual on Inspection was compiled for basic guidance of the trainees.

It is apparent from the above, that both the programmes for Technical Assistants in Production Control and Inspection have been *totally, fully and comprehensively oriented towards the practical aspects and requirements of the factory*. While it is impossible

to make a finished product of the trainee in a period of 12 weeks in the above areas, which do encompass a wide field, the objective has been to give *a sound and basic orientation.* Towards the same end, necessary instruction in the allied fields of Machine & Materials theory also was imparted for the above trainees.

Maintenance: The maintenance men were given orientation in Preventive maintenance procedures. The objective had been to derive the maximum utilisation of equipment by better maintenance and minimum down time. This particular problem was highlighted in the Training Centre itself since at no time the full complement of machines that were supposed to be available for training, were realised, particularly due to the lack of a Preventive Maintenance schedule which was responsible for the non-availability of all the machines at any one time.

Training for Trainers

Executives: Throughout the first phase of the programme, during the night shifts in the factory, the Assistant Works Manager was associated with the programme and was oriented in the methods of the crash programme, particularly from the angle of organising and running the same.

Production Control Engineers: During the first phase of the programme, two Production Control Engineers were associated, in order to carry out the new systems and procedures which were being implemented.

(iii) *Instructors for Theory:* Two Instructors of the Senior level were trained to conduct the Theory classes in future in the method initiated for the Crash Training Programme. This was done during the second phase of the programme at the Technical Training Centre.

(iv) *Instructors for Shop:* Three Instructors were trained in the area of Shop Instruction for the Crash Training during the second phase of the training.

It may be seen from the above, that counterparts in all the areas were developed to ensure that such a programme will be carried on and perpetuated.

The Gains for Labour

From the viewpoint of labour, the Crash Training Programme has benefited them in more than one way; among the several gains, in brief the following may be stated:

Increase in Job Opportunities

In the Tool Room a variety of new equipment was recommended for their expanding operations and each one of these machines will require three skilled tradesmen for manning a 3-shift operation. Approximately 50 new positions will have to be manned this way. Since these positions have to be manned from the already existing skilled category, this does provide an incentive for moving up the ladder.

The whole concept of the accelerated training programme has been to prepare the unskilled labour for employment in the skilled areas. Nearly 100 such men have been trained for filling in vacancies in the Machine Shop and the Tool Room.

Reduction of Training Period

The preparation period before the trainees fit into regular jobs has been considerably reduced and this is a definite advantage to labour.

Specialisation in Skills

Befitting the time-honoured concept—"Instead of being a Jack of all Trades, it is better to be Master of One", the training imparted is a singular one and as such, develops specialists in that particular application invested with a level of skill not normally encountered.

Appendix A

GENERAL INSTRUCTIONS

1. If in doubt Ask.
2. Know your Machine. Learn the handles.
3. Clean the Machine before and after work.
4. Choose correct speeds and feeds.
5. Check spindle rotation. Use correct tools only.
6. For standard operations use nearest standard tool.
7. A job is never spoiled in a stationary machine. Stay at your machine with your eyes & ears open.
8. Be sure that the job is securely held before starting the machine.

Appendix B

PROJECT WORK IN PRODUCTION CONTROL

You have the attached drawing pertaining to 'Miniclamps' supplied to you.

I. Write the process sheet for all the components.

II. The following information is available :

a) The last date for the delivery of the finished assembly is July 20 1963.

b) Total quantity to be manufactured is 125.

c) Castings are ready in stock.

d) Materials in full length as per BEL standards are in stock.

e) Machine capacity available :

(i) Turning Centre—Lathes—5 Nos.

(ii) Milling Machines—5 Nos.

(*Vertical 2, Horizontal 3*).

f) The Shop works for two eight-hour shifts a day.

The estimated timings might be assumed based on the data already available in TTC and supplemented by predetermined standards.

Draw a (i) Schedule Chart; (ii) Load Chart and estimate when the whole quantity can be delivered.

III. Explore the possibility of delivering batch-wise the total quantity of 125. Assuming that it can be delivered in 2 batches, what is the earliest date when the first 50 can be delivered in full?

Appendix C

PROJECT WORK FOR INSPECTION

CASE STUDY

You have the attached drawing pertaining to 'Miniclamps' supplied to you. The total quantity to be manufactured is 125 numbers.

I. Write out the process sheet for each component and tabulate the tolerances for each part.

II. Outline the inspection procedure that you comtemplate adopting for inspecting the component.

III. List the measuring tools you require for inspecting each component.

i) Which of the above tools are available?

ii) What alternatives do you propose for the rest?

IV. Write clearly what methods you would adopt for inspection (illustrate with dimensioned sketches).

V. The cost of inspection should not exceed 3% of production cost.
Justify your inspection procedure as related to costs involved.

VI. What precautions would you adopt to prevent a selective assembly at the final stage and how do you contemplate implementing them systematically?

I Sing All Day

Those who grumble about sound make me sick. The ice-cream vendor's chimes, juke boxes, transistorised radios: let's have the lot. I am 60 years old, and have a piano, two mandolins, a television set and two radios; I sing all day and even play tunes on leaking compressed air pipes with my thumb.- *Letter in Sunday Citizen.*

BREAKING BARRIERS THROUGH TRAINING

AN SAXENA

Training, according to dictionary definition, is instruction and discipline in a particular art, profession or occupation. It is also defined as a deliberate and systematic planning to enable people at whatever level to perform their task in the most effective way. It is the art of doing the job in a correct, effective and efficient manner and it may even be described as "something which is necessary for everything". In industry, training precisely refers to the process of passing along 'know-how' through carefully selected methods according to a well-conceived plan, by competent and well-prepared people, in a 'suitable learning climate' to shorten learning time or experience. *Training is telling plus showing, plus supervising* until the desired change is achieved in the skill, attitude or behaviour.

THE WORDS 'EDUCATION' AND 'TRAINING' are being constantly used. Of the two, education has a wider connotation and richer heritage. It includes the whole process of cultivating the mind, of developing ways of thought, attitudes and personality. It starts in the home and school and continues for as long as a man's mind retains its awareness and receptivity. Training on the other hand, in the context of work performance, refers to all the immediate means employed in preparing people for particular skills and responsibilities in setting up a 'community life' in industry. Training is certainly less ambitious in its scope than education which includes the complete upbringing of the individual. Nevertheless, every individual who comes for training has already received some measure of education and his success in training depends to a large degree on his educational achievement. Training properly conceived and directed in industries has the same important part to play as it has in the fighting services or in sport. To send untrained troops into battle or untrained boxers into the ring would be regarded as either criminal or ridiculous. Why, therefore, in the sphere of industry in which men spend all their working life, should it not be regarded as equally criminal or ridiculous to *entrust untrained operators to untrained managers.*

In our approach to training, the first question to be answered is why should we be interested in it at all? Does a newcomer require training because without it he will never learn quickly and more likely he will learn the wrong way? An operator who is said to manipulate a machine or perform a job without proper instructions, may find out after trial and error how to do so and possibly when a machine is involved, at some danger to life and limb. *Neither intuition nor instinct necessarily leads to the correct method* particularly if the machine or the process is a complicated one.

The process of trial and error, the hard way of learning, will bring about unqualified success only to the most persistent individuals. It is *certain to be prolific in the formation of bad habits*, and to breed discouragement and frustration. It can best be avoided by adequate and intelligent training, designed to give the newcomer the knowledge and skill necessary for the good performance of duties, to inspire in him a real pride of the job and to lead him to identify himself fully with the organisation of which he is a member. Unless an individual obtains full satisfaction from the performance of his job and feels that he is achieving something of real value, he will develop neither pride for job nor pride

in the concern in which he is working. His training has therefore to be designed to awaken his satisfaction from the very start of his career so that he may very quickly become an efficient and effective member of the work community.

Training is never really finished because the situation is always changing and making new demands in terms of training. New and different skills are required when workers are transferred from one job to another, when they are upgraded, when new types of machines are introduced or when there are changes in the procedures, processes or materials in the product, or in the quality required.

A trained employee feels that he is the master of his job rather than the job being the master of him. He has confidence in himself; he has skill and ease of operation; his work requires less effort; he is proud of himself; he has increased earning power and a feeling of security. He is ready for the next step upward. Obviously, such a man has higher morale than the man who has a *continual struggle with his job.*

As we move up from the operator level, it becomes necessary to train the superior personnel in the theory of management. The theory of management is not a substitute for its practice. I am reminded of the story of the Irish man who after hearing a talk on the utility of gaining experience by practice, came forth with the question. "That is all very well, but *how will it work in theory*"?

In fact, one would say that an ounce of practice is worth a ton of theory. But an ounce of theory properly grasped may be a safe foundation on which to place a ton of practice and experience. We cannot disregard the importance of learning the fundamentals of the Science of Management because these alone will enable the superstructure of management practices being raised on sound lines. If one does not go to a school of management or attend courses on management, then the only school open to him is what Lord Lever once characterised as the 'University of Hard Knocks'. The cost of gaining knowledge in this manner is obviously very heavy, for *experience runs an expensive school.* Undoubtedly, as in work, so in life, there is no substitute for experience. But proper training helps to accumulate and imbibe experience quickly and in a right selective manner.

Evidently, therefore, the theory is necessary for the development, evaluation and application of methods that will lead to achievement through learning. *Theory without try out application is empty.* Application without theory is blind. We need theory to guide experimental design which is the best empirical science.

Evaluation of Training

How am I doing? How do I rate? Where am I going? These are the anxieties of everyone in an organisation. A worker wants to know because his family depends on his earnings; he wants to know what his chances are of getting a rise or promotion and whether he is wise to tie his future to the job. Further, it is the better worker that management wants to develop. And it is for those in responsibility to provide answers to these challenging questions. "How am I doing"? "How do I rate"? call for an appraisal of past performance and "where am I going"? calls for an evaluation of the potential of each individual as a basis for helping him develop to his full capacity.

The degree of correctness of the criteria of evaluation depends on the type of training under consideration. Whereas the results of training in specific job skills may be measurable, the effectiveness of measuring the improvements in social skills may be difficult to determine. In almost all the advanced countries, it is felt that in the matter of evaluation the only thing possible is to prescribe standards for evaluating technical skills and knowledge, but not in respect of intangibles such as attitudes, and qualities of leadership. These can be reflected only over a long span of time. One thing is now universally accepted that *in the long run the cost of not training is always more than the cost of training* and greater the training activity in an organisation, the less the doubt about its utility.

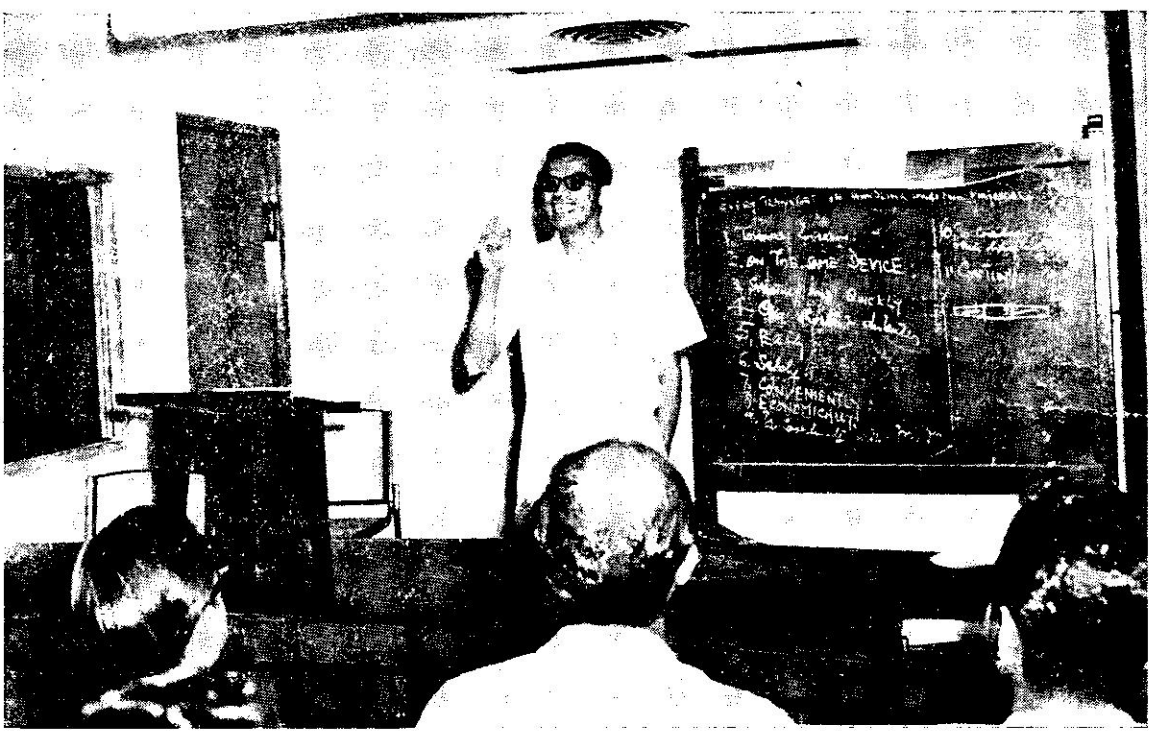
AN ESSAY ON TWI

AA NIAZI
Assistant Director NPC Bombay

EVER SINCE THE INTERNATIONAL LABOUR ORGANISATION conducted the first course in 1950, Training Within Industry (TWI) has gained wide popularity in India. Already more than five agencies are engaged in imparting this training to supervisory staff throughout the country. The number of those trained runs into tens of thousands.

This impressive numerical record seems to indicate that TWI has been well received by managements and supervisors and that industry would be reaping rich harvests as a consequence of subjecting their supervisors to this training. Experience of association with the trainers and the trained, however, shows that its benefits, as evidenced by shop floor application of principles taught, have, if anything, been rather small.

It is time, therefore, to sit back and evaluate the past so as to determine the cause or



The author conducting a Training Course in Method Study under the auspices of the Bombay Productivity Council

ıses that act as impediments to the practice
VI principles. Such an evaluation of a
ıining programme, primarily concerned
'h the behaviour of men and with attitudes
supervisors, needs to be done in two direc-
ɔns. Firstly, it should establish suitability
of the programme and its principles and the
feasibility of their application to problems
posed by Indian conditions. Secondly, this
evaluation should delve into the background
the pre-requisites for the success of such
programme.

ions in India and TWI

What are the conditions in which a TWI-
ained supervisor is required to operate?
ndia, like most of the other under-developed
ıntries, is in the midst of a hectic activity
ɔr industrialisation of the country and
ɔr raising the standards of living of its people.
forts in this direction, however, require
ɔlution of some of the chronic problems that
ɔt as hindrances in the way. These problems,
ly stated, are: dearth of trained and skilled
sonnel; scarcity of capital and material
ɔurces; and a general apathy towards work
ıd disinterest in detecting and removing
ırces of waste.

A programme of supervisory training to
worthwhile should, therefore, aim at
oviding the trainee with the skills that
ı be fruitfully put to use under these
ıditions. TWI does fulfil this basic
erion for its success. The three pro-
mmes of Job Instructions, Job Methods
ıd Job Relations, that constitute TWI, were
fact developed to meet somewhat similar
quirements in the USA during World
ar II. Briefly these three programmes
ɔ:

Job Instructions course lays down basic
ples to be adopted in drawing up the
ıing plans for the people under the
ɔervisor. Its four-step methodology makes
seemingly difficult task of imparting
ıstructions rather simple.

Job Methods course with its principles and
ır-step methodology aims at equipping the
ɔervisor with skills to detect waste, to analyse the causes and to improve the method so as to rectify the situation.

Job Relations course attempts to develop in a supervisor the skill for leading people, for understanding and solving their problems in order to lay the foundations of a cordial cooperative human relationship.

All the three courses of TWI have all along laid an emphasis on the human aspects of the problems. They try to change the behaviour and attitudes of supervisors towards work and the people. The courses insist on avoiding 'hasty judgments', on 'treating an individual' as an individual, on 'giving credit when due' etc. They call upon the supervisors to 'enlist help of those doing the job', for they know the best in it, and to 'work out ideas with others' who may give valuable tips.

Such principles if put to use will go a long way in drawing out the dormant human energies that are now submerged in the general feeling of apathy and disinterestedness. They will help channelise the enormous force of human endeavour to productive labour.

Reduction of these potentially useful theoretical postulates to practical application in day-to-day life, however, requires that the supervisor himself be provided with an atmosphere that encourages him to use what he has learnt. This is an essential pre-requisite for the success of TWI.

Pre-requisites for TWI

Pre-requisites for the success of TWI can be compared to those required for using an electric bulb. A bulb lights a dark room only when it forms a part of the paraphernalia of electrical connections. Its filament glows by connecting the two wires, emanating from the source of energy, to complete the circuit. TWI too can glow when it functions as a connecting link between support from the top and understanding and co-operation from the bottom. Management's support and workers' co-operation are the essentials of the organisational climate required for the success of TWI.

We may carry the analysis further: a supervisor is an agent for ensuring that the objectives as laid down by management are carried out in the manner desired by the management itself. He thus forms a link between management and the workers. His future and his promotions are dependent on fulfilling the expectations of his own boss and superiors. Ability to fulfil these expectations are in turn dependent on co-operation and response from his subordinates. These two factors—management's expectations and subordinate's response—motivate a supervisor to act and behave in the manner he does.

It is obvious that a supervisor cannot and will not dare step out of the generally prevalent trend of behavioural approach in the organisation. In case he does step out of line he will risk violating the practices set by his boss. Moreover a supervisor, like any other human being, adopts a behaviour and an attitude in conformity with what he himself is subjected to. Approach of an individual supervisor to problems of work and people is thus a reflection of the practices of top management. The best that a supervisor can do under conditions of ignorance, scepticism and antagonism of management towards TWI, is to passively appreciate these principles and fall in line with the organisational climate.

It is equally obvious that a supervisor cannot practice the principles of TWI where the people who are to be the recipients of the changed behaviour refuse to co-operate. Worker who has till recently been considered as a mere cog in the wheel and has been denied opportunities of self-expression will shy off any attempts to enlist his help or seek his ideas. The first reaction of such a worker is one of caution, usually expressed as a negative or hostile approach to any attempts at democratisation and in seeking all the relevant facts. Such reactions are *strong barriers against entry of TWI principles to the floor.* They arise because of the past unha· experience of the working group or di ignorance of and *apathy towards any trai at levels higher than their own.* A probing movements of the supervisor to TWI principles thus meet a solid hard surfac of non-cooperation or hostility and supervisor falls back into the cool shelter o the existing situation.

Success of TWI, therefore, req provision of not only management support— which TWI considers as the foundation for th gate of good supervision—but a climate th sets the pattern and that motivates a supe visor to practice what he has learnt.

Provision of such a climate requires th *TWI be considered as a part—and only part—of an overall training scheme* starti from the very top and going down to the ver bottom. If TWI is really to be successfu conditions need to be created where management not only practices what TW teaches, but also rewards a supervisor does the same in due form. Further, essential to create among the worker understanding of the principles of TWI a necessary means of soliciting and en their co-operation.

In absence of such an organisational cli mate, the bulb will fail to glow and the super visor striking his head against a solid wall darnkess will feel utterly frustrated. T courses will only be remembered by t fine time the supervisor had out of work in the class.

REFERENCES: 1. TWI Centre, Bombay—"*Tra ing Within Industry*"—1961.
2. Foundation for Research Human Behaviour—"*Training Human Relations*"—Report of Seminar.
3. James N Mosel—"*Why Tro ing Programmes Fail to Ca over*"—*from* "*Readings in man Relations*" pp. 300-8. Graw Hill Book Co., Inc

NPC Question-Answer Service

Q You ask... We answer... A

We have received the following questions from Sri RD Kulkarni, Chief Accountant, Kopargaon Sakhar rkhana, Kolpewadi, Ahmednagar. NPC Specialists' answers to these questions will be published in the next ıe of the Journal.* We shall however feel obliged if readers can spare some time to answer Sri Kulkarni's tions.

