All-India Council
for
Technical Education

Proceedings of the
6th Meeting
1951

Ministry of Education
Government of India
1955

Proceedings of the Sixth (Special) Meeting of the All-India Council for Technical Education

Held at Calcutta on the 4th January, 1951

MINISTRY OF EDUCATION
GOVERNMENT OF INDIA
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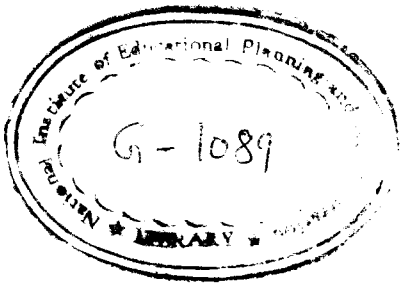

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PROCEEDINGS OF THE SIXTH (SPECIAL) MEETING OF THE ALL-INDIA COUNCIL FOR TECHNICAL EDUCATION HELD AT CALCUTTA ON THE 24TH JANUARY, 1951.

The sixth (special) meeting of the All-India Council for Technical Education was held at 10 a. m. at Calcutta on the 24th January, 1951, at the residence of the Chairman, the Hon'ble Mr. Nalini Ranjan Sarker.

2. The following members were present :

1.	The Hon'ble Shri N. R. Sarker (Chairman)	
2.	Dr. Tara Chand	Educational Adviser to the Government of India.
	Ministries of the Government of India	
3.	Dr. B. P. Pal	Ministry of Agriculture.
4.	Brig. Aserappa	Ministry of Defence.
5.	Shri G. L. Mehta	Planning Commission.
	Parliament of India	
6.	Dr. P. S. Deshmukh	
7.	Prof. Yashwant Rai	
	State Governments (Part A)	
8.	Shri P. G. Menon	Government of Madras.
9.	Shri J. A. Taraporevala	Government of Bombay.
10.	The Hon'ble Minister of Education, West Bengal	Government of West Bengal.
11.	Dr. K. R. Krishnaswamy	Government of Bihar.
12.	Dr. H. B. Mohanti	Government of Orissa.
	State Governments (Part B)	
13.	Shri N. C. Chakravarty	Government of Saurashtra.
	Industry, Commerce and Labour	
14.	Shri B. B. Joshi	All-India Organisation of Industrial Employers.
15.	Shri M. P. Gandhi	Federation of Indian Chambers of Commerce and Industry.
16.	Shri Noor Mahammed Shaikh	Indian National Trade Union Congress.

17.	Shri G. V. Apte	Employers' Federation of India.
18.	Shri V. Chakkarai Chettiar	All-India Trade Union Congress.
19	Miss Maniben Kara	Hind Mazdoor Sabha.
20.	Shri S. Guruswami	All-India Railwaymen's Federation.

Inter-University Board of India

21. Dr. A. L. Mudaliar
22. Pandit Govind Malaviya

Association of Principals of Technical Institutions (India)

23. Dr. S. R. Sen Gupta

Institution of Engineers (India)

24. Dr. Shiv Narayan
25. Shri N. K. Mitra

Indian Institute of Architects

26. Shri C. M. Master

National Planning Series Committee

27. Dr. J. C. Ghosh

Indian Chemical Society, Calcutta

28. Dr. P. C. Mitter

Nominee of the Government of India

29. Shri Fazal Ibrahim Rahimtoola

Shri G. K. Chandiramani
(Secretary)

The following members were unable to attend.

1.	Shri S. Ranganathan	Ministry of Commerce.
2.	Dr. S. S. Bhatnagar	Council of Scientific and Industrial Research.
3.	Joint Secretary (G)	Ministry of Finance.
4.	Shri P. M. Menon	Ministry of Health.
5.	Shri S. Boothalingam	Ministry of Industry and Supply.
6.	Dr. J. N. Ray	
7.	Shri N. Das	Ministry of Labour.
8.	Shri T. P. Bhalla	Ministry of Communications.
9.	Shri F. C. Badhwar	Ministry of Railways.

10.	Shri M. P. Pai	Ministry of Works, Mines and Power.
11.	Consulting Engineer (Roads)	Ministry of Transport
12.	Representative of the Cabinet Secretariat.	
13.	Shri A. N. Khosla	Central Board of Irrigation.
14.	Nawab M. I. Khan	Parliament of India.
15.	Shri Biswanath Das	
16.	Pandit L. K. Maitra	
17.	Hon'ble the Premier of Assam	Government of Assam.
18.	The Director of Industries, Punjab	Government of Punjab.
19.	The Hon'ble Minister of Industries, Uttar Pradesh.	Government of Uttar Pradesh.
20.	Dr. V. S. Jha	Government of Madhya Pradesh.
21.	The Hon'ble Minister of Education	Government of Mysore.
22.	Shri B. N. Jha	Government of Madhya Bharat.
23.	The Principal, Engineering College, Pilani.	Government of Rajasthan.
24.	Director of Education	Government of Jammu and Kashmir.
25.	Shri J. A. Murray	Associated Chambers of Commerce of India.
26.	Shri T. G. May	
27.	Shri P. N. Sinha	All India Organisation of Industrial Employers.
28.	Shri K. C. Munshaw	Federation of Indian Chambers of Commerce.
29.	Shri A. P. Sharma	Indian National Trade Union Congress.
30.	Shri N. K. Sen	
31.	Dr. K. Venkataraman	Employers Federation of India.
32.	Shri J. N. Mitra	Hind Mazdoor Sabha.
33.	Dr. Mata Prasad	Central Advisory Board of Education.
34.	Shri B. H. Zaidi	
35.	Shri P. N. Joshi	Association of Principals of Technical Institutions (India)
36.	Prof. K. T. Shah	National Planning Series Committee.
37.	Dr. A. A. Pandya	Nominee of the Government of India.

3. Prof. Bernard Mouat-Jones, former Vice-Chancellor of Leeds University and a member of Percy Committee on Higher Technological Education in the U. K., whose visit to India had been arranged by the British Council, attended the session by special invitation.

4. The Chairman opened the session with an address in which he referred to the great national calamity that had befallen the country in the passing away of the Hon'ble Sardar Vallabhbhai Patel. He briefly touched on the matters placed on the agenda for the consideration of the Council (Full report of his speech is at appendix 'A').

5. Prof. Mouat-Jones then addressed the members on the subject of 'Cooperation between technical institutions and industry in the U. K.' A gist of his speech is given at appendix 'B'.

6. Secretary reported the following changes and additions in the membership of the Council.

Ministry of Agriculture

Shri B. P. Pal, Director, Indian Agricultural Research Institute Replaces Dr. J. N. Mukherjee.

Ministry of Finance

Shri K. R. K. Menon, Secretary, Ministry of Finance, replaces Shri Brij Narayan, Joint Secretary (retired).

Planning Commission

Shri G. L. Mehta, Member, Planning Commission, appointed as an additional member of the Council.

Industry, Commerce and Labour

Shri A. P. Sharma, replaces Shri Hariharnath Shastri.

7. *Discussion of the Agenda*

Item No. 1 : *To report that the proceedings of the fifth meeting of the All-India Council for Technical Education held at Calcutta on the 24th and the 25th July, 1950, were confirmed by circulation.*

It was reported that the proceedings of the fifth meeting had been circulated and confirmed.

