Technical Education in Industries

(With Special Reference to Paper Mills)

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Lord Rutherford, one of the biggest scientists of the world, and who is known as the prince of the experimenters, the initiator of the 'Atomic Age', in his presidential address on the occasion of the joint session of the 'British Association for the Advancement of Science' and the Silver Jubilee Celebration of the 'Indian Science Congress' which met in Calcutta in January 1935, remarked :—

"This is in a sense a scientfic age where there is an ever increasing recognition throughout the world of the importance of science to national development. A number of great nations are now spending large sums in financing scientific and industrial reasearch with a view to using their national resources to the best advantage. Much attention is also paid to the improvement of industrial processes."

India of today though favoured with enormous natural resources is still far behind the mark in her industrial progress. This is mainly due to lack of extensive industrial researches and for the want of proper technical personnel in the industries

Though India possesses a few of the first rank world scientists, yet it must be admitted without reservation that there exists a big void in between the top ranking scientists and the actual technical personnel in the industries. This is due to the lack of interest in properly educating the technicians of the various industries.

Education in industries pays dividends beyond mere financial reckoning. Education in industry builds morale by bringing system to the organisation by substituting the value of merit in promotions for that of favouritism.

The benefits from the education in industries are derived by both those who receive the education as also the management of the industries concerned. Not only the students get the advantage of the instruction offered, but the whole body of employees receive a benefit, which although difficult of measurement, is none the less real. The mere fact that some men are studying a problem or process makes it a topic of conversation and discussion. Questions are asked which certainly stimulate thought and interest amongst all. Thus the over-all knowledge of operation and of the methods of doing things is improved and extended. Now, any improvement in the intelligence of the general body of employees is reflected in the over-all efficiency of operations. Thus this can be reckoned as a definite gain for the management.

It can be pointed out as an admitted fact without any fear of contradiction that trained personnel are always assets to the management of the various industries even when higher wages are paid to them. It should be admitted that latent ability spurred by ambition and industry makes it possible to attain real success in chosen field. Most people recognise that some humble immigrant lad may develop into a Carnegie, that some presently underpriviledged youth in an industrial community may turn out to be a Ford or Edison. However, no matter how bright the flame or warm the desire within them, any number of hopeful careers will wither on the vine unless given the sunlight of the opportunity and the rains of experience.

The industrial educational programmes have shown itself to have resulted in improved industrial relations and improved public relations as well. There is no question that this is the direct out-come of friendly contacts between managements, supervision and the employees provided by the courses of study and the methods of instruction used. On the occasions of the technical discussions the employees, the supervisors and the management meet together, where views are exchanged in an atmosphere of goodwill and friendliness. Employees get the idea that their management is not the cold heartless thing that many agitators would have them believe. This I would reckon as the most vital aspect of the educational programme specially in these days of strained

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relationship between the management and the employees.

The Paper industry is a growing industry of the country and is one of the very important industries considering from the point of utility of paper in the present age.

We all know that the paper output in India is far short of the demand. With increased percentage of literacy which our present government is aiming at, the demand for paper will still increase to a very great extent. To cope with this development in the paper industry, the technical manpower of the industry will also have to be increased greatly. This is a factor of vital national importance. It has been found in the United States that during the last war years when the paper mills of that country were left with only a few of their skilled workers and technicians, the educational programmes successfully trained a good number of workers and technicians to maintain the over-all efficiency of the industry. And ultimately it has been found that the expenses borne by the management in this educational schemes have been rightly repaid by the increased efficiencies of the trained technicians. These results have induced them to keep in tact their educational programmes in their industries even during the post-war days on a rather wider scale.

If this be true for United States, there is no reason why this will not be true for India. Of course, I admit that we shall have to face an initial disadvantage that the normal labourer in this country is mostly illiterate. But this is definitely not an insurmountable difficulty. If a proper scheme is taken in hand the whole table will be turned in a very short period.

While drawing up a scheme of education for the workers, supervisors and the administrators in a paper industry care should be taken to see that this is a broad-based scheme on general culture, its sweep enlarged and its machinery moulded so as to give it a technical liberal character if our future technicians are to play their legitimate role in shaping the economy of our country. Education must be thorough and concrete from the very beginning. For it is only then that we can have the right man in the right place.

There should be three different types of curriculum for the three grades of personnel to be trained. One for the workers, the other for the supervisors and the third one for the administrators. But there should be proper links between these three types of education system. No one should be denied of the facilities of the training for the next higher position provided his calibre and ability permit. While drawing up the schemes of training, particular attention should be paid to the fact that every one must have the opportunity of learning the fundamental ideas and theories of all important subjects. At the same time facilities must be provided again for all to specialise in certain particular branch suiting his tastes and aptitude.

I shall try to do a little regarding the schemes of education to be adopted in paper industries, I should say that the details should be worked out by a group of experts. I think all the paper mill authorities of India should think of this problem for the better interests of the future of this industry and set up a panel to work out the details of the schemes. I am sure if a planned and systematic educational programme is carried out in every paper mill in India, it will be ultimately to the advantage of each individual worker, to the management of the industries and lastly to the greater interest of the country.