(i) It is considered a vital management technique that responsibility must be proporonate to the delegation of authority. How can this technique be effectively incorporated t management practices of Indian industries with a view to increase their productivity?

ii) What are the effective measures that can be adopted to stimulate the development :t and productivity consciousness among different categories and levels of employees orking in the newly established large scale undertakings in the public and the private sectors?

ri RN Warriar writes

: technique of delegation can effectively be incorporated in Management practices by

1. **A proper understanding and appreciation of the concept of delegation and the sound principles underlying the process of delegation on the part of all members of the Management.**
2. **A constructive attitude and a spirit of co-operation on the part of all members of the Management team. Patience and toleration by all concerned.**
3. **Presence of carefully prepared and up-to-date organisation charts and manuals.**
4. **The sound practice of finding suitable man for position in hand instead of creating suitable positions for men in hand.**

The principles and implications of delegation are generally well-understood and appreted. However, sometimes, there is a tendency to interpret delegation as the process of sferring authority and responsibility from a senior (person or position) to a junior (person osition). This approach is unsound and misleading. Delegation could be between equals; it could be from a junior to a senior or from a senior to a junior. Moreover, delegation ves not the transfer of authority and responsibility. What is transferred in the process egation is a function, job or task. Along with the transfer of a function or job, the

al Director (NPC Bangalore) sent his reply as we were going to Press.

right to do it (including the right to get it done—re-delegation) and the responsibility to achieve certain results (including responsibility to get certain results achieved) are transferred. It will thus be seen that it is not authority and responsibility that is transferred to a job or function, and authority and responsibility have existence only as long as they are related to the job or function to be performed. A person's or a position's authority and responsibility will be determined by the requirements of the jobs or functions delegated to be performed by him or by that position.

To make delegation effective in the process of Management the following suggestions are made

a. Make a comprehensive survey of managerial tasks/jobs/functions; this is sometimes called listing of activities.

b. Group the jobs/functions on the basis of convenience and economy in the matter of performance; this will create positions.

c. Establish communication and command channels between different positions; this will indicate who will report to whom and who will take instructions from whom. The unity of command principle may be kept in view while developing the communication relationships.

d. Develop a full description of each position indicating the functions to be performed, the relationship established and other similar relevant details.

e. On the basis of job requirements and performance expected determine the authority required for each position. Authority should be incorporated as the right to perform and therefore only such authority as is required for effective performance of jobs delegated to the position need be allotted to the position.

f. Develop a comprehensive organisation manual and organisation chart incorporating all the job descriptions. Great care should be exercised to keep this document up-to-date and correct.

g. Fill all positions with suitable men. Delegate to the men, jobs as described in position description or organisation manual. There should be no wrong delegation of functions. Then the delegate should be allowed full freedom to perform the functions allotted to his position within limits specified and he should be made accountable only to the delegater for effectiveness of performance.

h. There should be no interference in the performance of delegated functions. The delegater should overcome the temptation to constantly "breath down the neck" of the delegatee. Expect completed jobs only.

i. There will be risk of wrong decisions and wrong implementation. But if delegation is to succeed this risk must be faced.

A number of steps like the above could be laid down for effective delegation. But it is not the ignorance of the principles of delegation or the steps in delegation which often make delegation ineffective; it is the absence of a proper climate in the organisation and an unfavourable attitude on the part of the members of the Management team which defeat delegation. Delegation, like any other good management tool, can thrive effectively only if the climate is proper and the willing co-operation of all concerned exists. The tendency to pass the buck, to interfere constantly, punish unintentional mistakes kill delegation.

The measures for development of cost and productivity consciousness in employees are

1. A cost conscious management

2. A management willing to disclose information on cost, price and profits to employees.

3. Systematic effort to educate the employees on the importance of reducing cost.

4. Conviction on the part of Management and men that cost reduction in the long run will benefit all partners in industry as well as the community.

5. A system of remuneration where provision is made for sharing the gains of productivity, say a production bonus, where cost of production both of labour and material is within the control of employees.

Incentive

Technology

Scientific Training In Ancient India

It is a pleasure to record here that for this Special Issue of the NPC Productivity Journal, we have created a Special Section on Scientific Training in Ancient India. We would also like to record our deep appreciation of the gesture of cooperation by Burmah Shell (India) who made available to us the original paintings on the subject. This Company had commissioned Artist R Goswami to do these paintings for them. Today when India has become stronger, adding to the foundations of her scientific and technological education, our minds turn to the early beginnings of scientific thought in ancient India. In these six paintings an attempt has been made to present visually historical scenes showing scientists and scholars engaged in training activities in the various fields of intellectual endeavour:

Teaching of Chemistry: The painting shows the great master *Nagarjuna* teaching the subject to his students round about the year 100 AD.

Teaching of Marine Engineering: Teaching of the subject with visual demonstration of a Viking type of ship in the foreground.

Teaching of Medicine: The picture shows the great *Charaka* (discoverer of the lymphatic system) engaged in a discussion with his students, while they are doing their practical lessons.

Teaching of Mathematics: The painting depicts *Arya Bhatta*, 476 AD, expert in trigonometry, who wrote his famous Arya Bhattiya.

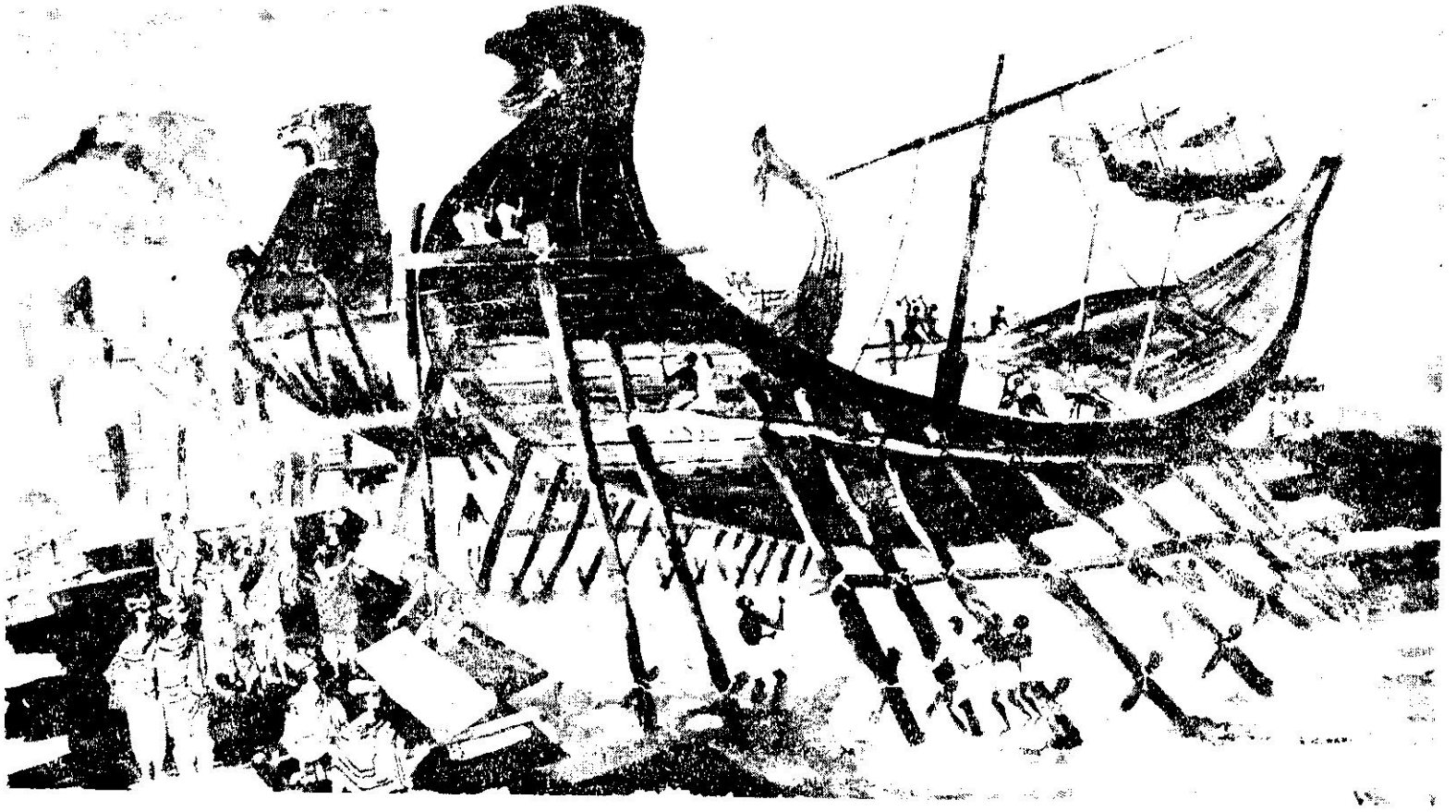
Teaching of Astronomy: The painting depicts *Varahamihira* in a teaching session on Astronomy.

Teaching of Physics: This painting depicts *Konada* in a session with his disciples. Konada's name is associated with the theory of sound-air waves, light, heat, etc.

The photographs of the paintings, presented in the following pages, were taken by artist Gopal Guglani who also prepared the cover design and the perspective picture embodied on the first page of the Editor's Notes.

TEACHING OF CHEMISTRY

Chemistry grew and developed in ancient India primarily in the service of medicine, and covered both organic and inorganic chemistry. Use of gold for ornaments and medicine was known in the Vedic Age. Discoveries at Mohenjo-Daro confirm the use of glazed polychrome, painted pottery, cosmetics and alloy metal. Iron, copper, tin and lead were extracted from ores, and important alkalies, acids, metallic salts produced. Glass-making, use of combustibles and firearms (Agneyastra) have been referred to in many records. Greatest among the masters, Nagarjuna lived in 100 AD. He discovered the process of distillation and calcination, wrote "Ramaras" on the fundamental properties of elements and their chemical behaviour. "Rasarnava", a later book (120 AD) comments on the colour variations in metals (copper, lead, tin) in contact with flames, use of instruments and suitable locations for chemical laboratories. The above painting depicts Nagarjuna with his students.



TEACHING OF MARINE ENGINEERING

As early as the Mohenjo Daro period (2000 BC) Indians traded with other parts of the world by land and sea. Pali and Greek literatures refer to the astonishing standards of shipbuilding, navigation and cartography in India. The Greeks wrote in admiration of Indian ships "built with prows at each end for turning about in channels of extreme narrowness" and of "construction of dockyards and galleys of 30 oars". Pliny estimated tonnages of ship at 3,000 amphorae -an amphora being equal to one-fortieth of a ton. The Cholas moved men and animals by ship for their invasion of Java and Malaya. All evidence points towards much knowledge, skill and experience in marine engineering. "Yuktikalpataru", a Sanskrit treatise provides comprehensive details bearing on the science of shipbuilding, including even decoration and furnishing. Such knowledge was transmitted at many sessions for craftsmen and trainees at the shipbuilding yards. The above painting shows a practical training course in progress at a shipyard.

TEACHING OF MEDICINE

Charaka, the doctor in this picture, was the discoverer of the lymphatic system. An extract from his valedictory address to his students, some time in 100 AD, reads much like the Hippocratic Oath of modern medicine– "You must pray on rising and before going to bed for the welfare of all the beings. You must strive with all your soul for the health of the sick. You must not betray your patients even at the cost of your life." The recent discovery of a Buddhist manuscript near Gilgit throws light on the scientific methods of medical teaching, where the students learnt from great masters about the dissection of brain, lungs and the abdomen. Psychotherapy and toxicology were also taught. There was a good deal of surgery in ancient time as evidenced by the fact that some 127 surgical instruments have been listed by archaeologists; and there is reason to believe that they could perform delicate operations of the eye, brain and caesarean section. There was also plastic surgery. In Susruta (400 AD) we find it said "If surgery is to be mastered well, it is essential that each part of a body should be dissected and studied".

TEACHING OF MATHEMATICS

Study of mathematics reached a high level of perfection in ancient India. In the universities, ashramas (residential schools) discussions grew around many aspects of the subject– use of multiples of ten, the decimal notation and the outstanding concept of zero to represent neutral value. Trigonometry found extensive use in astronomy, navigation and survey work. Pingal's (200 BC) book refers to fractions, l.c.m., g.c.m. permutation/combination and a book discovered at Bakshali near Peshawar touches upon the principles of square root and simultaneous linear equations. A few of the master mathematicians may be mentioned here: Brahma Gupta, Bhaskaracharya, and Arya Bhatta who is seen here teaching mathematics to students.

TEACHING OF ASTRONOMY

In astronomy Arya Bhatta offered scientific interpretations of Solar and Lunar eclipses. He established that the Earth revolves round the Sun and on its own axis, calculated the occurrence of equinoxes, etc. Varahamihira worked out the parabolic courses of the comets. Research was done on Mars and its characteristics, Mercury, etc. Bhaskaracharya's 'Siddhanta Shiromani' provides valuable reference material even to this day.

TEACHING OF PHYSICS

In ancient Indian literature, there are frequent references to the nature of elements: Earth, Air, Fire, Water and Akasa (ether). They believed that these elements were made of atoms which had no qualities but immense potential. Atomic theory found expression in discourses of Pakudha Katyayana, a contemporary of the Buddha. The Indian theory was that light and heat were different expressions of the same energy. Indian thinkers' interest in physics ranged over a fairly wide area: magnetism (Matsya Jantra), theory of sound, air waves, light and heat (Konada); gravitation (Bhaskaracharya); formation of clouds and rainfall (Varahamihira). This painting depicts Konada in a session with his disciples.

EDITOR'S CORRESPONDENCE:

PERT and the CPM

There has been in recent times in Productivity circles a good deal of interest in PERT and the CPM. In this connection the readers of the NPC PRODUCTIVITY Journal will find it of interest to read the following letter regarding PERT and the CPM received from the Chairman of a new, large and complex public sector enterprise consisting of several major establishments located in different parts of the country.

"...I thought you might be interested to know that while discussing the programme of a fairly complex public sector enterprise with which I am intimately associated, I happened to ask whether they were using PERT and the Critical Path Method at this early stage of their planning?

"None of them had even heard of these things, including those who have been running this major industrial enterprise; and the only reaction I got was that these were probably just new terms for something which was known in the way of efficiency and productivity methods.

"However, I asked them to go into it a little bit; with the result that when we met again a fortnight later, the same persons were bubbling with enthusiasm at what they now found is something new and scientific. We have made a start, and a first rough critical path chart has been prepared; and has already proved of more than academic value..."

India, My Second Home

THE NATIONAL INDUSTRIAL
FUEL EFFICIENCY SERVICE,
71 GROSVENOR STREET
LONDON, W.1., May 4, 1964

Dear Mr. Butani,

For many reasons I am very pleased to write a contribution to the journal. Not the least of these is the deep affection I have for India, which was developed during my many years' service with the Royal Air Force in the Sub-Continent. Over the years I have come to regard India as my second home. My regard for the many friends I made in India is a warm and happy recollection, which springs readily to mind as I wish your organisation every success in the work you are doing to bring greater prosperity to your country.

In writing to you, I would acknowledge too your letter to Mr CAJ Plummer who spent six months on a Colombo Plan assignment to advise on fuel efficiency and its organisation in India. He is now in NIFES Head Office in London and sends warm greetings and good wishes. His contribution has been incorporated in the enclosed article.*

I would conclude by saying that NIFES will continue to follow developments in India with keen interest and are prepared to do all they can in support of the efforts being made,

Yours sincerely,
Leslie Hollinghurst

*This will be published in our Special Issue on Fuel Efficiency.

Memories of NPC

Department of Mathematics,
University of Iowa, Iowa

March 17, 1964

Dear Mr. Butani,

I have gone through the volume of 'Productivity' Vol. VI, No. 4 with considerable interest. It brings back many pleasant memories which we had in connection with industry in India and of the pleasant relations with your office.

With kindest personal regards, I am

Most sincerely,
Lloyd A Knowler

Explosion in Efficiency

CSIR Advisers' Office
Indian Institute of Petroleum
Dehradun, U.P.

May 15, 1964

Dear Butani,

You will remember that we were discussing the rather important question of Fuel Economy in which NPC has made such a good start, and you had asked me to write an article for your Special Issue on Fuel Efficiency. As I was working it out, there developed a rather useful and interesting formula, which I think has a somewhat explosive significance for the general run of business in this country, both in the private and the public sectors. It is of major importance where existing efficiency is low.

Consider arithmetically an increase in efficiency from say 5 to 9 per cent: it means a saving or economy not of 4 per cent (9-5) but of 44.4 per cent (see below). The moral is that we can bring about, through comparatively small improvements in efficiency, an astonishing degree of saving or economy.

Simple examples will clarify the position:

IF WE ARE RAISING STEAM AT 40 PER CENT efficiency, and we improve it to say 60 per cent, how much does this mean in terms of saving in fuel? Suppose we are using 100 tons of coal at 40 per cent efficiency. The actual *effective* coal is 40 tons. Now if, by attention to the plant and process, we improve the efficiency to 60 per cent, the problem becomes: "How much coal will be required to give an *effective* 40 tons?" The answer is clearly $\frac{40 \times 100}{60}$, i.e. 66.7 tons. In other words, our fuel saving is 33.3 tons in a hundred, i.e. 33.3 per cent, *not* (60-40) i.e. 20 per cent.

It is easy to show that the general expression for the saving is $S = \frac{e_2 - e_1}{e_2}$ as a fraction where e_2 is the improved efficiency and e_1 is the original. Thus, in the example taken, the saving amounts to $\frac{(60-40)}{60} = \frac{1}{3}$, or 33.3 per cent. Now, it is well worth observing that the same saving (of 33.3 per cent) could have been achieved by increasing the efficiency from 4 per cent to a value of only 6 per cent, since $\frac{6-4}{6} = \frac{1}{3}$, or 33.3 per cent. In steam locomotive practice

it may easily happen that a locomotive is operating at 4 per cent efficiency (overall). If measures are taken to increase this efficiency to 6 per cent (an easily achievable figure), there is a fuel saving of 33 tons of coal in every 100 previously used.

In many stationary boilers in India, the operating efficiency is of the order of 40 per cent, and can usually be raised to 60 per cent by simple measures. It can in fact often be raised to 70 or 75 per cent. But, keeping our aim reasonably modest at 60 per cent, we can save one-third of the coal by raising the efficiency to this value from the original value of 40.

Where the heating plant is operating at a still lower efficiency, say 20 per cent, the same proportion of saving can be achieved by raising the efficiency only to 30 per cent—admittedly a deplorably low target. If we aim higher and improve the efficiency from 20 to 60 per cent, the saving is no less than $\frac{(6-2)}{6}$ i.e. 2/3, or 66.7 per cent of the coal previously used.

The above figures are not imaginary or impractical; they are factual. Briefly, in almost all coal-consuming plants, there is room for much improvement in operation and thus for the saving of fuel, and this, *not to the same extent, but to a much greater extent.* The saving is of course greatest where e_1 is low to begin with.

If we want to make the big impossible jump from 20 to 100 per cent, we shall *fail.* But a small practical jump will mean in our present context a considerable saving of resources. Thus, to consider steam locomotive practice, if the (overall) efficiency of 5 per cent be increased to 6 per cent, we save 1/6 of the loco coal. In India this means one-sixth of some 12 million tons per annum. If coal costs Rs. 20 per ton, we save 2×20 million rupees, say Rs. 4 crores per annum, neglecting the cost of transport and handling.