Item No. 2 : *To consider the request for representation of the Institution of Chartered Accountants of India on the All-India Council for Technical Education, its Committees and Boards.*

Resolution No. I. RESOLVED that a recommendation be made to the Government that representation be given to the Institute of Chartered Accountants of India on the All-India Council for Technical Education.

The Council expressed its inability to accede to the request of the Institute for membership of the Coordinating Committee and the

Boards of Studies. It was, however, noted that the Institute had been invited to nominate a representative on the All-India Boards of Technical Studies in Commerce and Business Administration.

Resolution No. II. RESOLVED that the Institute of Chartered Accoutants of India be informed that the Council was unable to accede to the Institute's request for representation on the Coordinating Committee and the Boards of Studies.

Item No. 3. *To consider a note on the composition of the Regional Committees of the Council and the demarcation of the regions.*

Resolution No. III. RESOLVED that four Regional Committees of the Council be constituted forthwith with the composition of the Committees and the demarcation of the regions as set out below :

(*a*) *Composition*

Ministry of Education.	One representative.
Ministry of Labour (D.G.R.E.)	,,
Ministry of Railways.	,,
Part A & B States.	One representative from each State.
	(Northern Region 5
	Eastern Region 4
	Western Region 4
	Southern Region) 4
Eminent persons connected with Industry, Commerce and Labour.	Three (to be nominated by the Chairman of the Council)
Universities having Technological Departments.	Two representatives (to be nominated by the Chairman of the Council.)
Technical Institutions	Two representatives (to be nominated by the Chairman of the Council.)
Institution of Engineers (India)	One representative.
All-India Council for Technical Education.	One representative (to be elected from amongst non-official members of the region.)
By co-option (if considered necessary)	Two members.

The Regional Officers of the Ministry of Education will act as Secretaries to the Committees.

(b) Demarcation of Regions

Northern Region

Part A States	Uttar Pradesh, Punjab.
Part B States	Jammu and Kashmir, Pepsu, Rajasthan,
Part C States	Ajmer-Marwara. Bilaspur, Delhi, Himachal Pradesh.

Eastern Region

Part A States	Assam, Bihar, Orissa, West Bengal.
Part B States	Nil.
Part C States	Manipur. Tripura,

Western Region

Part A States	Bombay, Madhya Pradesh.
Part B States	Madhya Bharat, Saurashtra.
Part C States	Bhopal, Kutch, Vindhya Pradesh.

Southern Region

Part A States	Madras,
Part B States	Hyderabad, Mysore, Travancore and Cochin.
Part C States	Coorg.

Resolution No. IV. RESOLVED further that the headquarters of the four Regional Committees be as follows :

Northern Region—Kanpur
Eastern Region—Calcutta
Southern Region—Madras
Western Region—Bombay

Item No. 4. *To consider a note regarding the reconstitution of the All-India Boards of Technical Studies.*

The Concil adopted the proposal contained in the note.

Resolution No. V. RESOLVED that the Boards of Technical Studies be reconstituted in accordance with the revised composition as set out below :

Representative of the All-India Council for Technical Education.	1
Nominees of the Coordinating Committee	4
Representative of the A.P.T.I	1
Representative of Affiliated Institutions	1
Representatives of Industry, Commerce, Trade, etc.	2

Representatives of Professional Bodies	2
Representative of Inter-University Board	1
Experts to be co-opted by the Board itself	3
Total	15

Item No. 5. *To consider the question of investing the All-India Council for Technical Education with statutory powers to confer degrees in Engineering, Technology and Commerce.*

On the recommendations of the Coordinating Committee, the Council agreed to consider the item in the following revised terms :

"To consider

(*i*) the question deferred by the Council at its last meeting to the special session viz., investing the Council with statutory powers to confer degrees in Engineering, Technology and Commerce, and

(*ii*) the Note by the Educational Adviser previously circulated to the members of the Council".

The discussion mainly centred on the proposed power of the Council to confer degrees on students undergoing courses in affiliated institutions. Complete unanimity prevailed in regard to the desirability of establishing the Council as a statutory body with powers and functions relating to the coordination of facilities in technical education, ensuring proper standards and development of institutions by suitable grants. The Council was also unanimously of the view that there was need in the country for two distinctive types of courses in higher technological education of a standard usually connoted by the award of a degree ; one to be provided by the universities which would be more closely related to fundamental science than the courses of a technical college, such courses in general containing a smaller amount of training related to immediate or special work in industry and the other to be provided by technical colleges which would combine practical and industrial approach with a large element of broad fundamental science.

Certain fears were expressed by members, particularly relating to the existing institutions affiliated to the universities breaking away from them. A point was also made that, if the Council affiliated a few institutions, it might have a tendency to be partial to those institutions in the matter of sanctioning grants of development. It was thus suggested that the Council could perform its role in the development of technical education more effectively, if it did not have any affiliations with a particular class of institutions. The representatives of the Inter-University Board also desired that, should it be decided to confer statutory awards on students undergoing courses in affiliated institutions, the awards should be distinctive and should not be expressed in terms similar to degrees awarded by universities. All the speakers, however, stressed the need for providing channels for learning the 'why' as well as the 'know how' of the various techniques.

The Educational Adviser to the Government of India allayed these suspicions and fears and gave an assurance that the institutions, at present affiliated to the universities, would not ordinarily be disturbed. It would be for the Council, which would be composed of all the various interests concerned, to determine whether or not a particular institution should offer courses with a more practical approach. In any case, institutions forming part of unitary universities would not be allowed to affiliate to the Council. Regarding the suggestion that the Council might become partial to affiliated institutions in the matter of development grants, the Educational Adviser said that this was a baseless fear and that such a responsible body as the Council could not be expected to behave in this fashion. Moreover, the Government considered that both the universities and the technological institutions outside the jurisdiction of universities had important roles to play in the field of higher technological education and that it was equally essential that the two types of institutions should receive encouragement. By assuming statutory powers, the Council would not convert itself into a university. The proposed measure was designed to secure proper recognition for courses already conducted under the aegis of the Council, for which the All-India Diplomas were at present being awarded. The need for a distinctive type of courses having been accepted, it was clear that the courses should continue to be provided. The Coordinating Committee had on the previous day considered measures for improving the examination system of the Council. The ultimate aim is to devise a system of examinations, whereby the work done during the courses would be the main factor in the assessment of students' abilities. By and by, external examinations would be done away with and the institutions concerned would assume responsibility for all assessment. It had been considered even in advanced countries like the U. K. that the awards given to students on completion of the new type of courses in technology should be made by a competent central body, which should concern itself with the overall supervision of the examinations and maintenance of standards. In a country like India, it was all the more necessary that this should be so and the Council which had devised courses with the aid of men drawn from universities, industry and other interests, was in the best position to perform the role of the central body. Regarding the desire of the universities that the awards conferred by the Council should be such as to distinguish them from the awards conferred by universities, the matter would be investigated and such appellations found which would distinguish the awards.

Resolution No. VI. RESOLVED unanimously that a bill be introduced in Parliament for the grant of a status to the Council and that its functions as a statutory body should be :-

(*i*) to coordinate facilities in technical education in the country and to ensure proper standards ;

(*ii*) to develop technical institutions in the country by giving suitable grants (with proper machinery provided to assess the needs and to ensure judicious spending); and

(*iii*) to confer awards on students undergoing courses in affiliated institutions (institutions forming part of unitary universities would not be permitted to affiliate to the Council).