The whole industrial educational scheme should broadly aim at following important objectives :—

(1) Breaking in new men :—This mainly consists of training up the apprentices. My view on this subject is that in a paper industry all appointments should be on the apperenticeship basis, whether a worker or a supervisor, excepting, of course, a few special posts where only qualified and experienced men will be necessary. The apprentices as appointed will have to go round every department for a specified period and lastly a major portion of his time will be spent in the department where he will ultimately be posted. This is true for both workers and the supervisors.

(2) Improving the regular workers :—This will include development of an understanding of the entire process of which job constitutes a part; increased knowledge, understanding and skill on the part of each worker, safety education, etc. etc.

(3) Upgrading personnel :—This will be a definite encouragement for each individual to improve himself. According to the calibre of each man, he may be promoted to the next higher posi-

tion if he can satisfy his departmental heads as regards his ability and knowledge.

Another important point of this education programme will be the utilisation of the employees' suggestions. Suggestion should be invited from the employees for the improvement of the processes, etc., and there should be an expert committee to judge the merits of each individual suggestion put forward by the employees and regular rewards to be paid for valuable suggestions. By encouraging this, in addition to aiding production, morale is improved because the employees feel that they belong to the organisation, that they count for something, that their opinions are worthwhile. All of these make an educational programme more effective in that employees will not be as suspicious of the Company's motives in attempting to develop better employees.

Over and above efficiency of the industries, the educational programme makes a real effort to bridge the gulf of misunderstanding that had existed too long between the employer and the employees.

To start amongst the altogether illiterate workers the best way should be the extensive use of educative motion pictures, which will be both instructive as well as recreative. The next step may be by the way of popular lectures on the technique of the works they actually do inside the mills, and these may often include recent developments on the same subject. The third step in this scheme should be on the job training by efficient instructors. While putting this scheme in actual practice, care should be taken to see that every worker gets a little training in every other department of the mill in which he works. After watching the particular aptitude of each individual worker, he should be given the facility to specialise in that particular branch which suits him best. As for example, a man working in the paper machines must have his training right from the grass choppers up to the finishing department as well as in the engineering department. Similarly a man who will be working in the maintenance department must have his preliminary training in all the process departments. This should hold good not only for the operatives but also for the supervisors and the administrators.

While drawing up the curriculum of studies for the supervisors, care should be taken that a general idea is given in all the fundamental scientific subjects, namely :—Chemistry, Physics, Mathematics, Engineering, Wood technology and Forestry, Paper technology and a little of Economics and Statistics. The idea of giving a particular supervisor training in all the departments irrespective of actually where he will work, increases the over-all efficiency of the industry.

The theoretical lectures should be conducted at least twice or thrice a week. This course should be for four years. The first two years should be devoted to fundamental sciences as was mentioned previously, the next two years to be devoted to paper chemistry and paper technology (advanced), and any other subject that may be thought desirable and necessary according to circumstances.

The scheme should be made compulsory for both the newcomers as also for those who are already in employment. But at the start, instead of making it compulsory, arrangements should be made to induce all to attend the classes by proper encouragements. This may be done by awarding occasional prizes and rewards on the results of the periodical examinations. Further, it should be the policy of the management that the promotions and increments should depend on the joint report regarding his aptitude in practical works as also in the theoretical classes.

The education scheme for those who are expected to go in for the administrative jobs in paper industry should include bibliography, organisation and writing of reports, verbal presentation of tecnical matters, discussions with outstanding research specialists invited from industries and institutions of higher learning, instrumentation and the physical tools of research, statistics, the economics of the paper and pulp industry and patents and other aspects of research.

Now let us discuss about the practical difficulties of the implementation of these schemes in our country. We know that in our country there are a good number of smaller units of paper mills. Sometime it appears that it is not possible for every individual unit to have their own educational programmes. In that case my idea is to have a joint scheme for a group of mills located in certain specified areas.

Before concluding I would like to appeal again to all the paper mill owners of the country to

immediately go into this vital question of industrial education and set up an expert body to draw up a definite scheme and to give effect to the same at an early date for their own interest and for the greater interest of the country.

In this connection I would like to mention that one or two mills have already started educational programmes for their employees. This can form the nucleus of a proper and full fledged programme. These schemes include theoretical classes in Chemistry, Physics, Mathematics and paper technology. The classes are held usually twice a week. Further, there are often technical meetings in which talks are initiated on technical subjects, mainly of paper mill importance. Another idea has cropped up in the minds of those who are actually conducting this programme that questions will be invited from all on subjects mainly of paper technology, and these questions will be distributed to those who are interested, for discussions and solution and finally discussed in an open meeting. This will definitely stimulate the ideas and induce people to consult others who are supposed to know better on the subject.

Finally I would like to state that I do not hold a conservative view of restricting any such programme to certain definite shape at all times. As the time will pass and according to day-to-day circumstances the programme may be shaped to suit. I am sure in a very very short period of time a comprehensive curriculum will be evolved for the proper education of the employees to suit their actual requirments.

For the sake of an example and being connected with paper industry for quite a good number of years, I have discussed above the problems of industrial education in paper industries. But the principle holds good for other industries too. A careful study of each particular industry is required to formulate the respective schemes.

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