I am sorry to have written at such length but I have done so because only few people realise what is immediately possible with so little effort and over a large sector of the industrial economy of the country.

Yours sincerely,
JW Whitaker

Indian Socialism

Heavy Electricals, Bhopal
April 14, 1964

Dear Editor,

I will be failing in my duty if I don't mention that you have done a wonderful job for this issue* too! Quite unusually, this time, Editor's correspondence has contributed much for thought by the article of Prof Rago and his comments on your paper. I would be too glad if you could send me a copy of your paper on 'Indian Socialism'. It would have been very helpful for the reader if only you had published that paper too.

Truly yours,
PSC Raja

*Productivity and The Engineer

How Productivity Questions are Handled in UK

BOARD OF TRADE
Industries & Manufacturers Department Division 2
Horse Guards Avenue, London S.W.I.

December 9, 1963

Dear Sir,

You wrote to us on the 16th September, 1963 about your publication 'Productivity', asking if we could provide an article on 'Training in Industry' which you proposed would be included in a future special edition on this subject. I regret the delay in dealing with your enquiry but I am in touch with the Authority concerned with industrial training and hope to be able to write to you again on this matter shortly.

You may be interested to know how productivity questions are handled in the United Kingdom. The 'Productivity and Technical Assistance Secretariat' to which you addressed your letter ceased to exist as such some time ago; all technical co-operation with overseas countries, previously dealt with by a number of departments, was taken over by a new Department of Technical Co-operation which was set up specifically for this purpose. The Board of Trade retains its overall interest in productivity matters, but a number of independent non-Government bodies are concerned with day-to-day work in this field. Among these is the British Productivity Council, which operates through the agency of a large number of local productivity committees or associations in centres throughout the UK. Other bodies such as the British Institute of Management and industrial bodies like the Federation of British Industries, National Association of British Manufacturers and the Association of British Chambers of Commerce also play their part in promoting productivity; as do other Government Departments such as the Ministry of Labour, the Ministry of Agriculture and the Department of Scientific and Industrial Research.

We have in general found your Journal extremely interesting and informative and, it would be most helpful if you could let us in future have three copies of each issue.

Yours faithfully,

AW Curtis

UK Industrial Training Bill

BOARD OF TRADE
INDUSTRIES & MANUFACTURERS DEPARTMENT
1 Victoria Street, LONDON S.W. 1
February 28, 1964

Dear Mr. Butani,

I am sorry for the delay in writing to you again, but the Authority concerned with industry training have been busy revising and bringing up-to-date their information on aspects of training in which there have been some recent changes.

The Government's own Vocational Training Scheme has been considerably expanded in the last year or so. The most significant development has been the publication, in December 1962, of a White Paper outlining new Government proposals for industrial training. Until that time, industrial training in Great Britain had always been regarded as the responsibility of industry itself. The White Paper pointed to the need for Government intervention if sufficient workers were to be trained—and to be trained properly—to meet the future requirements of industry in an expanding economy; and it contained specific proposals for ensuring that these requirements were adequately met.

To give effect to these proposals, which have been discussed widely in both industrial and educational circles, the Industrial Training Bill was introduced in November 1963, and is now before Parliament. I should point out that important changes will result from the new legislation and that you should bear this in mind.

Yours sincerely,
AW Curtis

BOARD OF TRADE
Industries and Manufacturers Department Division 2
1, Victoria Street, London S.W.1.
21st April, 1964

Dear Mr. Butani,

With reference to your letter of the 7th April, the Industrial Training Act, 1964, became law on the 12th March, 1964. I am sending for your information a copy of the Act, the details of which differ only slightly from the proposals made in the paper previously sent to you. The main change is in Section 14, whereby Industrial Training Boards, at the request of the Minister, are now able to help firms with the training of overseas persons.

The other changes are of a technical nature only such as the submission of reports to the Minister. I hope that this is all you require.

Yours sincerely,
AW Curtis

Productivity of Pressmen

S.B. Chakraborty
M.A. (Econ.), Dip. in S.W. (Cal.)
Industrial Relations Adviser
(Management Consultant)
5. Braunfeld Row,
Calcutta-27.
April 28, 1964

Dear Sir,

I am a regular reader of your esteemed journal on productivity. Your latest publication on Engineering issue of Productivity has added interest for my constituent small and medium industries. I have had very healthy opinion and reaction from some of them i.e. National Floors Private Ltd., 5, Braunfeld Row, Calcutta-27, Machine Parts Mfg. Co., 8/3, Hungerford Street, Calcutta-16, to cite a few examples.

The valuable guide and attitude which the journal creates through informative and expert articles are sure to enlarge productivity consciousness even among industrialists of small and medium sectors.

In this connection, I shall deem it a favour if you kindly spare some valuable time of yours to solve our following difficulties through direct communication or in a suitable published article in your journal :

(*1*) *In a small tile manufacturing industry employing roughly about 85 workers, the Pressmen (direct productive workers) are being paid premium on pro rata basis on their production of 8 hours for time saved over and above the target of production fixed for 8 hours. As a result, the Pressmen earn extra wages in the range of Rs. 35 to Rs. 50 per month. This scheme is continuing for the last eight years or more.*

(*2*) *Recently, two years back, after prolonged discussions with the union leaders other categories of workers who were not participants in the Production Bonus Scheme have been provided with a suitable Production Bonus Scheme: a copy of which is enclosed. As a result, this group of indirect productive workers earn on an average Rs. 12 to Rs. 20 per month.*

(*3*) *The production process and the general organisation being the same, it is curious that productivity of Pressmen has not increased. The total production also remains more or less the same.*

(*4*) *Absenteeism amongst direct productive labour and indirect productive labour has neither increased nor decreased. Percentage of absenteeism in a yearly curve shows more or less the same pattern of high absenteeism. In this connection, it may be pointed out that absenteeism remains high amongst the local workers with family links in comparison to workers from other provinces who live in dormitories. The management concerned naturally feels that in spite of the introduction of Production Bonus Scheme by which the workers' cash earnings have increased substantially, neither the productivity nor the total production has increased. Furthermore, it is surprising that the habit of absenteeism remains the same in spite of the fact that a workman for absenting loses not only his daily wages, if leave is not due, but loses a good portion of his production bonus earnings too.*

I shall deem it a favour if you kindly let me know how to improve the situation as otherwise the burden of wages remains comparatively high without any comparative increase in productivity.

I am sure you and your esteemed organisation will kindly throw some light on the problems to help the management of this company, viz., National Floors Private Ltd., 5, Braunfeld Row, Caclutta-27 to achieve what is desired through the Production Bonus Scheme.

Yours faithfully,
SB Chakraborty

Absenteeism

National Productivity Council,
Madras,
May 4, 1964

Dear Butani,

I have read the problem you have sent with good interest. But, I am sorry to say that I am unable to make head or tail of the problem. In the problem it is stated that the Pressmen earn an extra wage in the range of Rs. 35 to 50 per month. This extra payment is made on a pro rata basis for the time they save. After stating this in the same problem they say that the production process and the general organisation being the same, it is curious that productivity of Pressmen has not increased. Both these statements are contradictory and hence not clear. The formula for paying production bonus to the Foreman and indirect workers is also not self-explanatory. Unless these things are made clear and all the facts collected, it is difficult to give clear solution for this matter.

Another point raised in this problem is regarding absenteeism amongst the labour. Absenteeism in industries is in itself a complicated problem and it is more or less linked with this problem. Moreover, incentive bonuses are not a cure for all industrial problems. But, if incentive schemes are designed taking into consideration these socio-economic conditions, it can reduce to some extent absenteeism. But however, this problem should be tackled by some other means. I think Labour Research Centres in India have carried out quite a lot of studies in this field, and they may be able to give some solution for this.

MM Jacob

Inventory Control

The Eastern Purchasing Journal
New Delhi

April 6, 1964

Dear Mr. Butani,

Please refer to page 613 of the NPC 'Productivity' Journal, October-December 1963 issue—A Case Study in Inventory Control. There appear to be some errors which the author might have overlooked. For example the safety-stock calculation $1,200 \times 15$ has been shown as 1,80,000 whereas it should be 18,000. This means the square root is not 424 but 135 (approx) and so on. Fortunately no harm is done as the recommended inventory is 15 days' usage, but on the basis of computation it comes to less than $1\frac{1}{2}$ days' usage.

Yours sincerely,

AR Palit
Editor-in-Chief

You Are Invited To Write

The following Special Issues of the NPC *Productivity* Journal have been programmed, and articles for inclusion in them should reach the Editor as indicated against each issue:

Inter-Firm Comparison (Monsoon 1964)	:	**Mid-July 1964**
Preventive Maintenance (Winter 1964)	:	**Mid-September 1964**
Fuel Economy (Spring 1965)	:	**Mid-December 1964**
Production, Planning & Control (Summer 1965)	:	**Mid-January 1965**

BOOK REVIEWS:

Productivity and Social Environment

By *K Sreenivasan*, **published by** *Asia Publishing House, Ballard Estate, Bombay 1.* **Pages 181. Price Rs 18.**

THIS BOOK CONSTITUTES A MAJOR BREAK-THROUGH in Industrial Sociology. It is remarkable for its balanced analysis, its sweep and depth, though occasionally, (Chapter Four for instance) one has a feeling as though we are still living in the age of *Ekalavya, Karna, Rama* and *Bharata*. To this rather superficial impression, the author has deliberately applied certain powerful historical correctives, but on balance the overall conclusion appears to be that despite recent progress, the feeling of independence and the new social dynamics, the author has dealt with them all—the burden of history with its caste and religion and joint family bears heavily on the Indian economy and vitally affects its productivity. In fact, the author's study is really a poignant sociological tragedy of an ancient community "struggling between two worlds—the one dead and the other powerless to be born". The contradictions involved, as for example, between the Directive Principles of State Policy and the actual life of the people in the street and on the shop floor are dealt with such deadly realism that parts of the book reach the level of a literary masterpiece.

Over a considerable part of the analysis, however, the author is quite on the earth and extremely interesting at that. The account he has given of what happens in factories and offices is based on down-on-the-ground experience, and the attitude throughout is constructive and mildly optimistic, despite the general overhanging tragedy referred to in the preceding paragraph. His attitude towards Government control of industry and public enterprises is rational and objective. Even his handling of working class attitudes is marked by sympathy and what may be called, almost fellow-feeling. It is a progressive publication.

K Sreenivasan

While there would be general agreement with the author in his analysis of productivity and its broad sociological perspective, his criticism of Gandhian economics, its present practitioners, is rather harsh and particularly probably somewhat intolerant: "...certain uneconomic and potentially dangerous schemes are being undertaken because of sentiment...the creation of a huge army of people who have a vested interest in an inefficient method of manufacture"... It is true that "India today is not creating a society as Mahatma Gandhi envisaged it; nor is it possible". This is true and profound but one would have expected a somewhat positive approach to the huge problem of providing a living and employment for a population of 450 million increasing at the rate of 2% per annum and the people in charge of affairs, who are struggling with the massive problems of industrialisation and rationalisation and the population explosion, need sympathy in the handling of the baffling problems that face them.

Similarly, the author's attitude to "the few businessmen who might have indulged in questionable activities to make money", the need of 'psychological incentives' etc is likely to be misunderstood, though by and large the attitude of the author is realistic and progressive.

The real strength of the book lies in the fact that it is an extremely interesting piece of sociological analysis: there is considerable depth in its analysis of the caste system as a cause of low productivity, in the generally demoralizing results of the authoritarianism of the traditional Indian family. The conclusions are historically profound: "...This twin combination leads to intellectual arrogance among the privileged few and timid passivity among the multitude...Indian society, while it has produced just as many able and even great leaders as any other civilisation in history, *has not been able to maintain consistent progress* because of its authoritarian nature on the one hand and restriction of knowledge on the other..." In fact, the major characteristic of the book is its balanced perspective: "...Employers and workers are both inheritors of the same tradition and their attitude to many of these problems is similar. It is just that the employers have greater opportunity".

Certain parts of the book need to be quoted, particularly in the context of the author's analysis of productivity: "...the very critical situation as far as productivity is concerned arises as a consequence of the terrific social gap at the lowest level of management... the junior supervisor is essentially a middle class product...The people who work under him...are all from the working class, often illiterate. They have never done any kind of work other than manual, and are quite proud of their craftsmanship. They have often spent a life-time on the same group of machines and understand all their weaknesses as well as their capacity. On the other hand, they do not understand the theoretical principles behind the working of the machines and processes of which they are in charge...They cannot even read the blue-prints of the machines that they understand so well. ...That is we have two groups of people who have two halves of the same basic knowledge—one purely theoretical and the other purely practical—and who work together in close proximity. And yet, they are separated by a wide gulf of social background, interests, education and training. The camaraderie that exists between these two groups, the back slapping, the leg pulling, drinking tea together, working together and learning from each other in an atmosphere of easy informality which is an essential feature of the relationships between a fresh college graduate and an experienced workman in other advanced countries, does not exist in India. The junior supervisors demand separate canteens ...The college graduate feels that he knows quite a lot about the process that he is supposed to supervise and is rather disgusted at the ignorance of the maistry. But at the same time, he is only too painfully aware that the maistry can repair, adjust and set the machine far better and quicker than he can and is afraid to match his skill against his subordinates. If there is a mechanism in a machine that he does not understand, he is afraid to ask his own superiors lest they think he is no good; and he is ashamed to ask his subordinate since he considers himself superior to him socially and culturally... The maistry takes the attitude that these educated supervisors are arrogant and that their education is useless, because he is so much better than them at actually doing a job. And he takes pleasure in 'having them on' much to his own satisfaction and that of his colleagues and often misleads them..."

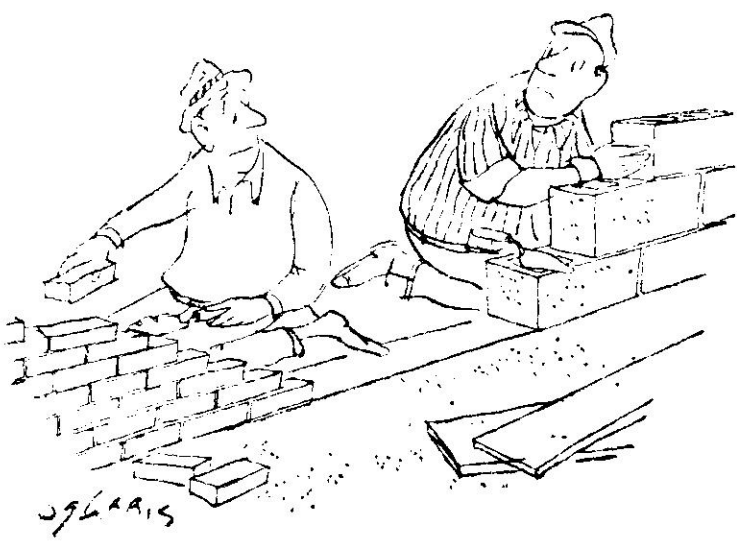
From the point of view of the NPC, the author's evaluation of the application of productivity techniques, of the training in these techniques etc is extremely important: "... the application of new techniques such as quality control, work study, manpower and machine utilisation, and so on, have resulted in exposing the weaknesses of many of the methods used in the past...". The author's appraisal of training in productivity techniques is generally unfavourable: "During the past few years, hundreds of people have

been trained in the various productivity techniques in almost all the industrial centres in India. Most of them have been drawn from various levels of managements in industry as well as from trade unions and they have gone back to their respective industries after a period of training. But *if an evaluation were made today it would be found that very few of them are applying these new techniques in their jobs. Nor has productivity shown an appreciable increase in factories from which these trainees have been drawn...*"

The author realises that "the fault does not lie with the productivity movement. If the sociological climate in a factory is not conducive to the introduction of productivity techniques, then the training of one or two supervisors in these techniques is not going to change the climate. Therefore, if the productivity movement is to make effective use of its limited resources, it should concentrate on staff training and implement the techniques only in those factories where the climate is suitable. Intensive application in selected factories would yield quicker results in terms of actual increase in productivity..." In fact, these are the very lines along which NPC has been moving as would be evident from Sri NK Bhojwani's article titled "A New Deal for Productivity," printed in the last issue of this Journal (*Page 149*).

The author's broad conclusion is one with which we would agree unreservedly: "If the morale and the efficiency of the supervisory staff in India is to be improved, it is necessary to establish a new social equilibrium in our industrial enterprises..." The book is really an extremely constructive contribution towards this end. One of his suggestions is worth noting: "...Only a large volume of sociological research will enable us to answer" the many questions posed in the book. An interesting suggestion needs to be noted here both for its significance as also for its humour: "...social reform in the context of productivity should be directed towards *the creation of an all-India type of personality...*"

The book is rather highly priced at Rs 18. Including the Index, it has 181 pages which works out roughly to a price of 10 nP per page. In terms, however, of profundity and importance of the analysis, it is *a work of infinitive value.*



New Horizons In Industrial Engineering

By SEYMOUR M SELIG* AND MORTON ETTELSTEIN† published by the American Institute of Industrial Engineers, 1963, Spartan Books Incorporated, Baltimore, USA. Distributors: Cleaver-Hume Press, 10-15 St. Martins Street, London W.C. 2, ; Distributors in India: Macmillan & Company, 276 Dadabhai Naoroji Road, Bombay-1. Pages 232. Price Rs 37.50.

THE reading of this book is an intellectual treat. It is typical of the large-scale research activity that is constantly going on in American society; and what is still more remarkable about that civilisation, its practicality. This is group research at its very best: the writings of a number of intellectuals, programme directors and a whole host of others known by the names of the many techniques that have become prolific in the industrial economy of the United States. Anyone concerned with and interested in "the explosive growth of science and technology" (page 199) would be well-advised to peep through the pages of this book.

As the Editors know, the title is a somewhat high-sounding one but the decision was a deliberate one, for the authors really intended "to explore the frontier region in industrial engineering". The frontier, as everyone knows, in American research has been stretched quite far or should we say quite near: "We no longer face a geographical or technological frontier, we are faced with a human one."

The authors really have a feeling, like, probably, people of all ages that we are involved in a sort of revolution which is daily gaining greater and greater momentum and that a crisis will supervene unless "we can learn rapidly to handle the complexities of modern life at all levels of endeavour". They look upon "the growing need for better management for our private and public affairs" as a manifestation of that revolution. Broadly, their outlook, as contrasted with the past, may be summarised as follows:

> **"The materialism of the last century with its emphasis on energy, power and efficiency is being replaced by a philosophy of information, communication and control. A cursory review of almost any topic from space exploration to international politics reveals an increasing number of areas where the objective is to communicate information (true or otherwise) for effective control instead of the efficient use of energy to obtain power."**

The book has a number of highly knowledgeable papers on the Critical Path Method (CPM) and Programme Evaluation and Review Technique (PERT). With large-scale construction of new projects, it appears imperative that we learn these techniques: "...it (CPM) has found wide acceptance by the construction industry with applications to bridges, dams, tunnels, buildings, missile bases, highways and power plants. Just as important have been the applications of CPM to all types of complex maintenance work and to some miscellaneous applications like replacing a plant manager...Its impact has been such that today it is virtually impossible to get a government contract for work related to the space programme without becoming involved with PERT...It has even been applied to the production of a Broadway Play".