Item No. 6: *To discuss the draft bill for the registration of engineers.*

It was reported to the Council that the Institution of Engineers (India) had not finalised its views on the proposed measure. Members expressed the view that the Government might find it necessary to revise the draft in the light of the views of the Institution of Engineers (India), the body most concerned, and as such it would be more profitable if the Council considered the draft bill at a later stage.

Resolution No. VII. RESOLVED that the final draft bill when received be circulated to the universities and be placed before the Council for consideration with such views as the universities might express on it.

Item No. 7: *To receive and consider the report of the Joint Committee on the Training in Industrial Administration and Business Management.*

A question was raised whether it was proper for the Council to consider the report pertaining to the Eastern Region only and to recommend to the Government grants for the purpose of providing facilities in that region, when it did not have an opportunity of knowing what obligations might devolve on the Government in providing similar facilities in other regions of the country.

The reason for recommendations for the other regions not being available were explained. The Joint Committee of the Boards had considered general questions and had then proceeded to appoint special sub-committees for the Eastern and the Western Regions to start with. The Committee intended to appoint sub-committees for the Northern and the Southern Regions also. The Eastern Region Sub-committee had submitted its report and the Joint Committee had an opportunity of considering it. It had, therefore, been decided to present to the Council the reports of the sub-committees as they were received.

Resolution No. VIII: RESOLVED that the Council proceeds to consider the general recommendations made in the report and to make no observations for the present on the financial implicatiosns for implementing the recommendations regarding the Eastern Region. These would be examined when reports from the other regions were also available.

(1) *Opinion Survey*: (Para six of the Report)

The Council approved the recommendation that an organised 'Opinion Survey' be carried out to assess whether the present system of commercial education in the country does or does not have sufficient bias to equip students for managerial careers in industry.

(2) *Part-time Day and Evening Studies* (Paras 7-8)

The Council generally approved the suggestion for organising part-time day and evening courses in Management Subjects for the

benefit of large numbers of junior executives working in business and industry. The Council was of the view that the industrial and commercial interests should bear the cost of such courses, and suggested that the possibilities in this connection be explored.

3. *Post-graduate Studies* : (Paras 9-49)

The Council generally approved the provision of facilities for post-graduate studies in—

(*a*) Industrial Engineering for Engineers, particular emphasis during training being on the physical control of the organisation and products ;

(*b*) Business Management for Commerce Men, particular emphasis during training being on the financial and economic control of the organisation and the distribution of the products ; and

(*c*) Industrial Administration for men of leadership and potentialities, particular emphasis during training being on the human and financial control of organisation including public relations.

(4) *Refresher Courses* : (Paras 50-51) :

The Council generally approved the provision of short-term intensive refresher courses in Management Subjects during vacation periods for the benefit of such executives in business and industry, government officers and labour officers as may wish to avail themselves of the opportunities.

(5) *Administrative Staff Colleges* : (Paras 52-53)

The Council approved the proposal to explore the possibilities of establishing such a college as an enterprise of the industrial and commercial community of the country.

The meeting terminated with a vote of thanks to the chair.

APPENDIX A

Opening Address by the Chairman, the Hon'ble Sri Nalini Ranjan Sarker

I accord you a most cordial welcome to this special meeting of the All-India Council for Technical Education. Last time when we met, we decided, in order to meet the wishes of the members, to postpone consideration of a couple of items of the agenda till such time as a special meeting of the Council could be held to discuss them. Since then circumstances have so shaped themselves that Calcutta had to be made the venue of the meeting and I am very glad that despite so many preoccupations you have taken the trouble of making it convenient to attend the meeting and give the Council benefit of your experience and counsel.

The National Loss

Before I proceed to set forth some of my ideas in connection with the agenda before you, I cannot but make a mention of the great calamity that has befallen us in the passing away of the Hon'ble Sardar Vallabhbhai Patel. It is needless for me to recount here his great contribution to our struggle for freedom, for that has indeed passed into history ; but probably of far greater importance was his lasting contribution to the consolidation of our hard-won freedom which sometimes tended to be threatened by external and internal stresses. The whole weight of his personality was always thrown on the side of stability and progress and his wise counsel and sagacious statesmanship acted as a great steadying force in our national affairs. He used to take a keen interest in the affairs of this Council, as in every other useful national activity, and the nation is very much the poorer today without him. We share this deepest sense of loss with the whole nation and mourn the death of the great Sardar who meant so much to us and to the counttry.

The Need for the Reorientation

The agenda of this meeting is with you for some time and I am sure you have noticed that you will be called upon presently to take decision on a number of important matters. I do not presume to anticipate your decisions on any of them, nor do I wish to re-state the function and utility of this Council or the output of its work and achievements so far. I had already dealt with them in my address before you in the last Council meeting in July. I feel sure that there is at present a lively awareness of the great importance of technical education in this country, particularly at this stage of our development, when we are realising at great cost that a re-orientation of our technical educational system can play a vital *role* in enhancing the efficiency of the productive capacity of the country. This, I need

hardly stress, is vital at a time when our future well-being as a nation depends very greatly on our economic prosperity and the contribution we are able to make to the world's wealth. For, with the rapid advance of scientific discovery and research, industrial prosperity is coming to depend increasingly on the speed and skill with which new scientific knowledge can be put to practical use. This is the task which the technicians and technologists are called upon to serve and national interest demands that the number and quality of such personnel should be adequate to keep industry abreast of modern scientific and technical developments. This in turn calls for a suitable system of advanced education, training and research in technology, supported by an adequate amount of education and training of the less advanced kind needed by technicians. Their combined contribution, both higher and lower, is no doubt essential for efficient industry ; but technologists and technicians are needed for different kinds of work and responsibility which are bound to arise as we make progress towards economic and industrial prosperity.

I have noticed that there happens to be a subdued dissatisfaction when the Government or industrial organisations or autonomous authorities of big projects requisition the services of foreign technical experts for large-scale undertakings, thinking as if we have quite a good handful of this type in the country. Quite often political capital is made of this, creating unnecessary bitterness. But from practical experience it has been found that such import of talent cannot be helped despite all the good intentions of the appointing authorities as our resources in technical man-power is lamentably poor, and on the higher level, demonstrably meagre. One can realise the nature and extent of our deficiency in this regard if one will only consider the fact that even in an advanced country like the United Kingdom there is the feeling that her technical man-power is inadequate for her growing needs, so that during the past six years discussion about the education and training of technologists and higher technicians has grown apace in committees, in conferences and in the press and it is agreed that she has fallen behind others, particularly the United States, Germany, Switzerland and Sweden in the field of applied science, and that the remedy is to provide more and better, applied scientists and technicians. The Report of the Special Committee of Higher Technical Education appointed in 1944, known as the Percy Committee, the Report of the Scientific Man-Power Committee (1946), the Report of the National Advisory Council on Education for Industry and Commerce (1950) and of the University Grants Committee (1950) bear testimony to the sense of urgency with which the problem is being viewed in that country. In the light of this, our problem would appear only too patent and we must therefore approach our task with a clear sense of perspective and objective needs.