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† *Personnel Research Activity, US Navy*

We must, of course, learn these techniques but we must at the same time be cautious, for these commercial Anglo-Saxons—very hard-working and practical people in their domestic business—have the habit of giving grand names to some commonsense formulae. We are thus persuaded to believe that it is something magical and we divert our resources to learning the new techniques, employ fantastically paid foreign personnel (of course, Uncle Sam pays for that) and import costly and unmanageable gadgets (for which also Uncle Sam pays) while our Indian technicians stand in awe and learn the new techniques that are going to revolutionise our industrial economy and make it deliver the goods in much the same manner as rats come out of a hat; and then pat, within three months or six months at the most, hectic cables with alarmist headlines come pouring in that the CPM or PERT has been superseded by another magic formula, named much as Swift did it in Gulliver's Travels; and that all our previously acquired knowledge is as dead as Dodo and so on. This is not to decry CPM and PERT, for the extreme utility of these techniques is obvious enough under our present conditions of making projects and scheduling them: a lot more than the United States, this country suffers from "serious schedule slippages and cost over-runs..."

How techniques get rapidly superseded in the United States would be clear from a series of papers published in this volume on the future of work measurement. Do we in the context abandon work measurement, because the associated techniques of time study etc are being given up in the United States? Probably a saner conclusion would be that we have to go through the mill. We must have time study, overcome the resistances involved and then change over to the new phase of human relations etc., for every industrial economy has to go through a certain evolution. We have hardly established work standards on the shop floor. It is essential in the interest of productivity that we not only work out but we establish the standards.

The book closes with a number of general papers on the role of the American engineer in the development of the under-developed areas such as ours, a couple of papers on management; the management factor in development and the new management tools in the US general services administration.

The book is extremely stimulating. Not only engineers but the non-engineering technicians, people in charge of making projects and executing them would find the book worth reading. The price is rather high for the Indian market: Rs 37.50 for a book of 232 pages, but probably the demand would be largely institutional and most of us would manage to get it free from Uncle Sam, rather than pay a reasonable price to the Macmillans, who have the distribution rights in India. It is however in the public interest that the Macmillans (India) should work out a price, which would be attractive to research workers, managers of industrial establishments, project-makers in public sector enterprises, young industrial engineers, to own a personal copy of this very necessary publication.

No plan can produce the will: that must come from the people. —*John Wellens*

Productivity and Economic Growth

by DR. KR SANGHA, *Asia Publishing House, Bombay*. Pages 114. Price Rs. 14.

THIS is an excellent academic publication, managing to compress the entire theory of Productivity and Economic Growth (alongside the necessary history of economic thought and relevant statistics) in 114 pages which include a whole chapter of 16 pages on productivity in under-developed countries. The book is extremely well-documented from current economic literature and US statistical publications. The analysis is thorough-going and in matters of controversy such as Sharing the Gains of Productivity, the author shows a rare degree of fair-mindedness. Even in dealing with widely differing economic theories, the author's approach is purely academic, as between Karl Marx, Adam Smith, JM Keynes, and others.

In discussing Labour as a Measure of Productivity, the author has not lost sight of the other significant variables: "...The state of industrial art—the nature of capital employed—is a major determinant of a given output at any time...The reason why productivity per worker engaged in digging coal in the US mines is 7 to 8 times higher than in any other country of the world is that the American mining makes use of more automatic machines and employs better mining methods than its counterparts in other parts of the world. It is conceivable that the quality of capital employed is of overriding significance in explaining the magnitude of differential in productivity."

The book is throughout very well-written, particularly the chapters dealing with the Methodology of the Measurement of Productivity, Productivity and Related Variables, etc.

The critic would probably like to find out if the book in any way deals with India. It frankly does not, though there is a whole chapter dealing with productivity in under-developed countries. This chapter is really an economic survey of the factors that affect the growth rates of the under-developed countries. Indian statistics have been very liberally and ably used and they do in a broad way relate to productivity. There is a casual reference to the Indian Five-Year Plans on page 84 but beyond that there is no attempt to measure Indian Productivity either analytically or historically. Nevertheless this book is probably the best and the richest exposition of the theory of productivity that is available in the Indian market.

SCHOOL TEACHER'S PRODUCTIVITY !

A lady teacher was challaned for a traffic offence. She pleaded that she was a school teacher and requested the court for urgent disposal of the case "so that I can return to meet my next class". "I have waited," so the judge said, "to have a school teacher in this court. Sit down and write: 'I would always observe traffic rules' and write it 500 times ".

Psychological Counselling in India

By JM FUSTER **published by** *Macmillan & Co., Ltd., Macmillan Building, 276 Dr Dadabhai Naoroji Road Bombay-1.* **Pages 261. Price Rs 10.**

DR FUSTER has done a great service by publishing this well-informed book on Psychological Counselling in India. He is well qualified to write this book. In fact, it is the outcome of 9 years' experience in counselling students at St. Xavier's College, Bombay, and five years' experience in training counsellors at St. Xavier's Institute of Education, Bombay. This explains why the book errs on the excessive side: too much reading, too much research, too much of the author's own published material. Properly edited, the excellent material contained in this work might have made it almost a classic in its own field. The book claims to present "the normal person in all his dimensions, and set the stage for increased personal efficiency and a more satisfying way of living". With all its evidence of deep and extensive reading and considerable depth of experience. it would really be difficult to justify these claims. The book is not without its good points, particularly its case studies, though some of them do sound apparently like the advertisement of some magic cure, as for example, the testimony of a college girl who was "in an entirely confused state of mind" losing weight and all that. Then she goes to the Psychological Counsellor:

"One day I made up my mind to visit the Counsellor and tell him everything. I am really glad that I did go to him for it was from that day that my cure started. Then there is a case of a college boy who failed at the Intermediate examination. His parents were divorced when he was only two years old, and then he alternated between his father and an overfond mother who considered him a pet even at the age of 18, and the psychological counsellor saved the boy from the clutches of this Amazon. There are many good case studies in the book but the best part of it is the theoretical exposition. The author's understanding of existing theory in his line is really comprehensive.

It probably needs to be emphasised that the author's background is institutional and Roman Catholic. This can be very well illustrated from the chapter on Sex Education in India in which he quotes Pope Pius XII who advised a group of mothers on their duty "carefully and delicately to unveil the truth..." The author's own attitude is simply expressed: "Sex is God's idea...Any sex education that does away with God as the Creator of man, and with His plan of procreation, and our obligations to Him as our supreme Lord, does not deserve the name of education and should not be accepted by parents". This is simple and straightforward religion, very commendable against the perverse background of the times. But if the publishers are going to make money out of this stuff—and they can make quite a lot out of it, since the author's knowledge of theory and practice of psychological counselling is probably unequalled in this country—they would be well advised to find out an editor for the second edition, who could manage to persuade the author to streamline his massive experience and knowledge and to express the essence of what he has to say in terms of the secular philosophy of the times. So edited, the book has in it the possibility of becoming a classic in the line.

PEOPLE AND PRODUCTIVITY

By ROBERT A. SUTERMEISTER, **published by** *McGraw-Hill Book Company, Inc, New York.* **Pages 520. Price $ 6.95.**

BOTH the title as also the bulk of this book appear frightening. Actually, nothing could be simpler. The dramatic title "People and Productivity" simply means that the author is dealing with the employee's job performance. The entire exposition is based on a concentric diagram with Productivity as the centre of the piece, technological development as the major factor directly influencing productivity; employee's job performance is concentric circle No. 2, determined by employee's ability and motivation (next circle) influenced in turn by social and physical conditions etc. Thus the concentric circles grow. It is an extremely interesting diagram spread over two pages: the second cover page and the first page of the book.

Taking again the bulk of the book, the real text is barely 57 pages, its central theme being productivity as the 'primary goal of business'. The book is extremely well-documented and draws upon the extensive literature with which we are familiar. The end of the book is as dramatic as the title. The last chapter is called "The Future and the Challenge". Referring to various segments of the diagram, the author details 33 items beginning from Discussion with Employees and ending with Communication. Then comes the question: "Which of these methods, and what other methods yet to be revealed through continuing research in the behavioural sciences and continuing experimentation by management, can be utilized in the future to achieve increased productivity? Which of these methods, and what other methods, will be appropriate in the various parts of a particular organisation, at a given time, with a particular informal group, composed of particular individuals, under a particular leader, and with a specific union situation? This is the challenge of management".

The rest of the book from page 61 to page 515 is an excellent digest, summarising the best of practically the entire literature on Productivity beginning from the Hawthorne Experiments and running through Peter F Drucker (Managing the Educated), Doughlas McGregor (Integration of the Individual etc) and much else on that scale and of that quality. This digest really suits the type of audience for which the book has been designed: the layman, the businessman and the student. At any rate, they could not wish for anything better and more time-saving than a book of 515 pages between two covers. Taking account of the enormous flood of literature on what has become a fashionable subject, even a critic would be filled with a feeling of gratefulness to the author; and what is really charming, there is no pretension to originality.

PRODUCTIVITY THROUGH TRAINING

LN GHIRNIKAR
Superintendent of Training, Durgapur Steel Plant

It is the burden of this thesis that higher productivity is primarily achieved through innovations and improvements in all the sections of an organisation. Competent sectional managers striving continually to improve themselves, their men and departments, should, therefore, be regarded as key-men in the productivity movement. Sound policies on training of suitably qualified youngsters to replace older men, and other connected matters like man power planning, recruitment and promotion play an important part in the productivity potential of an organisation.

NAPOLEAN ONCE SAID: "AN ARMY IS ONLY AS good as its officers". Similarly *industry can be no better than its managers.* Experience in foreign countries tells us that the major part of rise in productivity has resulted from simpler designs, better materials, specialised machines, improved layouts, optimum equipment utilisation, economic use of raw materials and spares. The influence a manager exercises on his supervisors and workers by proper planning, directing and leading decides the level of productivity of his shop.

The National Productivity Council and a few industrial undertakings have realised the key roles of managers and supervisors in productivity. They are doing their best in devising and conducting suitable training programmes for managers and supervisors, but much more needs to be done. There may be some managers who accept the need for training on the assumption that *this applies only to levels lower than our own.*

It is frequently not realised that vast progress has been made, and continues to be made in such fields as communications and control, ergonomics, operational research, the use of computers, psychology and so on with all their impact on management practices. Our young men trained in universities and foreign countries possess knowledge about some of these new techniques. It is not enough to possess this knowledge but it must be applied and the responsibility for deciding to adopt new measures lies a long way up the managerial tree. Unless the senior ranks are prepared to listen to the younger people, *it will take a generation for new ideas to be applied on a wide scale* and we cannot afford to wait that long for our productivity to increase. Realisation of this has led to many long and short term management training programmes being launched by several universities, technical institutions, professional bodies and industrial organisations in all progressive countries, and the demand for these courses continues to outstrip the supply. At the British Iron & Steel Federation Management College I was told that their courses were already booked for two years ahead. This is so, inspite of the fact that most of the large steel companies have their own staff colleges. If the need for training of managers in latest techniques is considered so urgent and pressing in developed countries, *in countries like ours struggling to develop, the training of managers should be given top priority.* Unless this is done, our hopes of building new industries or increasing the productivity of existing industries will remain unfulfilled.

Managers of the Future

Even though our colleges are turning out engineering graduates in large numbers each

year, we are faced with *a critical shortage of developed middle-level managers.* In order to meet this shortage, industry will have to *rely more and more on university graduates with sound technological education* and training in modern management techniques. There are, however, many in industry who decry the university graduate and *sing the praises of the practical man.* Some senior managers say that graduates are of no use to them. When persuaded to take them, they do nothing to train them or give them responsibility which they can shoulder. After two or three years the managers have proved to their own satisfaction how right they were not to want them. But is this the failure of the young graduates? What about their practical man? In many cases he is one who practises the mistakes of his predecessors. It may be true that some of our capable senior managers have come up through the ranks. But *simply coming through the ranks has not made them capable.* It is *their continuous self-training* in developing knowledge, critical thinking and understanding of their colleagues that has made them so. Such persons are necessarily few and far between and their number will be too inadequate to meet our needs.

The graduates coming out of the engineering colleges are not ready to take immediate responsibility in industry, though they possess basic technical knowledge. They cannot be developed if viewed with suspicion and lack of understanding of what they can contribute. They require sympathetic guidance and systematic development. We must make use of all available means to train and give maximum responsibility at the earliest possible age, thereby *gaining the enthusiasm, drive and imagination that are the attributes of youth.* This should be regarded as one of the most important management functions. The responsibility for turning a university graduate into a practical engineer rests squarely on the company employing him first.

Suspicious industrial employers should find the following comparison reassuring. The marine engine industry of UK used to employ only a handful of graduates with the result that there is only one manufacturer of large engines who is not a foreign licensee. Indigenous manufacturers cannot compete and have fallen behind. But in the aero-engine industry, where a large number of engineering graduates are employed and trained, there are as good designers and innovators as anywhere else in the world. Consequently the industry maintains its lead. We shall have to learn from this example by employing more and more engineering graduates for positions of responsibility. Bright men anywhere in the organisation should be spotted and trained through tailor-made programmes to meet individual needs. Our aim in training them should be not only to make them proficient in the application of technical knowledge and management techniques, but *also to make them tough enterprising individuals who will seek to make the most of any situation,* however difficult or complex it may be.

Artisans and Operatives

Just as there is a shortage of high-talent managers, there is also a scarcity of skilled workers. In the face of constant worry about ever-growing unemployment, we have the problem of lack of workers with a wide variety of skills. This often is an obstacle to establishing new industries and bringing them to full production. With the contemplated growth of our industries, it can be safely predicted that the trend will be for an increase in the proportion of workers in skilled jobs, and a decrease in the proportion of workers in semi-skilled or unskilled jobs. Consequently, one of the major national problems we shall have to face in the next few years is the plight of the unskilled worker, who is going to find it increasingly difficult to remain employed. In fact, close observers of the industrial scene are convinced that an employee today must increase his skills and knowledge on a continuing basis merely to keep up with the changing times. In the established industries also changes take place slowly but surely with cumulative effect.

The changes in future will be at a faster rate than people want to recognise. These will lead to new demands on workers' skills, knowledge and attitudes. If we refuse to realise this patent fact it would cause a major morale problem, loss of production, lower than standard quality or some other major difficulty. A successful company must meet this challenge by continuous training at this level also.

The Apprentices Act of 1961 is a bold step taken for meeting the ever-growing demand of skilled maintenance craftsmen. This example set by the Government will go a long way, but what about training for other skilled jobs in the field of operation peculiar to each industry? The responsibility for this must rest with Industry. *To develop proper training programmes for operatives will be no act of public charity* on their part. Their own interests, their own future require the skilled and trained force which our young school leavers will supply. In this field also orthodox managers are allergic to employing intelligent school leavers who cannot continue their further education. They prefer to employ persons who could not complete even their middle school education. There is a *very widespread feeling that book learning makes a boy unfit for hard manual and practical work.* But experience in advanced countries has exploded *this myth.* There is, however, no doubt that the school leavers require training not only in job knowledge and skill but, what is more important, in proper attitudes. If our supervisors and managers demonstrate by example their willingness to do hard work, our youngsters will also pick up the same attitudes.

How often a line manager employing half-educated young boys realises his mistake and finds himself disillusioned too late? These very men whom he took on in the hope of getting hard manual work, become a problem for him. They neither want to do hard manual work, nor do they possess the skill for the job. On the contrary, with the backing of the Union they press for promotion to higher jobs by virtue of seniority, though they may not possess necessary skills. Then there are *demands for crash training programmes and a rush to do something about it.* All this confusion can only be avoided by having proper selection and training. At the end of training there must be a test mainly practical but with some theoretical content. Even in the regular procedure for promotion of employees from a lower to a higher skilled job, the test must be given supreme importance. Only in this way, will it be possible to ensure a minimum standard of competence among skilled operatives, which in turn will help in raising productivity.

Planned Training

That planning for training is essential is illustrated by the following example. The Manager of a factory was asked to set up a similar production unit elsewhere. He did an efficient job. The building went up in record time. The machinery arrived and was installed. Arrangements for transporting raw materials were finalised. The Manager set a date (two weeks hence) for the opening of the factory and asked the Personnel Manager to send men a little in advance of the date. He then informed the Chairman that the job was accomplished. Imagine how he felt when the Personnel Manager told him, it would take six weeks to fill in a small part of his personnel requirements, and those selected would require considerable training. More than half of the selected men were doubtful about taking their families to a distant place not yet developed. *The Manager had forgotten the human side of the job.* Planning ahead for manpower and training was neglected and the company learnt a costly lesson. This example may appear far-fetched to some, but knowledgeable persons will agree that this happens to a greater or lesser degree.

Planners for manpower should note an important point about training that *poor human material can be improved but no amount of training can convert it into first-rate material.*

Training is not a substitute for a sound recruitment policy. This should be based on as clear a picture as possible about various jobs, number of men required at various levels to do the jobs, job descriptions and rational wage structure based on job evaluation. From the job descriptions should follow the personal qualities, qualifications and experience required of men filling the various positions. Where experienced persons are not available the level of intelligence and basic technical knowledge necessary should be determined. The selection procedure should be more scientific and not be confined to an interview only. Suitable objective tests to judge the level of intelligence, aptitude for the job, willingness to learn or *trainability* should precede the interview. Having taken all the care to select the right type of persons, suitable training programmes should be developed. These should be drawn on the basis of knowledge and skill content of the jobs and sound learning principles. Placement of right men for the right jobs is also very necessary. For skilled positions this can be greatly assisted with the help of suitably designed tests. Only by careful selection, training and promotion policies can we expect desired results in productivity.

Joint Responsibility

Vis-a-vis the planned training at all levels which we have considered so far we must also consider another form of training which continuously goes on in a company. For this we need to consider our own training. How much of what we know about how to do our job, what company policies are, how to get along with our fellow workers: *how much of this knowledge, these skills and attitudes did we acquire directly from formal training sessions*? Relatively a small part. A larger part of it has come through actions of our superiors like counselling, work assignment, relations at work etc. This on-the-job training under the sole influence of the superior officer which goes on in a company, from a time standpoint, far exceeds the amount of formal training. A sense of this ratio is necessary to determine the responsibility for the results of training. It also emphasises the need for a training policy for a company, which must be loyally followed by all the managers and supervisors. If, for example, a man is instructed in one code of human relations in a planned training session and his job experience shows him an exactly opposite behaviour of his superior, then the effect of planned training is almost sure to be neutralised. Thus, through line management's day-to-day actions employees are constantly gaining knowledge, increasing skill and developing favourable or unfavourable attitudes. What happens in this training on the shop floor is extremely important. For this reason the line manager must be regarded as the key man for on-the-job training as for all other important activities on the shop floor.

The supervisor is closest to the workers and, therefore, is in the best position to recognise training needs. *Most of what men learn is learnt right on the job* being performed under his direct supervision. Training results should show in improved job performance and the supervisor is in the best position to evaluate this. The supervisor is also in the best position to see that training is actually applied on the job. Intelligent daily supervision yields the best training results. For all these reasons the supervisor must accept his responsibility in continually training his men. By the same considerations the managers are responsible for training of supervisors and top managers are responsible for training and development of managers below them. It is the responsibility of the line management to use effectively staff services like training which can help them train their men. The results of training are, therefore, dependent on how well this joint responsibility is accepted and carried out by line managers and the training manager.

Everybody's Concern

To seek to improve management performance to increase productivity is not to

confess failure. It has to be truly recognised that, in the ultimate analysis, industrial efficiency depends on the quality of the managers, their vitality and leadership. To obtain the fruits of higher productivity the managers must convince their men. There may be differences between managers and men, but *if the managers have created a suitable climate, men will strive for attaining targets*, as they too have a concern for long-term success of their firm.

In modern times a successful company not only meets the challenge of changing times, but also innovates and uses its resources to better advantage than its competitors. *After all, competitors generally have the same buildings, machinery, raw materials and money resources*. The deciding factor in losing or gaining ground is the utilisation of available human resources i.e., the way the intelligence, talents and energies of people are channelled by proper leadership at the top.

To be successful, a training programme for productivity must involve top management; most frequently *training must start with management*. Unsatisfactory conditions which training can be expected to improve may have their roots in management. No one further down the ladder of the management hierarchy will take training seriously if at the top management level the goals of training are ignored by management's attitude or behaviour. Every advance or improvement in an industrial company coincides with an advance or improvement in management. Useful ideas may come up from the bottom, but their use depends on management's responsiveness to them. Productivity through training can be *achieved* only if management—and top management in particular—participates in training.

Last but not the least a sense of purpose, a missionary zeal in all the workers in every field in the country is essential. All our measures to increase the nation's productivity will be of no use *unless the whole nation can be electrified* in the effort, once again as before Independence. Our statesmen, politicians and trade unionists, irrespective of party affiliations, must play their part. Let them *do and say things that help and encourage and release interest and energy*.

Management in Depth

IS THERE A TRAINEE WITH YOU ?

PK TIKKU

From the earliest days of recorded history we know that the one single purpose of all our endeavour has been to improve our environment and also to create more definiteness for our future. In the context of largescale industrialisation, it is necessary for each succeeding generation to take over the job from its predecessors. In other words each generation is to train its successor after adding its own contribution. A stage has now been reached where the expansion of industrial activity is so fast that we can no longer afford the old method of allowing people to learn the hard way. It causes waste and therefore *the solution lies in organising ourselves.*

THE ORGANISED WAY OF MAKING PEOPLE aware of their future difficulties and letting them know their solution (based on the past experience of others) is training. Alternatively, training is that process by which a person able to do a job less efficiently before is made capable of doing the same job more efficiently, subsequently. We might also define training as the act of *making less experienced people do the job that demands greater experience.* It is this last one which is more pertinent because the question of obtaining people of long experience has assumed great importance in our country.

Rapid industrialisation by way of starting new industries and fast expansion of the existing ones, has created a vacuum; and experienced people, particularly of the artisan class, are most difficult to get. A similar situation had arisen in the West during the last war when a great majority of people had been called up for active service. This situation was overcome there by devising, very ingeniously, intensive training courses in almost every field and thus by taking raw people or less capable people and subjecting them to these courses, they were able to get on with the situation. Ever since then, *training has assumed a new dimension*—an amount of certainty that it is possible to train people and thus improve their capabilities as well as their utility to the employer.

Before going into the details of training programmes and the allied difficulties let us analyse the pre-requisites of a training programme. It *must have an AIM and a Purpose.* It is extremely important to lay down the aim of any training programme as, with the varied human faculties, unless an earnest effort is made to direct all energy towards a particular end, the individual is likely to go astray, will not come out as useful as was expected, will not be happy himself and this will thus lead to a situation where frustration will grow both in the trainee as well as in the employer. The former feels that full opportunity was not provided to learn and the latter feeling let down in the deal. This situation can of course arise out of other more genuine reasons, but nevertheless this can be one. And this certainly can be avoided.

Let us now deal with the purpose of training. The purpose of training is *always to meet a particular situation* and we should consider this question in the light of the situation that has arisen in our country consequent upon very rapid expansion. A great demand has been created for skilled workers, lower supervisory personnel, experienced engineers and the top manage-

ment class. *Obviously something has to be done* and the only course is to start as many training establishments as possible.

Training of skilled artisans with which we shall mainly confine ourselves is of particularly difficult nature in our country because the people encountered with, are of very little education. This problem becomes more acute because in the last few years quite a few progressive labour laws have been enacted whereby although they have become aware of their privileges, they are yet to appreciate the importance and urgency of obligations which accompany these privileges.

Let us now consider what a training establishment consists of? A typical training establishment for artisans consists of a top training manager assisted by a couple of lecturing staff and *some good and mature skilled artisans* to demonstrate in the shops and *help young aspirants to handle machine tools*, etc. The training is imparted initially in general in all the allied trades and towards the later portion of the training the individual is allowed to specialise in a particular trade. Very few of the existing establishments have their own training schools: a great majority of the skilled artisans being turned out today are from the Government-sponsored institutions.

This has necessarily created a situation where there is the possibility of a gulf remaining between the ideas and the objectives to which the training authorities set themselves and the requirements of the employer. This demands intimate liaison and coordination or else there is likelihood of waste in time and money. Like fresh graduate engineers, the product of these training schools is a 'raw skilled artisan'. This phrase might sound paradoxical but it contains an essential truth. A great deal of effort has to be done before these raw skilled artisans are turned into mature skilled artisans and useful members of society. As in the case of a weapon, it is not only necessary to possess it but also to know how best to use it. Similarly the skilled artisans passing out of a training establishment have to be 'broken in' in a factory so that they may learn the art of using their skill advantageously. It is here that failures occur, not necessarily because of inefficiency in trade but mostly on account of immaturity in life, or more correctly in industrial life. The ability to be part of an industrial order and industrialised society, the urge for it and the method to achieve it are all that the first employer of these young artisans is required to give them. Many employers are unable to provide this because they are not fully geared for it and have been caught unawares in this crisis and also because it lacks incentive for them. There is no immediate gain in providing that to the young artisan and no immediate loss in not providing the same. They are quite prepared for losing him after a short while, and this they regard as a natural process.

There is another aspect of this problem. Unlike the West where the boys choose a career by selection, in this country the youngster who turns to these skilled trades is perhaps one who has realised that opportunity for him does not exist for higher education for either want of funds or just lack of enough opportunity for all to go. He has thus already faced the first frustration of life and if so it is added further frustration by way of unresponsive attitude of the employer, or, on account of the inability of the employer to provide the necessary education, a great deal of misunderstanding and agony are the results.

Lastly, there is one more factor to be considered before we try to draw up a complete picture. Training in an industrial establishment or factory is compulsory and necessary after the artisans have passed out of a training school. This is often accompanied by a small stipend but it should be understood that *a stipend cannot create the same stimulus as the wage.* It might be argued that they cannot become wage earners immediately on passing out of a training school, but at the same time it must

also be agreed that '*stipend*' *creates a sense of separateness.* The very beginning is thus rather weak and this lack of interest grows till the trainee begins to feel that there is no place for him in the organisation. He has thus already started looking outward when in reality he should have been concentrating on accommodating himself within the organisation. Such a beginning is indeed tragic but this tragedy is being repeated fairly often.

The situation as it stands today is that as soon as an employer opens a training school, the rush of admission is tremendous. After the initial surge is over and when the dust is settling down, a determined body of candidates is left who are admitted and commence the training. As soon as this training in the industrial training school is over and *the trainees have gone to the industry proper, the disappointment begins and perhaps on either side.*

The result is a change of employment sought by a great many skilled artisans. This is the present-day situation. This situation has started discouraging industry from opening more industrial training centres of their own. If they open such schools they try to secure their rights by way of making them execute agreements to serve for a couple of years. But *coercion does not lead anywhere except to lowering the morale, which in turn lowers productivity.*

What then are the causes of this unhappy situation? The answer lies in the following:

1. **Selection of wrong people for artisan training**
2. **Wrong training at the training school**
3. **Incomplete training at the training school**
4. **Lack of response from superiors and the unsympathetic attitude towards trainees**
5. **Immaturity of trainee**
6. **Failure of Management to guide them correctly: inadequate leadership**
7. **Wrong incentives**
8. **Incomplete information to the trainees: less publicity to the facts of employment.**

For artisan training only those people should be taken who have the aptitude for it, who are above a minimum standard of education and intelligence and who are below a maximum expected level of aspiration in life. To recruit people too good for the job always leads to waste because they would never stick on. Further, it is not only necessary to select the right chap but also necessary thereafter to train him for the particular end. Training should be given not only in operating machine tools, but also for developing the mental faculties of the young apprentice. They must be encouraged to feel part of the industry as a whole—should be given as far as possible independent work...As long as a lieutenant wants that his soldiers should fight for him, he must continue to inspire them and give them the necessary leadership. Each human requires leadership. The persons representing the Management to the trainees (and in many cases no such person exists in the factories) should thus be able to set the example and lead them. *Management by bluff should give place to Management by sympathy*, and what is more necessary is understanding.

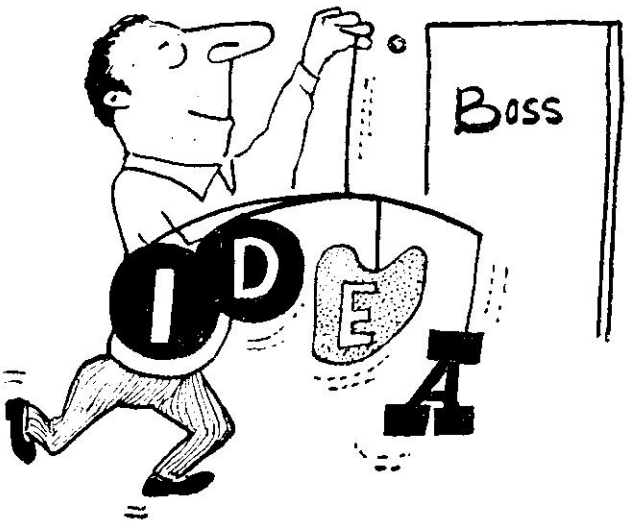
Money is not the only incentive, though decidedly the most important. Although the skilled artisans leave the job sometimes and in changing their job they gain monetarily, but they very soon reach a maximum level. Why should then they leave even after this stage? Because of lack of other incentives. What about housing accommodation and all that goes with it for factories located in urban areas—transport from works site to nearest rail head in times of emergency and urgency, medical aid and transport in times of illness, etc, when factories are located in remote areas, shift working vis-a-vis steady working hours, likelihood of transfers to interior regions or far-off places—language difficulty arising therefrom and a host of other things all haunt the mind of a youngster. These are the things which every one must think of for himself, and they are such necessities at times that even if the employer does not

provide him with these, he has to buy them in the market with the money he earns. *Is it not then worth-while giving a thought to these things*?

Money cannot remedy every situation and it is not always desirable either to remedy a situation by enhancing the rate when actually other incentives are needed.

Incomplete information about future prospects is something that needs to be remedied radically. The trainees must know what all can be theirs, but along with this they must also be told what all is necessary to achieve that. Letting them know only one, either of the two, is neither correct nor can it remedy the situation. In our country, unfortunately, so far no importance is given to these things. *The new entrant is left to inform himself through hearsay* and at the most through oral information from some staff member. But, is there any harm in putting down the facts on paper and passing it on to each entrant. Even, at times, junior supervisory staff also do not know, leave aside the artisans, the correct rules of Provident Fund, gratuity, leave and many other benefits which are available to the employees. Sincere chances of promotion should also be made known to the young aspirants: the actual cases of how many people and who all have risen in course of time should be left for verbal information to be passed on to them through junior supervisory staff. In many cases, unfortunately, *people are left to guess their own grades even. This is a very sad state of affairs and certainly requires no investment to improve it.* By providing the above information people are automatically discouraged from leaving the employment because they also become aware of the things they would lose.

In summation therefore it can be said that trainees of artisan class being young and less educated require special attention. They also require all-round general education to widen their horizon and to help them become useful members of society. With all the knowledge gained, the skill acquired and the horizons widened they should then be commissioned by reminding them that "Men are useful only in proportion to their ability to co-operate with others".



TRAINING IN INDUSTRY AND ACCIDENT PREVENTION

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If we take a look at the rapid development of the industrialized countries of Western Europe and compare their index of production with the number of work accidents, we shall notice that the prevention of accidents has by no means been commensurate with the growth of industrial production. The reason for this discrepancy probably lies in the fact that, in Europe, the need for accident prevention in industry was not fully recognized until industry had already grown into such definite shapes that there was very little room for new ideas, no matter how urgent they were.

LET US CONSIDER WEST GERMANY AS AN example of a highly industrialized nation. Here, the number of work accidents rose 118 percent between 1950 and 1960. In the same period, the total number of employees increased only 16 percent. Such a development is indeed very alarming, and so are the total costs of these accidents: It has been estimated that for 1960, the total costs of labour accidents in West Germany amounted to the equivalent of Rs. 4,700 million.

These figures show clearly that the prevention of accidents in industry represents one of the most promising and important factors to increase both industrial and national productivity. Industrial enterprises which are now being built or planned in countries under development like India, must not risk a similar development of the number and costs of work injuries from the very beginning. It is a necessity to choose safe equipment and production processes, and to introduce a Safety Training Programme for the workers.

In general, one or several of the following factors contribute to work accidents

1. **The worker**
2. **The production equipment**
3. **The working conditions**
4. **Faulty design**
5. **Organizational deficiency.**

The most common and most important of these potential safety hazards is the worker himself. The majority of all work accidents could have been avoided by proper reactions of the involved workers. A safety-conscious worker will react safely to most of the many daily situations that could—if followed by wrong reactions—endanger his health or even his life.

During their years of employment, many workers develop this sense of safe working. The young and unskilled workers, however, forming the largest part of the labour force available in countries under development, have no industrial experience whatsoever and, hence, no safety-consciousness. They do not know of potential dangers related to most of industrial work, and they have no means of knowing the possible consequences of negligent or absent-minded work.

Evidently, *Safety Education is a very important part of training in industry.* We feel that this particular field of training is so essential that the management of any larger industrial enterprise should give it a lot of thought.

Developing a Safety Training Programme means a compromise between two alternatives : First, to lose as little as possible of the workers' productive time, and, secondly, to make the programme detailed enough to

impress really the participants. A Safety Training Programme should consist of a minimum of 5 to 10 hours of instruction, and the class hours should not be too far apart.

How can such a programme be set up? In order to answer this question, we have to distinguish between two cases:

1. **Safety Training for skilled workers who have been holding their job for some time, and are familiar with it.**
2. **Newly hired workers with no or very little industrial experience.**

Let us first consider the possibilities for conducting a Safety Training Programme for skilled workers.

To start with, these employees should be instructed in the fundamentals of accident prevention. There are safety rules every employee ought to know, like handling inflammable liquids, avoiding the dangers of electricity, protection against power transmissions, the explosion dangers of boilers, avoiding the danger of spilled machine oil, and others. Every employee should know how to handle the fire extinguishers, and where they are placed. Also, he should know what to do if a fellow worker gets hurt. In every department, there should be *at least one person trained to give first aid to injured colleagues.*

In order to make the workers more safety-conscious, it is good practice to demonstrate the possible consequences of unsafe working. This can be done best by *reconstructing some accidents that have recently happened* in the department being trained, and to show how these accidents could have been avoided by *a better safety conscience.* In case the company has statistical records of past accidents, it is recommendable to use the accidents that have happened most frequently for this demonstration. It is not difficult to derive from such a demonstration general rules for safe working, and to *make them drastic enough to enter the workers' minds.*

A third important point for a Safety Training Programme is the introduction of personal protective equipment to the personnel. Of course, management must be ready to give this equipment free to the workers, or at a very nominal charge. Among the most widely used protective equipment are safety goggles, helmets, shields, gloves and safety shoes. The training object here is to encourage the personnel to wear such equipment by demonstrating the resulting advantages. Quite often, you will find that, at a first glance, many workers are sceptical towards such protective equipment arguing that its use is a hindrance to work. This, of course, should not be true of any properly designed equipment. It is a psychological problem to get the personnel used to it.

Now, let us come to our second case: the development of a Safety Training Programme for inexperienced, and unskilled workers.

Such a beginner should not from the first day on be put on the job he is hired for. Much rather, he should get acquainted during a short training period with all machines and production processes he can possibly come in touch with while performing his job to be. This period should last from one to two weeks. From the managerial viewpoint, it will always prove to be a good investment. During this time of adjustment, the new man is not supposed to gain special technical knowledge. His instructor should only explain to him the most important production machines and processes, stressing at the same time all the related safety hazards. In this way, the worker will be safety-conscious from the first moment of performing his job, and he will avoid dangers by proper reactions.

The second period should be the training for the particular job the man is hired for. It has proven advantageous to give a 'sponsor' on the side of such novices. This sponsor, having worked at the same type of equipment long enough to be able to teach the new man, looks after his colleague as soon as he has received his first instructions, and makes sure that he works safely.

By the time a new man has been worked in, and has become safety-conscious like his more experienced fellow workers, he should participate at the nearest occasion on the Safety Training Programme for experienced workers as outlined before.

This author has deliberately written his contribution in very general terms. There is no intention of giving a prescription for a standard safety training programme, but to give some hints for the conduct of such a course hoping that they will be of some use. Of course, each industrial enterprise will tend to include some special items on the schedule depending upon its production facilities, and upon the particular job the workers are being trained for.

In summing up, we want to direct once more the executives' eyes to the enormous costs that can result from work accidents. Let us assure you that the investment for a Safety Training Programme will always more than pay for itself. A good Safety Training Programme rates among the very first measures towards increasing a company's productivity.

——:o:——

Chairman's Report

The Chairman addressed us in terms that impressed us
And, nearly as we could discern,
He dealt with new markets, with means and with ends,
With assets and debits and taxes and trends,
With costs, and with rates of return

The speech was applauded and heartily lauded,
For no one admitted a doubt
That the Chairman's report was brilliant review
Of company progress, since nobody knew
What the guy had been talking about !

From *Management Review*, November 1964

"START IN TIME!"

HANS TAANING

Consultant, Federation of Danish Industries, Copenhagen, Denmark

This beautiful piece, written in delicious Danish style, was received through the good offices of Sekretariatet for Denmarks Erhverbsfond, the Danish Trade Fund, Copenhagen. Against the background of Danish practices and thinking, the author has managed to express in his charmingly simple style, certain fundamentals in regard to Industrial Training in the context of the dynamic demands of the time.

IN ALL WORK PLACES THERE ARE EVERYDAY many employees facing something strange and unknown. This holds good both of the newly engaged employee and of the employee who is just facing a new piece of work or a new task. In order that they can perform the work satisfactorily they are dependent on instruction or guidance. In most cases they can get help from chiefs who are in the know, but *what about the chief's ability to communicate information?* To know how a work is performed is not identical with the ability to instruct others in its performance.

The man who knows work and who is also trained in instructing others in its performance will generally think that there can be no important objections to his instruction methods. The expert who is about to instruct another in some piece of work has an *inclination to underestimate its difficulty for others.* It is no improvement that the instructor emphasizes how easy and simple the work is. No wonder that the learner who does not want to look foolish usually says that he understands perfectly well what is told him. When the instructor has left, he hopes to get assistance from his work comrades.

The expert who is trained in instructing others is not the only one who is convinced of the excellence of his instruction methods; frequently this conviction is shared by his superiors. In many undertakings *they still placidly think that instruction on the work place does not involve great difficulties.* The staff is seldom renewed, tasks do not change much, machinery and tools are not replaced more rapidly than it is possible to catch up with servicing them. Perhaps people are employed who by virtue of their expert training and experience in the trade can themselves catch up with the novelties that appear. Do the managers of such undertakings expect that these conditions will continue indefinitely?

Many factors involve today that the modern industrial company *cannot in future leave the instruction of their employees to chance.* In the first place higher productivity in the industry has the effect that the losses will increase which are caused by an employee who during his training is not fully engaged in production. It must be remembered that it is not just the employee's wages which tend to increase, but that the production result dependent on his collaboration will rise in volume and value on account of increasing productivity.

Secondly, the pace in which new work tasks turn up with their demands for new methods and tools will be quickened. Only

a minority of industrial employees can expect that 10 years from now they are still using the same materials, tools, and methods as today. This means that most of them *in 10 years' time must envisage working under so altered conditions* that their work then will be entirely new compared with what it is today. For industrial undertakings this will mean that within a period of 10 years they must give the entire staff an opportunity of learning an almost completely new work; and at the same time many new employees must be taught who enter the company either due to normal replacements or because industry (including manufacturing, commerce, and distribution) in the future must employ an increasing portion of the increasing population.