Since our meeting last we have moved one step further with our plans. We have made definite progress in respect of the Higher Technical Institute for the Eastern Region at Kharagpur. The Indian Institute of Technology, Kharagpur by which name it will be known hereafter, will, in a few months from now, start its work a few miles away from Kharagpur with a compliment of 240 students in the under-

graduate courses and about 60 students for post-graduate work. One hundred and eighty students will be admitted for a course in Mechanical Engineering, Building Construction, and Civil Engineering, and 30 each in Electrical Engineering and Geoglogy and Goephysics. Post graduate courses in Business Management and Industrial Administration, Mechanical Handling, Transport Engineering, Communication Engineering, Harbour Engineering, Food Technology, Refrigeration and Air Conditioning, and possibly in Town and Regional Planning will be started simultaneously. The Board of Governors have decided to make the start this year in the Collectorate Building which has come as a gift along with the 1,200 acre-site from the Government of West Bengal. Meanwhile plans of a new building for the Institute, a residential colony for the staff and hostels have been completed and construction has begun. A self-contained C.P.W.D. circle has taken the charge of construction work and the preparation of building drawings is rapidly being finalized under the guidance of a Swiss architect whose services have been secured specially for this purpose. The construction schedule as has been drawn up appears very encouraging and if it is not interrupted because of inadequacy of funds and any possible non-availability of materials, we should expect the Institute in its new premises by the end of 1953.

In the matter of equipment, this Institute has not lagged behind. More than 100 machine tools have so far been obtained from the German Reparations Stocks and when installed these would constitute a balanced workshop. A large quantity of signal stores, hand tools, ferrous and non-ferrous metals, building materials have also been obtained from surplus disposal stocks at a concessional rate. Orders have been placed already both in the United Kingdom and in other parts of Europe for laboratory equipment and machinery and when these arrive, the Institute will have up-to-date laboratories fitted with latest type available equipment for Material Testing Laboratory, Hydraulics Laboratory, Geology and Geo-physics Laboratory, etc. In making purchases, the Board of Governors have made full use of such stores of indigenous origin as have been found to satisfy standard specifications.

The Institute has been able to secure the services of some foreign technologists who have to their credit considerable original work in their respective fields of research and who were engaged prior to joining the Institute in teaching work. Selected technologists who had been sent abroad on Government account for specialised industrial training in various fields of engineering and technology and who returned after crediting themselves with high achievements have now been employed in the Institute.

The Expert Committees

Although the *Ad Hoc* Committee on Higher Technological Education had suggested in its report a number of post-graduate courses for being taken in this Institute, the Board of Governors thought it prudent to entrust the task of organising these courses to a number of Expert Committees representing Industry, Commerce and Educa-

tion, to ensure that the courses to be undertaken are such as would meet the genuine requirements of the country in respect of technical personnel without leaving the specialised product of the Institute uncared for. Comprehensive reports by some of the committees have already been submitted and some are being finalized. It is gratifying to note that in a majority of the subjects selected, the committees have emphatically stated that earlier the post-graduate instruction in these subjects is started, better would it serve the cause of Industry and Commerce because due to lack of properly trained personnel, their interest is suffering. It would not be out of place to mention here that the Automobile Expert Committee, appointed by the Ministry of Industry and Supply to consider classification and import duty on automobile spare parts, examined by a special request from the Board, the question of introducing a course in Automobile Engineering in the Institute. It was their unanimous opinion that the automobile industry in the country is still in its infancy and cannot obviously absorb technicians to be specially trained for the purpose.

The Regional Committees

In the agenda before you, there is the proposal for the constitution of the Regional Committees. Although the functions to be assigned to these committees and their composition had been determined in consultation with the State Governments, the question of setting up these had to be postponed until the political set-up of the country was determined. In the new proposal before you, the composition has been reduced with the intention of making this a committee of action. The functions that we propose to assign to these committees are so onerous that much of the force of our decision will be lost if these committees do not meet often and work for the aims and objectives for which this Council has been created and the difficult task to which it is pledged. I do not want to influence your views; but I would only add that the proposal before you has been given deep thought by all officials concerned. Pending creation of these committees, two officers of the Ministry of Education have been working at Calcutta and Bombay for the last eight months with duties assigned to them identical to those now proposed to be entrusted to the committees. Their task will no doubt be simplified under the guidance and with the assistance of the Regional Committees.

Practical Training in Industries

The Scientific Man-Power Committee in their report have laid special stress on the industrial and practical training of the students passing out of our educational institutions, and have recommended that all factories, industrial establishments or technical departments, private or State-owned, should include schemes of practical training, and expenditure on this account should be regarded as normal and legitimate responsibilities of such establishments. They have urged that Government should, following the French system, levy on every industrial concern—say 3 per cent. of the wages bill—and the proceeds of such levy supplemented by Government subvention of an equal amount should be utilized for organising practical training under Government supervision. In this connection, I may invite your

attention to the Bill which was introduced last year in Parliament for the regulation and development of industries in which Government had intended to secure powers for making rules for the practical training of technical personnel in industrial establishments. For some reason or other, discussion on this Bill has been deferred. But the necessity of industrial experience as an integral part of an engineering or technological course has so much stressed itself that whether there be a Bill or not, circumstances will make it necessary for the industry to incorporate practical training schemes in their establishments.

The Scheme of the Indian Engineering Association

The lead in this matter given by the Indian Engineering Association, Calcutta, deserves praise. This Association, which represents the European industry in this region, surveyed the existing apprenticeship schemes followed by its members and recommended a training scheme for all types of apprentices classified into three main categories, such as Trade Apprentices, Engineering Apprentices and Graduate Apprentices. The report includes recommendation as to the age and educational qualification for entrance to each type of apprenticeship, the total period of training in each type, recommendations of pay and emoluments including premiums and school fees, where applicable, for each class of apprentice, the type of training, both theoretical and practical, to be given and the number of apprentices in each category to be employed in relation to factories' total labour force. The Trade Apprentices will be originally skilled workers picked up from the labour force who have an aptitude for skilled work and who can be later on employed as moulders, turners fitters, blacksmiths, etc., after undergoing a definite period of training. The Engineering Apprentices include persons who have obtained educational qualification equivalent to a Certificate from the Board of Apprenticeship Training in Calcutta and who could, on completion of the training, be employed in supervisory or junior managerial posts. The Graduate Apprentices include students who are in possession of an Engineering Degree or Diploma from a recognised college or university and who could, after the end of the training period, be considered as fit for holding the posts of foremen or similar responsible posts in industry.

While going through the details of this scheme one point obviously attracts attention. The scheme lays down a full three years' training period for a Graduate Engineer. In other words, an engineer until he is 24 years of age cannot be a wage-earner. Taking into account the general economic condition of an average middle class family, a boy who has taken education and on whom depends the maintenance of other members in the family may find it difficult to go through this three years' course. The sponsors of the scheme, however, feel that a period of one year's practical training is of no use whatever in producing properly trained men, but a period of three years is absolutely necessary to give students a thorough grounding in workshop practice before they can qualify for responsible posts. I mention this point for your consideration and valuable advice so that while coordinating various schemes of practical training, diversities of this nature may not impede success.