Thirdly, a rising number of new jobs in industry will compete for the scarce manpower, and this must give everybody who can influence the development and use of labour an increased inducement to secure for society the greatest possible utilization of the individual worker's actual and latent faculties.

In recent years we have seen an enormous expansion of the possibilities society gives the citizen to obtain knowledge and skill: but the greater access to extended education has been opened up almost simultaneously with a material increase in the demand for specially qualified labour. Universities and educational institutions now experience an enormous influx of students. This is not exclusively due to the fact that economically it has become easier to study, but rather that the jobs in business demanding an academic or other higher education are constantly increasing in number.

It is true it has always been maintained that *higher productivity in industry does not cause unemployment*; but it is a condition that labour is distributed in such a way that individual faculties and talents are utilized for the most valuable tasks to the solution of which they can contribute. The endeavours constantly to improve productivity in industry can, therefore, be observed in the distribution of labour on all work places and on all levels of an organisation.

Industry often complains of the shortage of qualified labour. The skilled employees who are scarce and who will be still scarcer in future, are not people who disappear. They still exist, but in other jobs. "The clever people", who know a little more and perform their work a little better than could be expected, are frequently employees who did not in school or later receive the education for which their faculties and talents qualified them. Only in those cases where some one "is out of line" with the educational system can we in future hope to find "clever people". In a majority of other cases we must expect that everybody receives the education that corresponds to his faculties and talents, and that later he will obtain a position in business demanding achievements close to the limit of his abilities.

The clever general worker of today will in future seek to get an education as skilled worker. The clever skilled worker will in future want to be technician, supervisor or the like. The clever supervisor will be an engineer, and so on. We must also notice that this will be a rapid development. It is not furthered only by the public educational institutions attracting the best of the young generations, but also by the fact that the firms which have built up their in-firm education and training can offer their employees more prospects for promotion than other firms, and consequently they will attract the best people on practically all levels of the organisation.

The trends described above may soon make it impossible to recruit employees possessing abilities which enable them with little or no instruction to obtain the know-how and skill necessary for their jobs.

With such prospects it is impossible not to see that *the near future will show a tremendous need for instruction and other facilities*

in training and education. If the number of employees in industry who possess the most elementary pedagogic faculties is not substantially increased, it is safe to prophesy that *never have so few had to teach so many so much.*

When a firm recognizes the need for training, either of an individual or of a group of employees, it seems to have a tendency to try to find an instruction course which the employees can attend. Less often the question is asked: What can the firm do to meet the need for training?

The difficulties many firms experience in meeting the need for instruction of the employees by in-firm education and training are presumably due to the fact that when this need is recognized there is no time for arranging an in-firm course, and first of all, there are no employees who can lead a course.

One of the ways to start in-firm training activities—which has been done in many Danish firms—is to have an employee educated at one of the teacher courses in communication arranged by the Federation of Danish Industries. On a teacher course the participants are trained in personally leading a course. When these trainers, as the participants are afterwards called, return to their firm, they can immediately start a course there. When the participants after the conclusion of the in-firm course return to their jobs, the trainer is still at their disposal. He can assist and guide the course participants as well as their superiors and thereby secure that the abilities the course has given them are also utilized.

In cases where a firm is not big enough so that all the executives can participate at the same time in a course in communicating work instruction, the correct procedure may be to let the Federation's rationalization staff arrange and direct a course in the firm. This procedure, however, prevents the firm from having an employee trained who could secure for the firm a better result of a course in work instruction and who could also later assist the firm in the solution of other training tasks.

It must be emphasized that the principles for preparing and directing instruction on which a course in work instruction is based can also be utilized in solving other training tasks than actual instruction. The participants, and especially the trainer, learn through a course in work instruction a method which is elementary in preparing the analysis of any training task. The method can be used both in information and in communication, and as preparation of an entire lesson; it can also be used as the basis of written instructions, description of a job, and the like.

Modern management must be dynamic. The manager who is muddling through education and training in his firm by constantly taking the line of least resistance has not the right view of the future training tasks.

It *takes time to educate the employees* and to build up the functions that in future will be necessary for a firm which wants to secure an adequate education and training of its employees.

The crucial point is therefore to start in time. A course in work instruction is a good start.

"Attractive girls wanted to train to be the first female professional wrestlers in this country. Opportunity of regular continental tours for those making the grade."

Advertisement in *The Stage (UK)*

Development Of Management Personnel

RN JAI
Principal Director, Small Industry Extension Training Institute, Hyderabad

RN Jai

Productivity of industries in India is generally low in comparison to industrially advanced countries. It is not that the managers in India are less intelligent, or that the Indian worker cannot put forth the required effort, or that the basic materials are not of standard quality. The fact, however, remains that we are not yet deriving optimum productivity from the application of available resources. This can only imply that our techniques in the field of scientific management and industrial engineering are yet inadequate and they need to be improved.

IT WOULD BE WISHFUL THINKING TO BELIEVE that mere promotional efforts as in the West European countries and in the United States will suffice in India, where the measure of organized experience and concept in scientific management is small. It is, therefore, *necessary to demonstrate by practical training* in relevant fields in order to create awareness on the widest possible scale in the ranks of business, industry, Government (and also representatives of workers and of trade unions).

The current position in India and the outlook for the years ahead suggest that the development of managers needs immediate attention, and will continue to require in the future, a substantial effort. Several conditions point to this situation:

- the continued growth of industry and expansion of commerce;
- the inevitably unsettled social, political and economic conditions that characterize an economy attempting to make large strides;
- the increasing complexity of business due to regulation and due to the rapidity of technological advance, and, finally, the shortage of capital.

All this adds to the demands on managers and points to the urgent need to compress the time taken for a manager to become competent and effective. Industry, business and government in India must have more and more of the people who are potentially capable of becoming managers, and who actually become capable performers in management in a shorter period of time than ever before.

Better People, Better Management

Better management comes from two sources:

(1) better methods of management and (2) from better people. This obviously suggests that the qualitative standard of education in schools and colleges in India has to be maintained at a high enough level to make young men potentially better prepared to be successful leaders, supervisors and managers. It is a well accepted opinion that the quality of academic performance in schools and colleges has a definite relationship to actual attainments in working life.

Where it is feared, or when it becomes obvious, that the quality of education is below the real needs of a progressive, enlightened

industry, or for the more exacting needs of a research and development institution, it will be necessary to offer facilities for higher education within the country or abroad. It will also be worth-while to create specialized training programmes both company or industry-oriented and institutional.

Broadly speaking, *management development is a process of producing business leadership.* This includes all of the actions and influences that affect what a manager knows and can do, how he thinks and makes decisions, how he works and behaves, and how he utilizes his opportunities to grow as a leader. The desire for self-development on the part of the individual is no doubt the key to the situation. Nevertheless the organisation (whether public or private) can and should provide stimulation and opportunity so that an individual's desire for growth is strengthened and sustained.

The first opportunity arises for an organisation when young people join an industry or an institution. It is a turning point, away from youthful self-centredness. The existence of a strong and compelling environment of planned progress helps to crystallize in young persons a sense of purpose.

Another important period in the career of a manager comes in the late thirties: there is then a tendency for those who have acquired moderate competence and status to settle down to the level of abilities they have. It is a defensive attitude just to hold their own. But in the dynamic times in which we live, and in the midst of technological advance and new demands, *there can be no static plateau of achievement.* The choice seems to be either growth, or a slow but sure decline. The conclusion is inescapable: it is for the organization to stimulate and create challenging situations so that growth continues.

Yet another critical stage is reached when a manager is within a few years of retirement. His 'growth' will then largely depend on how his needs for growth were handled early in his career—at the start and when crossing into the forties.

Management Development Programmes

In the first phase for increasing the tempo of management development programmes, the larger industrial organizations in India can take a two-pronged action. This includes not only preparation of replacement tables and schedules of experience assignments, but more importantly to assess as accurately as possible the potential of the existing personnel and to determine their training needs. Furthermore, in order to ensure that the effort is well directed, it seems to be desirable to define and set company goals before setting up company-oriented training programmes. Attitude surveys and interviewing by trained personnel are effective channels for ascertaining company needs.

The impact of training programmes is deeper and more fruitful when some essential conditions obtain. The support of top management and their active participation are important factors for the success of a training programme.

While a small separate staff may have to be set apart, preferably from existing company personnel or by recruiting for planning and directing the overall programme, *the actual administration of the company's own programme does not call for any specialized staff.* In fact it is possible to draw from existing supervisors, in rotation. To be a group leader, or a moderator, to conduct such a programme is by itself an important opportunity for development of the person concerned. This arrangement is economical; it ensures easier acceptance of the programme.

Small and medium-sized organizations with lesser requirements and limited resources would be well advised to avail of the standard courses offered by Government-supported institutions. Some attempt has already been made in India to meet the need,

but the programme needs to be accelerated. It is desirable that the assistance of practising industrial, commercial and personnel managers should be drawn upon. Then again it may be useful for smaller companies to pool their resources in a cooperative effort to secure training facilities which otherwise would be beyond their reach.

In industrially advanced countries, there are available consultant services of many kinds. In India this movement has not yet caught the imagination. And, besides, such consultation as is available is expensive. A partial solution for covering the training needs of lower and middle management levels seems to be to encourage the concept of Self-Administering Programme of Supervisory Training. The idea is that within the walls of every plant and office, there are available hundreds of years of accumulated managerial and supervisory experience. It is for the management to tap this knowledge and pool of experience, and to employ the specific know-how to teach each other and to help to solve each other's problems.

This concept would make it possible for each and every industry, business or office to conduct a continuing management development programme, tailored specifically to its own problems and needs, without having to hire outside consultants or trainers. In the first phase the basic programme can be so prepared that it applies with equal effectiveness to all kinds of supervisors and middle management personnel, both technical and non-technical.

The entire programme for management development has to be integrated into a meaningful whole. An *ad hoc* attempt to introduce a training programme, or merely copying what others are doing, and in the absence of more precise knowledge of real individual and company needs merely to proceed along the line of fashion, will result in considerable waste of effort, loss of valuable time and money. The temptation to take short cuts is too great.

In the final analysis, progress and productivity are results of the excellence of human performance. An organization grows with the physical expansion of its activities, but this growth is stable, real and enduring when the people who man the organization grow as individuals and as working groups. *Such growth is no accident:* it arises when a suitable environment is provided by deliberate creation by the management.

Hair Productivity

INDUSTRIAL TRAINING

CN KIRKUS

Imperial Tobacco, Calcutta

MANPOWER IS UNDENIABLY THE MOST important resource and raw material of productivity, and its efficient deployment, therefore, underlines the necessity for training. Since man does not live by bread alone and industry does not exist merely for profit, we need to take note of certain basic human desires, primarily the desire to develop, to make something of oneself. This requires training and it lies in very well with the urgent national demand for economic mobilisation. In this context, it is necessary to emphasise that *training is a social responsibility of industry*. The main objectives of training are:

a. **To integrate and consolidate management, to resolve sources of friction stemming from parochialism, and to instil the realisation that management, like prosperity, is not divisible.**

b. **To impart and maintain the vitality of the organisation as a whole and morale of its employees.**

c. **To improve job performance, ensure adaptation to change and generally increase productivity.**

d. **To fulfil the human desire and the need to develop.**

Keeping these general principles in mind all training programmes should be tailored to fulfil ascertained needs. *Training is not an ornament or an article of fashion.* Far less can it be introduced or imposed *a priori* or as a decision of top management. Before introducing training, it is necessary to assess the particular state of prevailing relations, skills, attitudes and the whole climate of an undertaking, on the basis of a *searching down-to-earth cooperative diagnosis* of needs by all concerned.

In the first instance, the searchlight of such an assessment should be directed towards the prevailing attitudes of management staff, their state of communications and understanding of the problems of the organisation as a whole, their readiness to innovate as well as accept greater responsibility and the techniques of management in use. Training programmes can then be framed, based on an assessment of needs covering these aspects, in order to enable managers to fulfil their own responsibilities towards productivity in the first instance.

In embarking on a programme of training activity, any organisation would be well advised to keep the objectives as narrow based as possible in the first place. This will help to maintain the active interest of all those who are concerned in training as well as to ensure that the initial training effort is not too widely dispersed or dissipated.

The objective, based on a definite need, should be clearly defined and the whole initial training effort should then be diligently directed towards that objective. It is only in such a way that training activity in any enterprise can get off the ground to a good start and have a reasonable chance of survival.

Training programmes can take the form of in-company short-term residential courses, seminars, inter-company meetings or in-shop training sessions. In the conduct of such courses and meetings, it should be appreciated that the method of lecturing or im-

parting set instructions can only be confined to tools or techniques regarding which the participants may be unfamiliar, and the emphasis should be on full-blooded participation based on their existing experience and knowledge. An indispensable ingredient of such courses is the imparting of the very techniques of training, so that the process of training can be carried down the line and the first line supervisors are also well-equipped to train operatives, clerks and others.

Once the above foundations are well laid, training in skills and relations can be extended down to the unskilled workers with a view to improve job performance, attitudes and relationships.

EVEN MOSES DELEGATED AUTHORITY

Moses had to face a problem which afflicts many modern managers: he was overworking himself because of his failure to delegate authority to subordinates. His father-in-law Jethro advised him on a solution, which was adopted in these terms: 'And Moses chose able men out of all Israel, and made them heads over the people, rulers of thousands, rulers of hundreds, rulers of fifties and rulers of tens. And they judged the people at all seasons; the hard cases they brought unto Moses, but every small matter they judged themselves.'

*

OLD-WORLD PRODUCTIVITY

"Herodotus describes the building of the Pyramid of Cheops and how it was possible to assemble 100,000 men on a site of a few square miles and organise them to a single creative end..."

*

The following story is told about Dr BF Skinner, who is one of the pioneers in the development of teaching machines:

One day, after teaching a class at Harvard, he returned to his home in Cambridge. Upon opening the front door, he happened to hear his maid say over the telephone: "Yes, that's right. Dr Skinner is a doctor, but he's not the kind of doctor that does anybody any good."

HOW TO ASSESS TRAINING NEEDS

SN SINHA

The determination of training needs of an organisation is really a specialist's job. There can however be a variety of approaches to the determination of training needs: systematic organised research is one way of identifying training needs. Another way is to employ outside consultants to spot deficiencies and to suggest an appropriate organisation of training facilities. Yet another way may be through holding training conferences of senior and middle level executives and to identify training needs through group discussions. Studies of the errors and failures of individuals could also indicate training needs. In this connection, probably meritrating reports, if systematically and conscientiously done, could furnish the basis for the organisation of training facilities.

WHAT IS A TRAINING NEED? A TRAINING need is really the appraisal of the gap between actual and expected performance. This gap holds up the realisation of optimum productivity; and a concern feels it worthwhile to bridge this gap through training.

The question then arises whether training needs are specific or general. Probably, the answer to this question would be generally equivocal—training needs are general in the sense that there are certain attitudes prevalent among all classes of personnel as they belong to the same culture. The training need would be general in this case because of the need of modification through training of certain given attitudes. Training, however, can also be problem-centred: through such training courses, there could be an understanding of the needs of an undertaking. In any case, it is an effective approach to democratic decision-making and leads to better morale. This type of training has also the advantage of gaining the minimum support of practical minded business executives.

Training, however, is more than mere remedial action. It is not a fire-fighting technique designed only to putting out fires or mending the fences. Training must really have a long-term programme anticipating the problems that are likely to arise. Probably, the best course is that an undertaking should so organise its training as to put all its personnel in a frame of mind to give their best. Merely correcting errors should be a small part of the job in a training programme. Training should really open out a wider window for operating efficiency.

People in charge of training institutions or training departments in industrial undertakings should keep their eyes open on what other companies, universities and professional bodies are doing in the way of gaining improved knowledge, skills and attitudes; what new techniques in communications, for instance, are coming up.

We may now examine a case history of a company to find out how training needs are actually determined. This particular organisation is probably the largest distribution agency in the country with a wide territorial coverage, including a very large number of different products. This company actually went on growing for 10 years, and without thinking of what training facilities it would require for its personnel at various levels. Then a training specialist was appointed and he had to investigate, spot and assess the group and individual training needs for the various divisions of the company, grouped in different trading lines, such as engineering and consumer goods. The training specialist held a preliminary discussion with all the divisional

heads and followed it up by a survey questionnaire and another round of discussion with the divisional managers. The questionnaire sought to ascertain the knowledge, skill and attitudes required for particular groups and the performance of the present incumbents as a group. The divisional heads were also to indicate the gaps if any. A second questionnaire invited suggestions as to the particular persons requiring training, particular areas of training at the present and for the future. The results revealed that 44 percent of the managerial personnel required some sort of training in various management skills, planning, control, organisation, motivation etc., and 30% of them required some training in human relations. The middle management group in the sales division required knowledge of commercial and legal aspects of the business, general sales management and modern sales techniques, business correspondence and techniques of dealing with the people. On the specialist engineering side also, a large percentage of the personnel required training in specialized product knowledge. It was also found that the clerical staff needed training not only in commercial and legal matters, but in the use of the English language in business correspondence and in company information.

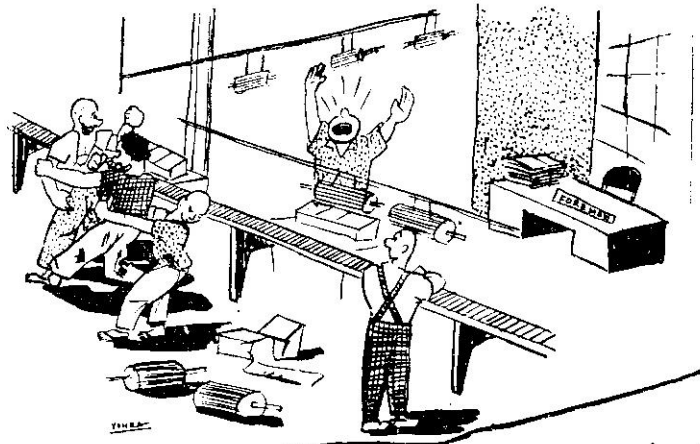
The Advent of Productivity!

"...Bombay has 80 per cent of the women executives employed in Indian business..."

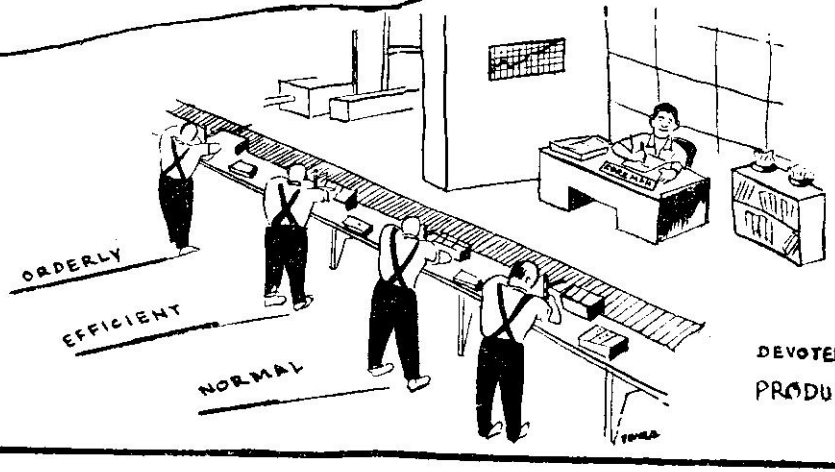
—Indalink, Jan-Mar. '64

WORKER- MACHINE RELATIONSHIP

WORKERS' INTER-RELATIONSHIPS



1. FIGHTING
2. DISORDER
3. HOSTILITY
4. LITTLE PRODUCTIVITY



Human Relations

EXECUTIVE - FOREMAN RELATIONSHIP

FOREMAN - WORKER RELATIONSHIP

THE THEORY OF EXECUTIVE DEVELOPMENT

SD TRIPATHI

Department of Commerce, Panjab University

Executive development is a recent philosophy and is one of the most interesting management improvement movements of the post-World War II era. Still passing through the stage of preliminary research, it has been universally accepted as a tool of the managerial revolution. The author, who is an academician, has taken pains to differentiate Management Education and Training from Management Development to which he rightly attaches crucial importance in the sound and large-scale development of the industrial economy of this country.