Opportunities in Industries Limited

Schemes of practical training in State-owned establishments such as Railways, Defence factories, Central Electricity undertakings are now complete and in some of these works, students have been already introduced and undergoing a training course. But this does not meet the problem. Opportunities for practical training in large-scale industries in India are meagre. Such industries are few in number and even these consider such training as outside their scope of activities. Situated as we are in India, large-scale industries for a long time to come, will not, by themselves, solve the problem of unemployment and under-employment. This was clearly recognised by the University Education Commission who urged that our greatest need was the planning of a new type of Engineering Colleges which would have for its special field the preparation of industrial engineers to develop and manage small-scale industries. While efforts are being directed for the training of some students in subjects such as Business Management and Industrial Administration in the new Institute at Kharagpur to enable capable young men to combine their engineering knowledge and business ability with a spirit of initiative, resourcefulness and self-reliance to start new industries on small scale for manufacture of a variety of goods needed by the country, it is obvious that this type of training cannot achieve results overnight, While individual approaches to the industrial works are bearing some results, the necessity of giving practical industrial training to raw engineers does not seem to impress some of the captains of Indian Industry. It would be our task to mould the viewpoint of industrialists by mutual coordinated efforts. It would be a more practical step to formulate a coordinated training scheme in consultation with industrialists, educationists and technologists for such factory-training than by method of individual contact. The Regional Committees should, therefore, take upon themselves, as a first priority the problem of working out such a uniform coordinated practical training scheme for all types of technologists passing out of the institutions within their respective regions.

Our Requirement of Technical Man-Power

While recommending the establishment of a few high grade technological institutions, the Council at one stage of its deliberations was confronted with a somewhat different view regarding the advisability of establishing such technical institutions. In the absence of a proper survey of the existing facilities as well as the need of the country for highly trained technologists, it was difficult at the time to assess properly the advisability of launching upon such experiments of a costly nature. Since then the report of the Scientific Man-Power Committee has been published. The Committee assessed the requirements of the technical personnel for industry, transport and Government at about 30,000 for the senior grade and another 32,000 for the junior grade for a period of 10 years from the time the survey was made. This assessment was, of course, based on the assumption that the recommendations of the Industrial Panels, the Electricity Commission, the Central Waterways, Irrigation and Navigation Commission and the various Ministries in the Centre and the States which had generally been approved by Government, would be duly imple-

mented. It is quite possible that all these schemes may not be implemented to the fullest extent, at least in the near future, owing to various handicaps, and it may even be that such a large force, as envisaged by the Scientific Man-Power Committee, may not be fully absorbed within a given period. The strain on our resources due to rehabilitation of displaced persons, deadlock in Indo-Pakistan relation and repeated failure of crops due to natural causes necessitating thereby heavy imports of foodgrains, have put a brake on the full-scale implementation of these various schemes.

The Risk of Unplanned Expansion

A time has come for us to face reality. We must now review the recommendations we made some years back and take stock of things that have happened in the meanwhile. If schemes of extending technical facilities are continued further without regard to actual needs, supply may outstrip demand and create a situation in which these trainees may not secure gainful occupations for lack of commensurate expansion of industies, private or State-owned. This may serve as a damper and defeat the purpose we have in view. I have always felt that in a matter which concerns the education and training of individual human beings, adjustments of supply and demand should be made within wide tolerances. Against the fear of unemployment, it is equally plausible to argue that in the case of this country, with vast possibilities of expansion in industry and commerce, the presence of these technicians may itself act as a spur to development, thereby creating their own conditions of work and employment. The fact that such training may develop in them a psychology of activity and hard work may encourage these trainees to undertake industrial ventures themselves. Thus a habit of risk-taking may slowly develop which may create its own field. In fact, the question of technical education cannot be wholly viewed in terms of employment, particularly in a country like India, where there is so much to be done but so few to do them. Even so, in adding to the number of the existing institutions we must proceed cautiously so that there may not be a wide disparity between our needs and supply. Any new venture of this type, if undertaken without proper planning and collaboration with a central organisation like this Council, may tend to do more harm than good to the cause of technical education in the country.

The Proposal for a Central Organisation

One of the most important subjects for your discussion in this meeting is the proposal for the coordination of higher technical education in the country through a Central organisation. The All-India Council, which is now broadly dealing with the problem of technical education in all its aspects, was appointed by a Government resolution as far back as in November, 1945, on the recommendation of the Central Advisory Board of Education. Since then it has pursued its task in a planned manner and can claim to have brought order in the sphere of technical education which so long moved in an unplanned and uncoordinated manner. It is now being felt that the Council could be expected to render better service to the cause of technical education if it were conferred statutory powers and

authority in respect of all technical institutions above the High School standard except the technological departments of the universities. This is indeed the long and short of the proposal before you to day which was examined and unanimously approved by a Sub-Committee appointed by the Coordinating Committee of the Council on the 12th January, 1950. The Ministry of Education, Government of India, have already circulated to you a comprehensive note on the proposal, which, I hope, will be found helpful in making your decision on the proposal. There seems, however, to be some difference of opinion on this matter, based, it appears, on a difference of approach. Generally, the universities do not seem to favour the idea presumably because it is felt that it would be an encroachment on the rightful sphere of university functions. I do not presume to anticipate your decision in any way on such a vital matter of importance beyond saying that the traditional concept of the jurisdiction of universities should not prevent you from approaching the problem from a practical point of view bearing in mind the objective needs of the country. I think the existing universities have had considerable powers of initiative and scope to improve the standard of technical education in the country, but I cannot say with equal confidence that they have fulfilled their part quite adequately in this regard for quite understandable reasons. In fact, the Engineering Faculties of some of the universities have been the weakest link in the chain and all but adequate attention has so far been given towards their improvement. Even in Great Britain, I find, it was 60 years after the appointment of the first Professor of Engineering at University College, London, that a degree in Engineering was admitted in the University. As I said on the last occasion, the hands of the universities are too full not only with ever increasing number of faculties but with continuous holding of examinations and other administrative problems connected with affiliated bodies. In the midst of these pre-occupations, the special needs of technical education may not receive the same attention as it deserved and may even get lost in the congeries of innumerable faculties. Moreover, from the practical point of view, it may become too burdensome for universities to absorb the vastly increasing number of technical students without substantially altering their nature and many of them may not find it possible to devote what would have to be a substantial part of their resources to equipping and staffing large technological faculties.

How U.K. views the Question

Even in England there is a larger measure of disagreement on this point. The matter was discussed during the Home Universities Conference in December, 1949, and were put forward in a debate in the House of Lords the following March, in subsequent correspondence and articles in *The Times*, and again at a conference arranged by the Advisory Council of Scientific Policy in April following. In this connection I may refer you to the Report of the National Advisory Council on Education for Industry and Commerce, 1950, which, while acknowledging the part the universities have played, and will continue to play, in providing a wide range of educational provision for technology, has strongly recommended "a suitable body, which carries prestige and will ensure high standards", and which

"is required to make awards". In fact, they have recommended the establishment of a national body with the title "Royal College of Technologists" with its own Court and an Academic Board and Council. They also recommended that this body would work to the best advantage only if it was a self-governing independent corporate body. The National Council of Technology recommended by the Percy Committee in 1945 also envisaged a Central organisation of the type we are called upon to consider today.

Technical Education and Limitation of Universities

Any further expansion of our present universities, some of them already overgrown in size, would indeed require most careful thinking. The present tendency in our system of University education, which is towards bringing together of more and more departments of learning under a common roof, has no doubt much that can be said in its favour, not the least being the broadening of outlook and character which the inter-mixing of the staff and the students of the different faculties promotes. But the tendency can easily go too far. In any case it is not an easy job to squeeze all the branches of technical education with sub-divisions of each, not to speak of monotechnic institutions into a single University faculty and do full justice to it among numerous other faculties. The country requires a comprehensive and go-ahead policy in technical education which can be hardly forthcoming so long as such education remains tied to the apron-strings of general education. Moreover, a higher Central organisation would not only modernise and develop degree courses and promote post-graduate research but upgrade and standardise the instruction imparted through numerous under-graduate institutions scattered all over the country. It would thus bring order and discipline to a field where at present utter confusion prevails and correlate all the stages of technical education in the country in accordance with an overall plan. Even in Great Britain where so long technical education has been dispensed through the general run of universities, opinion has gathered fast in recent years round the idea of a specialised Technological Institution like the Massachussets Institute of Technology or the Universities in Delft, Dharlottenburg and Zurich not only for relieving the pressure of the universities, but for avoiding the mixing up of purely technical training with higher technological courses.