'EXECUTIVE DEVELOPMENT' IS OFTEN CONFUSED with the concepts of 'Management Education', 'Management Training' and 'Management Development'. Inter-related and inter-connected as they are, they represent the different stages of the same process of management growth. Whereas education and training are preparatory in nature, Executive Development is a developmental process. Management Education usually refers to formal class instruction offered in universities and similar institutions, leading to diplomas or certificates, which may or may not contribute to the making of a manager. It aims at giving mental training to students to assist in the solution of management problems and responsibilities.

Management Training is 'job-oriented' and 'field-centred' and is an organised systematic programme of teaching, designed to instil or develop 'managerial competence'.

Management Development has a wider connotation than training for Management. Besides incorporating a wide field of training, embodying all aspects and functions of management, it is more concerned 'with ideas and with the changing attitudes on the part of those at the head of industry—whether private or public'. It envisages a carefully thought out policy of selection of potential managers, lines of promotion, practical and theoretical training, review of existing management posts and a planned succession. It is based on the conviction that planned management training can produce managers of higher calibre and with a broader outlook, greater knowledge and deeper understanding. It incorporates all efforts that are made to improve 'the activity of planning, initiating and controlling the activities of other people'.

Executive Development implies the growth of the executive, who is simply a cog in the machine of management, as 'a member of an organisation whose primary duties include, simply, the initiation and control of the work of subordinates'. The management, represented by the Board of Directors as delegates of shareholders, lays down the policies and programmes of the industrial units, which have to be carried out by the executive or manager, who is responsible for the implementation and execution thereof.

Executive Development is a science as well as an art, incorporating definite objectives and goals, well-defined scope, regulated processes and programmes, set techniques and methodology, and basic conditions of growth.

As a tool of the managerial revolution, Executive Development is motivated by the specific objectives of increased *knowledge*,

healthy *attitudes*, improved *ability*, efficient *job-performance* and better *operational results*.

Being a well-directed activity, Executive Development has definite goals in view, which may be summed up as

a. **Improve job-performance of present executives**
b. **Improve company's organisational structure**
c. **Develop each man's greatest potential**
d. **Provide replacements for expected executive alterations**
e. **Provide needed executive reserves for planned company growth and forecasted industry expansion.**

An Executive Development programme is a continuous process which requires a careful stepping, beginning from establishment of objectives and policy, assignment of programme responsibility, identification of management potential, advance planning of organisation, management inventories and replacement schedules, selection of methods, periodic appraisal and counselling, and special compensation to audit and research on policies and programmes.

Basic Conditions of Growth

Much of the success of Executive Development programmes depends upon the environment, in which it is executed, which in turn is influenced by

(i) *Organisational Culture* including cultural conditions and social beliefs consistent with desired attitudes: informal group rules and standards consistent with desired change and positive employee attitudes.

(ii) *Organisational Climate* resulting from goals, top management philosophy and policies consistent with the learning phase.

(iii) *Leadership Climate* incorporating neutral or positive attitude of superior towards development; superior attitude and example consistent with desired change; coaching, counselling and periodic performance review.

(iv) *Learning Effort* presupposing direct methods of instruction (programmed learning, lectures, films, readings and so on), competent instruction and discussion on on-the-job applications and personal benefits; practice of desired abilities; corrective training to correct understandable habits and behavioural patterns and opportunity for on-the-job practice of newly-acquired abilities.

(v) Participants' characteristics, presuming *sufficient* intelligence; sufficient motivation; *flexible attitude* on the part of participants, agreement with the spirit of the material to be learnt and non-conflicting habits or personality traits.

These theoretical foundations of Executive Development may indicate, to some extent, the broad lines of approach of the basic strategy to tackle the problem; their universal application however is rightly questioned. They have to be conditioned to the particular needs of Indian industry and with the political, social and economic characteristics of the Indian economy. Besides the problems of management, the existence of a mixed economy, the growing shift towards the public sector, the spread of democratic and socialistic ideas, the impact of Gandhian thought, the conservative outlook of the *entrepreneur class*, the lopsided development of trade union movement, the antiquated approach to production and the utter ignorance and poverty of the masses are some of the factors that have made the process of Executive Development more complicated than in the West. *India presents a challenge to the entire philosophy of Executive Development*, a challenge which must be accepted with full poise and implications.

THE GAME OF PRODUCTIVITY

"...It is a game for all ages, all seasons, all sexes, all climates..."—*AG Gardiner*

TRAINING IN INDUSTRY

MANOHAR LAL JAIN
Planning Officer JC Mills, Gwalior

Training in industry is a specialised and very practical form of education. The primary need is to prepare people to function well, willingly and with understanding within the framework of their situation. To meet the present industrial need, education must be deliberate and planned.

INDUSTRIAL TRAINING IS TO BE DESIGNED TO indoctrinate the employee at the very beginning with those attitudes and work habits which will make it possible for him to work efficiently and with a minimum of the waste and spoilage that come with trial and error learning. Training thus effectively stimulates employer interest in the improvement of methods and systems.

Training has also a corrective influence on excessive absenteeism and labour turnover which generally arise from the dissatisfaction of employees. Training is usually able to remedy the maladjustment by giving proper job instructions, developing understanding, and appreciation of the purpose and problems of organisation by preparing both workers and supervisors alike for harmonious association.

Sound and carefully planned vestibule or on-the-job training *can reduce learning time by as much as 75%. The well-trained worker needs less supervision* than the one who is inadequately prepared for his job. Group training designed to encourage employees to participate actively in quality improvement will pay large and immediate dividends.

One of the most important results of good training is a significant improvement in MORALE. Morale is a basic element which management must develop in all its employees. Employees whose morale is high are flexible, adaptive and receptive. They take pride in improved or increased production. They seek and suggest new methods of production. Workers with low morale do none of these things. On the contrary, they are apathetic towards work and indifferent to their employer's welfare and often show hostility to any change.

Only men who know how to work, who want to work and who understand the relationship of work and profit to the dignity, development and happiness of human beings, can make an organisation successful. To develop such men and women is the basic goal of training.

Any programme of training rests upon the assumption that planned, organised teaching is more profitable for management, and results in greater satisfaction and advancement for the employee, than does the alternative method of turning the worker loose to learn through his own unguided experience.

The growing social complexity of modern life, which is interwoven with industry, makes the need for industrial training far more critical than it was during earlier times. Today's worker, faced by increasingly com-

plex social and economic pressures of life in a rapidly changing society must have guidance in "*how to think*". As data with which to do this thinking, the employee must receive training regarding the facts about his business.

Management, if it is to satisfy the employee as an individual—which it must eventually do—must learn more about him as a person, about his social and psychological as well as his economic needs. It must learn how to run its affairs so as to help satisfy his deep-seated requirements. For these new tasks, *management also stands in urgent need of training.*

Training is needed *on all levels of personnel in industry from the sweeper to the Manager.* If business expects workers to learn about management and its problems as well as about themselves, both technicians and top Management are obliged to learn the facts about workers and their ways.

Training must be continuous. Even the best of men do not learn a thing for ever. *Forgetting goes on apace* and refresher training of some sort is always essential.

Training should continuously educate all levels in each of the three fundamentally important areas: knowledge, skill and attitude. Out of these three areas the latter has been most neglected, is most difficult and needs most attention. To be effective under modern conditions, training must deal with employee knowledge and attitudes as fully and effectively as it does with skill. Good attitudes in industry are partly the result of training concerning the policies, functions and problems of supervision and high-level management. *Good management in turn promotes good attitudes.* Training programmes that are designed to provide full information and an opportunity for discussion that encourages suggestions and presents problems, will surely help to develop fair, constructive attitudes, profitable to both labour and management. Training, therefore, must provide the information that will *motivate people, stimulate them, and advance them towards full self-realisation.*

After having concentrated our attention on developing materials, methods and machines so far, we must now pay attention to the social and emotional development of men and women in order that they may function as understanding partners in business and in democracy and never as skilled automations.

There are no easy roads to success in industrial training. No simple formulae, no occasional shots in the arm, no packages of easy lessons alone will do the job. Since people are not machines, their responses depend on the social context of the situation. Since they are complex organisms whose actions and attitudes are not easily predictable, no simple rule and no single training programme could apply equally to everyone. Good training includes a wide variety of activities and many approaches—formal classes and informal or even casual contacts, written and verbal talks, discussions, lectures, demonstrations, films, charts, exhibits, tours and all other varieties of approach which an alert training man can conceive. There is *no single, simple approach.*

Because there are no short-cuts and no devices appropriate for doing the full job, training must be professionalised; this means that training must be directed by persons especially prepared for this type of work. *Changing human habits, which is the objective of training, is a very difficult task: one that is the special function of the professional educator,* not that of an engineer or accountant.

Training, like any new service, requires full and persistent support from Management if it is to succeed. Lack of time, indifference, self-satisfaction and the strength of established habits combine to make it most difficult to enlist employees in programmes designed to change, even in small degree, the established patterns of their lives. So great is this resistance to change among adults that any training programme must devote a substan-

tial part of its approach to overcoming initial barriers. The time demanded will be minimised, however, if management demonstrates its support by attending classes and by helping to secure acceptance of the theories and practices taught by the specialists in training. It is also necessary for Management to provide comfortable physical surroundings. The housing and the furnishings set up for training should reflect the conviction of management that training is both important and permanent. Class rooms must be pleasant, attractively decorated, properly lighted and ventilated, if the mastery of skills and the equally important development of wholesome cooperative attitudes are to be acquired most effectively. *When the attention of the trainee is centred upon bodily discomfort, he cannot attend to learning.* Besides all this, the training director should be given the rank within the organisation which will enable him to establish and maintain status among other executives with whom he must work.

A sound and comprehensive training programme offers *the surest means of reducing costs* and increase in productivity by avoiding the well-known losses that come from employee dissatisfaction and disinterest.

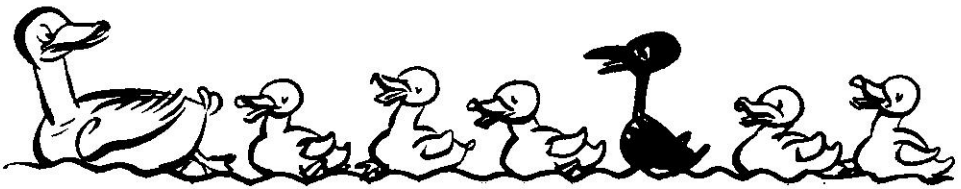
Training is a sound and profitable means of performing the following services:

1) Training can help people to perform the work normally expected of them. It can do so in office, store, or plant and managerial and technical levels as well as on the production line.

2) Training can help people to understand business, production, and management so that they may become enlightened participants, or at least understanding cooperators, in helping to meet the worthy goals of their employers.

3) Training can help Management to understand employees and thereby satisfy those social and emotional needs upon which cooperation and team work depend.

4) Training can contribute to the growth and well-being of the individual on his job and also as a member of his community and his nation.



TRAINING AND PRODUCTIVITY

YA GOPAL RAO
Tinplate Company of India (Private) Ltd., Golmuri

TRAINING IS NOTHING NEW IN INDUSTRY. It existed in one form or another even in the days of craft guilds, where it was only after long years of rigorous apprenticeship that the new entrant could work his way up to the position of journeyman and then become a master. The rules during apprenticeship were strict, and the quality of workmanship to be achieved was high. What is now new is the development of systematic training methods for all grades of employees in the organisation. With increasing mechanisation and scientific advancement, the training methods and techniques have been altered to suit the needs of the large-scale mechanised industry. Whatever be the methods and techniques, experience has shown that the following advantages are derived from systematic training:

1. **Employees become proficient in their jobs in less time;**
2. **Plant and equipment are utilized more efficiently;**
3. **Wastage of material is minimised;**
4. **Amount of supervision is lessened;**
5. **Labour turnover is reduced; and**
6. **There is considerable improvement in the morale.**

All the above advantages are of great help in maintaining a continuous improvement in the level of productivity from which the owners of industries, the employees, the consumers and the nation as a whole are benefited.

If full benefits are to be derived from a systematic training its needs should be based on a well-defined policy and all schemes, and policies should be well co-ordinated and controlled. The organisation of the training department will depend on the needs of the industry and the size of the organisation, but the principles are applicable to both large and small units.

Training should be an independent function. It may be that in a large unit, there may be a separate full-time training officer, while in smaller units, a supervisor or a skilled man may be deputed for the job. Whatever be the size, the content of the training has to be agreed to by all those who are likely to be responsible for it. It should be made clear what is to be taught and how it is to be taught. The standards and degree of accuracy to be attained have to be laid down clearly.

The method of imparting instruction during training should be based on well-established psychological principles of learning. The material to be taught or presented will often dictate the teaching method, but as far as possible any method that is chosen should permit *learning by doing*. It is said that an individual remembers 90 percent of what he does, 50 percent of what he sees and 10 percent of what he hears. With this in mind and also the fact that industrial training is an adult training, the trainer has to adopt a suitable teaching method.

The four principal methods of teaching are given below:

1. *Lecture method:* This is most commonly used to speak to large groups about general topics. Seldom should this be used in teaching adult groups, and if it becomes necessary to give lectures, they should be brief and made interesting by the use of examples.

2. *Recitation method:* Under this method question and answer technique is employed. To a certain extent it gives a sense of participation to the trainees, but at the same time a class-room atmosphere is created. This can be used to the best advantage when there are only a few trainees.

3. *Demonstration method:* This is commonly used in laboratory or scientific instruction. If instead of only watching the trainer demonstrating, the trainees also alternately put on demonstrations, the interest of the group is stimulated.

4. *Conference method:* The Conference method of directed group discussion is by far the best method of exchanging information and ideas among adults. It gives them a sense of participation and *keeps them awake.* The chief feature of this method is that the trainer who is merely a discussion leader, *does not try openly to impose* his answers on the group.

The problem is thrown open to the group and *the trainer monitors the discussion in such a manner that the group arrives at a preconceived set of conclusions.* It may sometimes, take a long time to arrive at the conclusions, but more is learnt by this than by a long lecture. The atmosphere is informal and a spirit of equality and a willingness to face facts are characteristic of the conference. Demonstrations and visual aids can be used to assist the learning process. As far as possible the trainees should be drawn from different departments, and from the same level in the organisation.

Introductory course or Induction training: As the name suggests it is the method of introducing a new employee into the organisation with a view to gaining his confidence and developing in him a sense of co-operation. Both these factors, in turn, promote good morale in the organisation. If a new employee has to be an effective member of the working team, he must understand what the company does, how it serves the community, where he fits in the organisation, what the rules and working conditions are, and a general picture about the activities of the organisation. Time spent in induction training proves beneficial in the long run.

The procedure and methods followed vary according to the age and grade of the employee being introduced. New entrants may be made to spend some time where practicable in an improvised training centre, where they are made familiar with the machines and equipment and working conditions on the shop floor. This gives the trainees a sense of self-confidence before they take up their job.

The period of induction training need not be long, but it is essential that before he starts on the job in right earnest, enough information should be given to him to hold his interest in the work he does. The amount of information given to the trainee in the course varies, but generally covers the following:

1 The Company and its products
2 Standing orders and working conditions
3 The organisation structure
4 Amenities and services
5 Personnel policies
6 Sources of information
7 Safety and accident prevention
8 Employees' own department.

Before the new entrant starts on his job, he should be introduced to this supervisor, fellow workmen and employee representatives. It is also preferable for the trainers to visit him periodically in the initial stages to watch how he adapts himself to the new job and also answer clearly any questions put by the trainee, regarding his work. As far as practicable attempts should be made to clear any doubts the trainee might have regarding his job.

Training for semi-skilled work: Industrial training is especially important in modern industry because of the great increase in semi-skilled factory workers. The present-day industry employs practically no unskilled labour, and, on the other hand, the

number of highly-skilled workers has also decreased. For modern industry it does not require any specific skill, but the employees have to be trained to perform definite and repetitive operations on somewhat complicated machines. Due to scientific and technical advancement the same workers may have to be trained to perform an entirely different operation in the shortest possible time. If due to lack of systematic training the change-over cannot be effected smoothly and efficiently, the loss in efficiency can well be imagined. It is only when the employees become proficient in their jobs in the shortest possible time, that a continuous improvement in the level of productivity can be maintained.

Traditionally, a new employee always had to learn the job by working with those who are already experienced, and even now it is the practice in many industries. This system of training has many disadvantages. The method of working followed by the older operatives may not always be efficient. There is sometimes a reluctance on the part of the older employees to provide opportunities to the trainees to learn the job, because it may affect their employment or earnings. Even the tempo of work may not be satisfactory because of long-established practice and tradition. Any new employee trained under these circumstances can never become as proficient in his job as he would if separate training facilities are provided to him.

Many industries are now realising the importance of providing systematic training to the new entrants. Individually or collectively they have established separate training centres, when under qualified instructors and away from the hurly-burly atmosphere of the factory or workshop the new employees are trained. In industries where it is not practicable to have separate establishment, the training is conducted on the shop floor under the guidance of special instructors.

The application of the technique of job analysis and motion study, has considerably helped in improving the methods of training. By a careful study of the operation or the job it is broken down into major parts or elements. In each element the pattern of movement and action is worked out. These form an "operation specification" and the trainee is made to learn the job stage by stage, taking care at the same time that adequate attention is given to the integration of the stages of training. Illustrations, still and working models, pictures and photographs, blue-prints and posters, stereopticon slides under sample demonstration are employed to assist the trainee in understanding the job or operation. Where it is necessary to develop a particular pattern of muscular movements, special gadgets are employed, which reproduce the movements required for carrying out actual job or operation. Lectures are given to the trainees regarding materials used, the purpose of each operation, the machines and tools employed and any special precautions to be observed. Although there has been a controversy in the scientific psychological circles about the superiority of the 'part method' of training over the 'whole method' of training where the job is taught in its entirety, it has been found that there is a good deal of evidence in favour of the 'part method'.

It is the practice in some companies to recruit young men with technical qualifications from universities and train them for supervisory jobs in their organisation. The trainees who have already attained a theoretical knowledge in the technical subjects, are given general training for a certain period in all the sections or departments of the factory and specialised practical training in the department in which they are likely to be employed. The practical training is supplemented by lectures from the experienced supervisors and the executives. At the end of the training period an examination is held to find out the fitness of the candidate for the job. This method of training has been found very beneficial in building up a good team of supervisors, who are the backbone of any industrial organisation. General training helps them to get a broad picture of the whole manufacturing process, which is of great help in the performance of duties with the larger interest in view.

The period of training varies, depending on the nature of the job and size of the organisation. Normally it ranges from one to two years, and the training is conducted in technical institutes run by the organisation. A good example of this is the training of Engineering and Metallurgy graduates, selected after psychological tests and interview, by the Tata Iron & Steel Company, at their technical institute. The graduate apprentices as they are called are trained for a period of two years. The type of training given is such that they can fit themselves in course of time to occupy responsible managerial jobs in the organisation.

During the training period, qualified supervisors guide them and watch their progress. The heads of departments evince keen interest in their training programme and render all assistance necessary to the trainees on the shop floor, and also lecture to them in the evenings about the process of manufacture of iron and steel and maintenance problems.