Broadening of Scope of Technical Education

To many, a Central organisation in the nature of a Technological University is almost a contradiction in terms ; for a University must be a place where all subjects are taught. This might have been true in the days when the faculties were less numerous and their scope more limited. Nevertheless, the danger of over-specialisation should not be overlooked ; and technological institutes should strive to introduce sufficient diversity into their curriculum so that the essential condition of university life may be satisfied. This condition is fulfilled in the best technological institutes of the West where the students are required to take a number of additional subjects such as Economics, Languages, Philosophy, Law or History.

Diversity of Specialisation

When a large number of technologies are brought together under a Central organisation, there would also be a diversity of specialisation. A higher technological institute would also facilitate the application of scientific reseach on the factory floor. In the United States of America, as it has been pointed out, the machinery manufacturers continually offer new designs to industry, whereas in the United Kingdom the initiative in seeking new designs of specialised machinery almost always comes from the individual industrial firms. The reason for this difference is at least partly that in America they have had generations of technological education of a high order, and that, through institutions, which are "independent institutions and not simply additional facilities offered by Universities". Britain's backwardness in technology in comparison to the United States of America and some other countries came up for particular reference in a recent debate in the House of Commons on the utilisation of scientific resources, and one member put the case for establishing a Technological University in Britain as follows : ".....if we are falling behind in one particular respect in this country, if among all our competitors we find that there are those Technological Universities and that we have not got them, it seems at least a formidable case for enquiry to decide whether that is a gap which ought to be filled and filled forthwith."

Conclusion

In conclusion, I may say that I make mention of all these facts only in the hope that the practical aspect of the question may be clearly understood by this Council and a correct decision taken in the best interest of the advancement and consolidation of technical education in this country. In this Council we have undertaken a great task which has a far-reaching bearing on our material prosperity as a nation. So we owe it to the country to approach our task with clear vision and a due sense of realism.

APPENDIX B

The gist of a speech delivered by Prof. Bernard Mouat-Jones, former Vice-Chancellor of Leeds University and Member, Percy Committee on Higher Technological Education in the U.K., at the sixth (special) session of the All India Council for Technical Education held at Calcutta on the 24th January 1951, on the subject of 'Co-operation between Industry and Technical Institutions in the U.K.'

I have been asked to say what has been the practice in the United Kingdom by way of getting industry and education into contact and how they actually work together in the matter of technical training. In the U.K., they certainly have cooperated to a very great extent with very beneficial results. I would like to say first of all that the technical education system in the U.K. has been drawn up in an extremely haphazard manner during the last 150 years. In the matter of planning, one would not naturally recommend too much haphazard growth but it has nevertheless very great advantages, which I think, are worth considering. There has been no uniformity in our technical colleges and in technical education, but on the other hand, there has been extreme flexibility *i.e.*, technical colleges have been able, through these flexibilities, to meet the ever changing demands of industry.

The most fundamental way in which industry and education cooperate in the U.K. starts with the system of 'Government of the Technical Colleges'. They are normally run by the Local Education Authorities. The fact has been responsible for a certain lack of uniformity, because each Local Education Authority wants to meet its own local needs. The Governing Body of the technical college which comes under the Education Committee of the Local Authority is generally an *ad hoc* committee of the Education Committee, on which industry is always represented and generally the Chairman of the Governing Body is an industrialist of the neighbourhood. Now, mere representation of industry by itself may not lead to anything unless it is something more than that. Thus we always see that the industrialists we have on our committees, are given concrete jobs to do. The Governing Body generally outlines the policy of the college and there are advisory committees for all the departments of the college. These advisory committees consist very largely of industrialists who are interested in particular subjects, and these are the people who really do the work in conjunction with the staff of the college. For instance, all staff appointments come before the advisory committees and the industrialists see that only the experienced teachers are appointed. In many other ways, industry takes a real and active part in running the college. That, I think, is a matter of real importance.

A great deal of the teaching in our technical colleges has at present been done through part time evening classes and also part-

time day classes. These courses vary in standard. They are usually of five years' duration ; students attend three nights a week, lasting over five years ; the other nights of the week are meant for home work. These are group courses so that the education which students get is not too specialised, but that they may get a broad training at the same time. Roughly speaking, the standard reached is that of a degree. A very large number of the best industrialists of Britain came through that avenue. At one time, a university degree was very much suspect in industry. A large proportion of the teaching in these classes is done by industrialists themselves, working part-time in the colleges. There are disadvantages as well as advantages in these evening courses. It is too much to expect of a young man who has been spending a hard day in the factory to spend another couple of hours more but some of the best technical men of the U.K. have come up through the way. The present tendency is to replace these evening classes by part-time day classes. The employer releases the employee one day a week or two half-days a week. These part-time classes are for selected apprentices. The standard of these classes is high and at the end of two years, you have a very highly qualified person, different from the graduate no doubt but in many ways somewhat superior. The industry cooperates in the working of these classes, which are of great importance in that the employer pays the fees of the student. It is hoped that those part-time day classes will develop even more rapidly.

Then, there is the sandwich system for full-time courses. These have not been in operation very widely. An example is the Glasgow Technical College. The student spends six months in the college and six months in industry. It is hoped that the new full time courses which the up-graded technical colleges envisaged by the Percy Committee are to undertake, will be of the sandwich system. It is also hoped that the sandwich system of training will become much more established than it has been in the past with great advantage in the training of people, who are the counterpart in industry of the graduates coming from the universities.

Another means of cooperation between industry and education is through Post-advanced Courses. The object of these courses is to keep those in industry up-to-date in the latest advances in science, which bear upon their work and also to keep scientists in the colleges and universities up-to-date in the latest technological advances so that each may know what the other is doing. In the U.K., there has always been a time-lag between scientific discovery and its application to industry and that is where, I think, America has gone ahead of us. These Post-advanced Courses are intended to reduce this time-lag in some way. These courses are planned regionally ; the industry and the staff of the colleges collect together and decide on the type of specialised courses that are desirable and also decide as to who would make the best teachers. These courses will, it is hoped, develop greatly and will be of real value.

Another means of cooperation between industry and education is through Summer Courses, in which they invite teachers from the technological institutions and the universities.

There is another project started by the Metrovicks (Metropolitan Vickers Ltd.), that is worth mentioning, The project is known as the Pre-University Training, The firm sends round persons to different parts of the country to select the most promising youths. These boys come to Metrovicks and spend one year of the college apprenticeship (*normally two years*). During this period, they would also be attending part-time day classes in the College of Technology, Manchester. They are very carefully watched during that year to see that they are the sort of persons needed by the industry. At the end of the first year, these persons are sent either to a university or a technological institution as the case may be, where they get three years' theoretical training, and then they go back to Metrovicks to do their second year of college apprenticeship.