Wherever groups of men and women are at work, some one has to direct their work or supervise them. But a supervisor today works in an atmosphere different from what it used to be. With the increase in the size of the industrial unit, semi-skilled operatives have replaced the old craftsmen. A feeling of equality on the part of the operators with management has reduced the automatic obedience to orders, complicating tremendously the relationship between the supervisor and the supervised. The only course left to him these days is to develop a sense of willing, informed and intelligent obedience, amongst those whom he is supervising. It is only in such an atmosphere that men work effectively with continuous high effort. A supervisor can be of great assistance to the management in developing this atmosphere by his word and action, decision and example and organisation. In short his job is that of a leader. Leadership qualities, although partly inherent, can be developed by systematic training.

The most satisfactory method of training a supervisor is the Training Within Industry (TWI) scheme for supervisors to develop the qualities mentioned above. With its origin in America during World War II, it has been adopted by many countries gradually. As the title implies its central thesis is the principle that the greatest benefit for supervisors is drawn from a scheme that links them closely with their work.

The supervisors form an important link in the chain of Management, and men on the shop floor look to them as representatives of the Company. They have to interpret management to the men, and men to the management. To carry out this part of the job efficiently the supervisors must be kept well-informed about the activities of the company and be made to feel that their opinions will also be considered in training policy.

With this in view in some organisations. 'Information Courses' are conducted to which batches of supervisors are invited with a view to exchanging information and ideas. The atmosphere should be informal and discussions free and frank. The facts about the organization are presented to the supervisors and the reasons for doing certain things should also be explained to the group. At the end of the course, a senior member of the management will informally talk to the group and try to clear all the doubts the groups may have come across during the course.

Training for Clerical Work

There seems to be a widespread belief that *any one can be a clerk* and no particular skill or experience is required to do paper work. But just as in the case of operatives, training also helps to improve the efficiency of office workers and with this in view many organisations have their own scheme of training the clerks. Training helps the clerks to keep the records neat and accurate. The importance of keeping correct records, and the advantages that a good system of records has, should be brought home to them during the period of training.

Training of Executives

The role of executives in an organisation is to create conditions in which the work of the team is directed towards the achievements of some co-operative purpose. To play their role efficiently it is necessary that in addition to laying down adequate standards of selection, provision should be made for their systematic training. It is only through sound training that they can develop the qualities listed below:

1 **Organising ability—ability to plan ahead, to assemble in the right relation and in right time diverse material and human resources, to take prompt decisions.**

2 **Ability to see others' point of view.**

3 **A balanced temperament.**

4 **Integrity.**

In developing the above qualities there is an order and a technique which are not simply gifts of nature. Training helps. In addition, the structure of industry is not as simple as it used to be. Executives have to face problems regarding distribution, housing, the affairs of local and Central Governments, trade unions, social service organisations, etc. To deal with all these problems, opportunities should be provided for appropriate training.

Re-equipment and modernisation are vital aids to industrial progress. The misguided opposition of a section of workers to automation is to be deplored. The experience of highly industrialised countries of the world, such as, USA, Germany, Japan and the UK, has been that introduction of automation and the so-called labour-saving devices has led to greater employment and higher standards of living by a sizable expansion in industrial activity. We have recently experienced this in the textile industry where it has been proved beyond doubt that outmoded and antiquated machinery is the principal cause of unemployment resulting from closure and all-round curtailment of production. The sooner this fact is accepted and recognised by all concerned, the better it is for the entrepreneur investor and worker alike.

The lengthening shadow of unemployment is a grim reminder of the fact that the real interest of labour, investor and Government are indivisible. We have in Kanpur learned that unless there is employment for all, there will be profits for none. Just as Labour must have gained employment, Capital, too, needs profitable employment.

Obsolete machinery, outmoded processes and techniques of production are an anachronism judged in the context of the rapid development that is taking place the world over.

In conclusion, may I express the hope that the endeavours of the National Productivity Council will lead to a greater awareness of the potential importance of productivity. The slogan "Produce or perish" must give place to "Produce efficiently or perish".

Not For Training Practice

"Everybody should know how to perform 'kiss-of-life' artificial respiration, but it is undesirable that the method should be practised freely for training purpose."—Surgeon Captain Stanley Miles in *Family Journal*, quoted in *The Times* (London)


IT'S SILLY ! WHO EMPLOYED ALL THESE BASTERS ?
VOHRA
THE PRESENT SYSTEM... IT'S NO SYSTEM, - MY BOYS !
The Boss
ALONE... HOW DELICIOUS ! I CAN MANAGE IT ALL PERFECTLY
AN EMPER
WITHOU
AN EMPIR

d Productivity

"For many people there's something about organising and reorganising that stirs the blood"

—Prof. Joseph D Cooper

WHAT CANNOT BE TAUGHT*

DH BUTANI

WHEN SRI GOPESHWAR NATH, DIRECTOR, Secretariat Training School, asked me to write for the first annual number of the magazine of their school, I first examined myself whether I had anything worth-while to say that would either elevate or enrich the minds of the trainees. I thought that if 30 years of working life had taught me anything, it was the fundamental truth of that part of the Socratic wisdom: "I know that I know not". Probably, it is presumptuous to mention Socrates in this context, for my mind works at a much lower level. Fifteen years of teaching at the university and another 15 years of Government service have made me rather cynical with regard to the teachability of most of us, not because the human race conforms to the misanthropic formula of Swift, but because *the really worth-while and personal elements of social life cannot be taught.*

Take, for example, the element of character upon which the whole future of our nation depends. We shall survive and prosper as a nation only to the extent that we possess the essentials of character. Probably, the example of Government is more telling. It is not the grandeur of the Constitution or its Directive Principles of State Policy or the pronouncements from High Authority, but the character and attitude of Government servants that determine the nature of the Government and its usefulness to the mass of the people.

In this connection, I recall a statement of Dr John Mathai, the distinguished economist who became the Finance Minister of the Government of India: "*Government breaks down at the point of contact with the people*". Rules and regulations can be taught; we can train people in productivity techniques as we are doing in the National Productivity Council. We now have whole manuals on human relations. But as every student of social sciences knows, *human relations cannot be taught.* They are born of a philosophy which must come from within.

Take another example: What is the basis of Government? The basis of governmental action is the paramountcy of the public interest. How do we ensure it? Is it possible through rules and regulations, through audit objections and the like, to maintain the paramountcy of the public interest? This is important because one of the major causes of the decline of Indian society has been the dethronement of this important principle of public life. How do we rehabilitate this principle as an essential part of the Indian polity?

I have myself passed some sort of an examination in Fundamental Rules, Government Accounts, and the like. One of the rules reads something like this: "An officer-in-charge of public funds is supposed to exercise the same precaution with regard to the expenditure of public money as he does with regard to his own". How many of us do this? Most of us are great experts in Government rules and we pride ourselves on the mastery of these rules. Does this mean that we have established the paramountcy of the public interest? We really look at these rules as possible sources of personal gain for ourselves, our friends, and hangers-on. We analyse every Five-Year Plan not as a milestone in the nation's advancement, but as to what it means to us in terms of status and

* This piece was originally written for the annual number of the Secretariat Training School Magazine in March 1964. It is printed here by the courtesy of the Director of the School.

money. The real fact is that the paramountcy of the public interest cannot be taught. Nobody taught it to Mahatma Gandhi and nobody has taught it to Sri Jawaharlal Nehru. Yet this is the one principle that characterised their entire career. It is the one principle through which they have contributed to the advancement of Indian society. It is the practice of that one principle which *makes the Prime Minister equal to several Departments of Government and several Divisions of the Army.* Here is one man who stands solid on the rock of that principle, and not millions of people here or abroad who differ from his policies can shake him from his unswerving loyalty to the interests of the people. Now how do we learn the art of public administration and imbibe this essential principle of Governmental policy and conduct? It is with great regret that I have to record that the answer is in the negative, that it cannot be taught or learnt.

In the beginning of this article, I have referred to Socrates. We really do not know anything about him except through his great disciple Plato who wrote the famous book *The Republic or Justice.* Probably the professor in me gets the better of my mind when I want to suggest to you that *you should always have this small pamphlet in your pocket.* It is probably the only book which explains in commonsense terms the essential principles of Government and how it should function. Incidentally, but significantly from our point of view, it is *the first socialist utopia in the History of Thought.* Probably, you will all be shocked to know that Plato actually advocated that *a Government servant must be a bachelor and must not own property!* How can he perform public service if he has a wife and property: he will have a tendency like all human beings, to utilize the resources of the State for private enrichment. Plato's Utopia did not succeed because in actual working life, *the best is the enemy of the good.* Plato was not prepared to accept anything less than the best. The result was a continuous deterioration in the public life of Athens which Plato wanted to elevate through his rather rigid prescription for public servants.

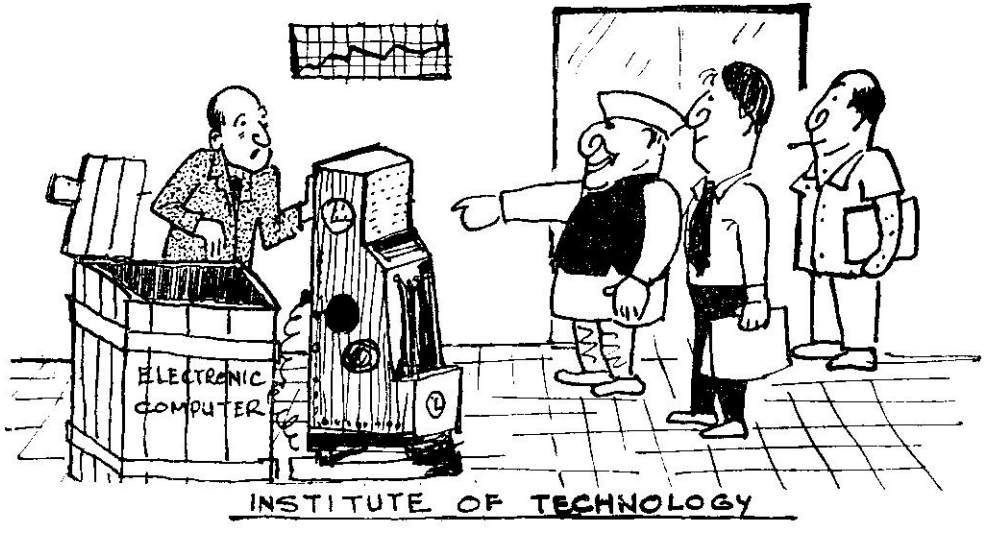
The essential principle, however, that emerges from Plato's *Republic* is the necessity of objectivity in the thinking and conduct of public servants. Once again, *can we teach objectivity?* A unique example comes to my mind. A number of my friends and relatives were locked up in the Central Jail at Hyderabad (Sind) in the Civil Disobedience Movement of the 'thirties. It was rather a difficult situation for the Jail Superintendent to handle. The gentleman whose case I am quoting also happened to be a medical man. He was Dr D'Souza, a rather hard disciplinarian who on every occasion of crisis opened the Jail Manual. Whenever any difficulty arose, he would ask: "What does the Jail Manual say"? Once the prisoners had lined up and one of them had a serious grievance that he was not allowed to speak. He had concealed a tin of rubbish and he threw it at the Jail Superintendent as he passed by. The subordinates of the Jail Superintendent all fell on the 'convict' and wanted to tear him to pieces, but the Jail Manual said that it could not be done. So Dr D'Souza ordered that the 'convict' be tried according to the law. He himself had magisterial powers. Witnesses were examined and he arrived at the verdict that the 'convict' had committed an offence under the Jail Manual and sentenced him to flogging as provided in the Manual. But it is also provided in the Manual that before a person is flogged, he ought to be medically examined and certified as fit for flogging! So Dr D'Souza as the Medical Officer-In-Charge of the Jail examined the 'convict' and recorded that he was unfit for flogging. How many of us possess this degree of objectivity? Can it be taught?

Ours is said to be a socialist State. The sovereign Parliament has resolved that it be so. How do we bring about a socialist State? We can bring it about only through the actions of Government servants. What is the essence of socialism? The essence of socialism is that all citizens are equal and we must see by all means that they get equal opportunities without fear or favour. We are further to see that in carrying out Government policies,

we do not make the rich richer or impoverish the poor. When in-charge of public enterprises, we have to see that they are run with the utmost efficiency and that as managers of public industries we treat the workers and pay them according to the established policies and practices of the State. Now, this will not happen unless we feel for the people; *and a feeling for the people cannot be taught.*

This brings me to the title of my article: What Cannot be Taught? The essentials, the fundamentals cannot be taught. Not that they cannot be acquired, but that they will not come to us through rules and regulations, training courses, and the like. Of course, I am not a spiritual type of person, but I have a strong mystical feeling that the whole problem is essentially of a moral character, that the problem I have posed can only be solved through some sort of a spiritual transformation; that, for example, *corruption cannot be put down by the Special Police Establishment but by developing some sort of a disgust with corrupt practices.* Are we disgusted with corrupt practices? Do the givers and takers of petty advantages feel ashamed of what they are doing? We often talk of the great spiritual heritage of our people. The fact really is that we have made of this grand adventure of life a mean and petty business.

In the moral crisis in which we are, everybody must become a keeper of his own conscience, and as a people we must ask ourselves the Tolstoyan question: "What then must we do"? Mahatma Gandhi got his salvation by making his life an answer to this question. When Bernard Shaw came to this country and was asked whether he would like to meet Mahatma Gandhi, he replied: "I certainly would like to pay my respects to the Mahatma, but I do not know whether it is worth-while taking his time." I would, however, like to say that *the salvation of India will not come through one Mahatma Gandhi alone. It will come only when there are millions of little Gandhis.* The question then is whether this country which claims Mahatma Gandhi as the Father of the Nation will find *some means to generate millions of little Gandhis.*



THE PIONEER OF MADRAS PRODUCTIVITY COUNCIL PASSES AWAY

IT IS WITH SORROW THAT WE RECORD THE passing away in April last of Sri S. Anantharamakrishnan, who pioneered the Madras Productivity Council and made it

S. Anantharamakrishnan

his business to apply productivity techniques to his large and expanding industrial empire, popularly known as the Simpson Group of Industries. In South India he was known as the Father of the Diesel Age. More remarkable, however, was his characteristic attitude to labour. In Amalgamations Limited, of which he was the Chairman, he employed over 12 thousand persons with an annual pay bill in the region of Rs. 20 million. Once it was suggested to him that two of his concerns be closed down, as being uneconomical. What he said would remind any one of Henry Ford: "I and my fellow Directors have money. But how about the thousands working for us? They will be jobless. No, we shall keep them on..."

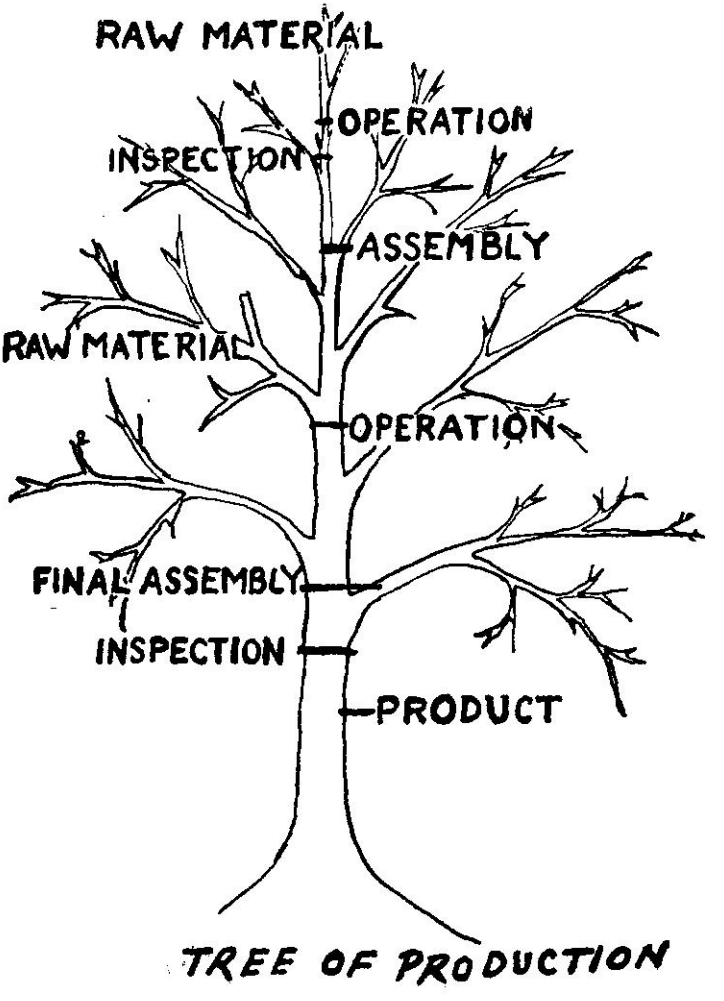
His business connections were extensive. He established quite a number of concerns: India Pistons, Speedways, Addison Paints and Chemicals, recently the TAFE. He also acquired *The Mail* of Madras in the 'forties.

"Age of Liquidation"

A representative of private enterprise in his own philosophical manner, Sri Anantharamakrishnan had a peculiar sense of humour. He referred to the present times as the Age of Liquidation: liquidation of maharajas, landlords; "...and we are now in the process of liquidating the industrialists...I think, people at large do not quite appreciate what is happening...Even today the private sector performs almost 95% of the economic activity of the nation. Private sector does not necessarily mean a few rich businessmen who may be coming from Bombay or Calcutta or Madras. Private sector includes tens of thousands of smaller merchants also, who have been performing during the last few centuries a very valuable task. In fact, without those

people, the whole economic set-up of the country would have been paralysed long ago. In the circumstances, therefore, to talk like this of the private sector and doing away with it, and to stigmatize it, is not doing the correct thing..."

If this economics of the private sector were to go alongside the practical industrialism of the late Sri Anantharamakrishnan, many of the negative attitudes that now eat into the vitals of the Indian economy would lose their force. Though Sri Anantharamakrishnan was really a lot more than a mere industrialist, for us he was the Personification of Productivity.



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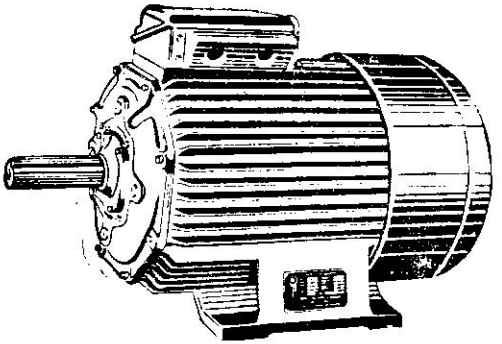

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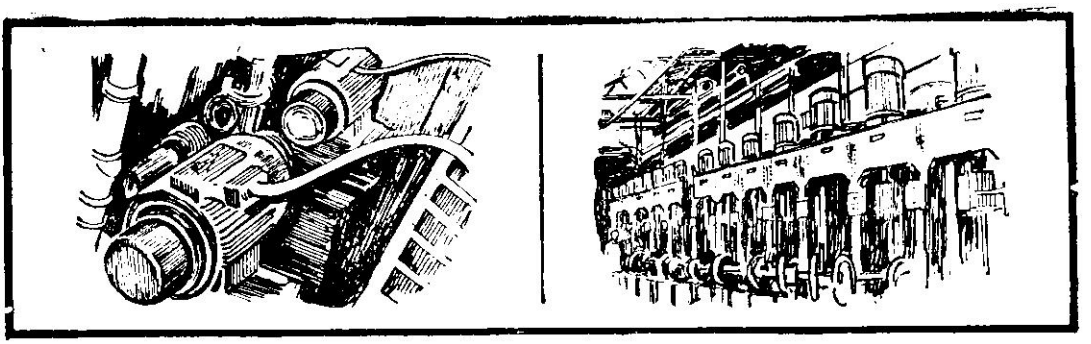

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