Yet another way is the Vacation Training of graduates from the universities. In this case, persons taking full-time courses in the technological institutions are expected to take vacation training in the firms. Close contacts are kept by the firms.

System of National Certificates

The National Certificates in Engineering etc., have come to stay and are found to be very valuable. They are run by a tri-partite arrangement i. e., by the Ministry of Education, Professional Associations concerned and the Colleges. Every college has its own scheme but it is assessed before it is allowed to participate. The institutions conduct their own examinations but the standards are assessed by the Ministry of Education. The National Certificate Course is of two years' duration and the standard reached is of the Intermediate stage. Three years of higher education more specilised in character, entitles the student for the Higher National Certificate, roughly of the degree standard.

In 1949, number of industrialists of Manchester decided that it was of great importance that people coming into industry should know something about industrial problems. So they started a Department of Industrial Administration in the College of Technology. This course is extremely popular with the students themselves.

Most of our technological institutions have been equipped by industry, very largely free of charge. In the past, industry has been extremely generous in giving or presenting equipment on a permanent loan. It is in the interest of industry to see that the equipment so given is kept up-to-date. It is not altogether for reasons of charity that the equipment is donated or given on permanent loan. It serves as an advertisement to the number of overseas students who come to the U.K. colleges for training. Persons trained on a particular type of equipment usually vote for it later in their professional career.

In many of our technological institutions, members of the staff are encouraged to take in work for industry and are allowed to receive remuneration for it up to a certain limit. In fact, a certain amount of outside work is encouraged because there is nothing that can bring industry and education together than working on a common problem.

ANNEXURE 1

All-India Council For Technical Education

Special Meeting

MEMORANDUM

The Coordinating Committee at its meeting held on the 24th July, 1950 decided to nominate the President of the Council of the Institute of Chartered Accountants of India, ex-officio, as a member of the All India Board of Technical Studies in Commerce and Business Administration in the vacancy caused by the resignation of Mr. V. Narahari Rao. The President of the Council of Chartered Accountants of India was accordingly requested to accept the membership of the Commerce Board.

2. In his reply the President of the Council intimated that the Executive Committee of the Council whose views were sought in the matter has suggested that the Institute of Chartered Accountants, India, may be given representation on the All-India Council for Technical Education and through it on the Coordinating Committee and the Commerce Board.

3. The Ministry of Commerce in their circular letter dated the 17th November, 1949 to the State Governments have stressed the importance of the Council of the Institute of Chartered Accountants, India and have also suggested that representation might be given to this Council on such bodies as are likely to consider matters in which specialised knowledge and experience of the Council may be useful.

4. Representation has been given on the All-India Council for Technical Education to such professional bodies as the Institute of Engineers, India, the Indian Institute of Architects, the Indian Chemical Society, etc., because of their specialised knowledge in their respective spheres. The Institute of Chartered Accountants, India, is an important professional organisation concerning the profession of accountancy and auditing. The All-India Council for Technical Education is concerned with these subjects and has set up the All-India Board of Technical Studies in Commerce and Business Administration for the promotion and development of commercial education in India. It is, therefore, for consideration whether the Institute of Chartered Accountants, India may be given representation on the All-India Council for Technical Education.

5. In regard to the suggestion of the Executive Committee of the Council of the Institute of the Chartered Accountants, India, that representation on the Coordinating Committee and the All-India Board of Technical Studies in Commerce may automatically follow

the representation on the All-India Council for Technical Education, it is pointed out that the constitutions of the Coordinating Committee and the All-India Boards of Technical Studies do not have such a provision for this. The Constitution of the Coordinating Committee provides for one seat for the nominee of the representatives of the professional associations on the All-India Council for Technical Education to be elected from amongst themselves. So far as the present term of office of the members of the Coordinating Committee is concerned, the representatives of the above mentioned bodies on the Council have already elected their representative. As regards representation on the All-India Board of Technical Studies in Commerce and Business Administration the constitution of the Board provides for four nominees of the Coordinating Committee and the Committee has accordingly nominated the President of the Institute of Chartered Accountants, India on the Board as mentioned in para 1 above.

6. Relevant extracts from the letters of the President of the Institute of Chartered Accountants, India, and of the Ministry of Commerce referred to above are reproduced below :

Extract from letter No. 14. CA (1)/50. dated the 7th October, 1950. from Mr. G.P. Kapadia, President, Institute of Chartered Accountants, India, to Dr. Tara Chand, Secretary, Ministry of Education, New Delhi.

Subject :—All-India Board of Technical Studies in Commerce and Business Administration—Constitution.

The subject referred to above was discussed in detail by the Executive Committee of the Council. It was the unanimous view of the Committee that taking into consideration the status occupied by the Institute in the Commercial world, a representation on the All-India Council for Technical Education should be given to it and by virtue of being a member of the All-India Council for Technical Education, nomination on separate Board and the Coordinating Committee may follow.

I am sure that these recommendations will receive your favorable consideration. In the meantime the offer of nomination to All-India Board of Technical Studies in Commerce and Business Administration is kept pending for consideration by the Council at its next meeting to be held in February 1951.

Extract from letter No. 63 (4)—Law (CA)/49, dated the 17th November, 1949 to State Governments.

Subject :—Institute of Chartered Accountants, India.

I am directed to say that the Institute of Chartered Accountants of India constituted under the Chartered Accountants Act, 1949 has now started functioning. For managing the affairs of the Institute and for discharging the functions assigned to it under the Act, there is a council, which has on it, besides the members elected by the general body of members of the Institute, nominees of the

Central Government including the representatives of Commerce and Industry. The Composition of this statutory Council is such that it is in a position to give useful advice on various problems relating to accountancy, audit, banking law, company law and trade and commerce generally. I am to suggest that the services of the Council in this behalf may be freely availed of whenever necessary. I am further to request that representation may also be given to the Council on all such bodies, as may exist or may be hereafter constituted as are likely to consider matters in which the specialised knowledge and experience of the Council may be of use.

ANNEXURE 2

All-India Council For Technical Education

Sixth (Special) Meeting

MEMORANDUM

Subject :- *Reconstitution of the All-India Boards of Technical Studies*

The term of the present All-India Boards of Technical Studies expires on the 31st December, 1950, and the Boards have to be reconstituted for another term of three years commencing from the 1st January, 1951. In accordance with the resolution of the All-India Council on the formation of the Boards the present constitution of each Board is as follows :

Representative of A.I.C.T.E.	...	1
Nominees of the Coordinating Committee	...	4
Representatives of A.I.T.I.	...	2
Representative of employers	...	1
Representative of employees	...	1
Representatives of professional bodies	...	2
Representative of Inter-University Board	...	1
To be co-opted by the Board itself	...	3
Total	...	15

It is suggested that the Boards may be reconstituted generally on the same lines as before but with certain modifications as indicated below which are considered desirable in the light of experience gained so far :

Representative of A.I.C.T.E.	...	1
Nominees of the Coordinating Committee	...	4
Representative of A.P.T.I.	...	1
Representative of affiliated institutions	...	1
Representatives of Industry, Commerce, Trade etc.*	...	2
Representatives of professional bodies	..	2
Representativs of Inter-University Board	...	1
Experts to be co-opted by the Board itself	...	3
Total	...	15

Note :-(*Where there are no organised associations such as for "Architecture and Regional Planning" and "Applied Arts", the representation shall go to appropriate professional bodies.)

Approval of the Council is sought to the revised composition of the Boards.

ANNEXURE 3

All-India Council For Technical Education

Sixth (Special) Meeting

MEMORANDUM

The All-India Council for Technical Education at its fifth meeting held on the 24th and 25th July, 1950, considered the following item:

Item No. 9- To consider the report of the Sub-Committee of the Coordinating Committee for the establishment of National Technical University.

A copy of the memorandum which was submitted on the above item is appended hereto (Appendix 1) and the views of the Coordinating Committee thereon are shown alongside. The Council after some deliberation accepted in principle the view that it should be a statutory body and not merely a body established by executive authority of the Government. It was, however, decided to defer fuller consideration of the proposal to invest the Council with statutory powers to confer degrees in Engineering, Technology and Commerce to this Special Session.

Appendix I

Copy of Memorandum on item 9 of the agenda for the 5th meeting of the All-India Council for Technical Education.	View of the Coordinating Committee.
To consider the report of the Sub-Committee of the Coordinating Committee for the establishment of National Technical University.	
At its meeting held on the 12th January 1950, the Coordinating Committee on the All-India Council for Technical Education appointed a Sub-Committee to consider the question of establishment of a National Technical University in all its aspects and to report to the Coordinating Committee on the desirability and feasibility of establishing such a University.	The Coordinating Committee recommended that the report of the Sub-Committee with slight modifications as indicated below be adopted by the Council. The Committee further recommended that the Sub-Committee be requested to frame rules for the formation of Committees of courses contemplated under part 5 Section X.

2. The Sub-Committee held two meetings, the first on the 18th March, 1950 and the second on the 15th April 1950 when the following attended :

(1) Dr. J.C. Ghosh

(2) Mr. M.P. Gandhi

(3) Mr. A.N. Khosla

(4) Dr. S.R. Sen Gupta

(5) Mr. J.A. Taraporevala

(6) Mr. G.K. Chandiramani (Secretary)

Dr. Tara Chand, Educational Adviser to the Government of India, participated in the discussions of the meeting held on the 15th April 1950.

3. The Sub-Committee was unanimously of the view that, for the attainment of uniformly high standards of education in Engineering and Technology, it was necessary that institutions not forming part of unitary regional universities be affiliated to one Central Organisation. In course of time, this organisation should develop and have constituent colleges. The organisation itself might also then undertake teaching.

4. The Sub-Committee was further of the view that the All-India Council for Technical Education, with certain changes in the composition and functions, as suggested hereafter, could usefully perform the role of the proposed organisation. The nucleus of such an organisation already exists in the machinery at present conducting All-India Examinations under the aegis of the Council.

5. In consideration of the above the Committee recommended :

(*i*) That a bill be introduced in the Parliament giving the All-India Council for Technical Education the power to confer Degrees in Engineering and Technological subjects on students of colleges not affiliated to regional universities and to hold examinations therefor. The Council should continue to perform the advisory functions also as at present.

(*ii*) That to begin with, the Council should affiliate only such institutions as do not form a part of unitary regional universities. It should be open to such institutions to affiliate for selected courses or all courses. At a future

Para 5 (i) :

(*i*) That a bill be introduced in the Parliament giving the All-India Council for Technical Education the power to confer Degrees, Diplomas and Certificates in Engineering, Technology and Commerce and to hold examinations therefor the Council should continue to perform the advisory functions also as at present.

(*ii*) That to begin with, the Council should affiliate only such institutions as do not form a part of unitary universities. It should be open to the Council to affiliate such institutions for selected courses or all

date, the question of having constituent colleges of the Council may be considered	courses. The Council should have the power to establish constituent colleges.
(*iii*) That in order that the Council may perform the functions of the Court of University, its composition should be as follows :	(*iii*) That in order that the Council may perform the functions analogous to the Court of a University, its composition should be as follows :
1. President of the Council — The President of the Union of India.	1. The Visitor—The President of the Union of India.
2. Vice President of the Council. — An eminent person.	2. The President of the Council
3. Educational Adviser to the Government of India (Ex-officio)	3. The Educational Adviser to the Government of India (Ex-officio)
4. One representative of the Council of States.	4-5. Two representatives of the Council of States.
5-6. Two representatives of the House of the People,	6-10. Five representatives of the House of the People.
7-10. Four representatives of the Central Government.	11-16. Six representatives of the Central Government.
(*a*) Ministry of Communications	(*a*) Ministry of Communications
(*b*) Ministry of Industry and Supply	(*b*) Ministry of Industry and Supply
(*c*) Department of Scientific Research	(*c*) Department of Scientific Research
(*d*) Ministry of Works, Mines and Power	(*d*) Ministry of Works, Mines and Power
	(*e*) Ministry of Railways
	(*f*) Ministry of Defence
11-28. Eighteen representatives of the State Governments (one from each State).	17-34. Eighteen representatives of the State Governments (one from each State).
29-40. Twelve representatives of industry, commerce and labour to be nominated by the President.	35-46. Twelve representatives of Industry, Commerce and Labour to be nominated by the Visitor.

41. One representative of the Inter-University Board.

42. One representative of the Central Advisory Board of Education.

43. President, National Institute of Sciences.

44. President, Association of Principals of Technical Institutions (India)

45. President, Institution of Engineers (India)

46. President, Indian Institute of Architects.

47. President, Indian Chemical Society.

48. President, Central Board of Irrigation and Power.

49-50. Two representatives of the affiliated institutions.

All members of the Executive Committee not otherwise nominated or elected.

Ten nominees of the President (Representatives of the Centrally Administered Areas to be provided here)

(*iv*) That the meetings of the Council may be held once annually and be presided over by the President and in his absence, by the Vice-President and in the absence of both (the President and the Vice-President), by the Chairman of the Executive Committee.

(*v*) That the Coordinating Committee of the Council be designated as the Executive Committee and that its composition be as follows :

1. *Chairman.* To be appointed by the President

47. President of the Inter-University Board.

48. One representative of the Central Advisory Board of Education.

49. President, National Institute of Sciences.

50. President, Association of Principals of Technical Institutions (India)

51. President, Institution of Engineers. (India)

52. President, Indian Institute of Architects.

53. President, Indian Chemical Society.

54. President, Central Board of Irrigation and Power.

55-56. Two representatives of the affiliated institutions.

57-61. Five nominees of the Visitor (Representatives of the Centrally Administered Areas to be provided here along with other interests and all members of the Executive Committee, not otherwise nominated or elected.)

(*iv*) That the Council should ordinarily meet at least once annually, the meeting to be presided over by the Visitor and in his absence, by the President and in the absence of both by the Chairman of the Executive Committee.

(*v*) That the Coordinating Committee of the Council be designated as the Executive Committee and that its composition be as follows :

1. *Chairman.* To be appointed by the Visitor

(For the present, the Educational Adviser to the Government of India be appointed as chairman)	(For the present, the Educational Adviser to the Government of India be appointed as chairman).
2 One member of Parliament.	2 One member of Parilament.
3-6. Four representatives of State Governments (One from each region)	3-6 Four representatives of State Governments (one from each region)
7-8 Two Heads of Engineering and Technological institutions (one of them to be Director, Estern Higher Technical Institute).	7-8 Two Heads of Engineering and Technological Institutions (One of them to be Director, Eastern Higher Technical Institute).
9. One teacher from the affiliated colleges	9. One teacher from the affiliatted colleges.
10-11. Two members elected by the Council	10-11. Two members elected by the Council.
12-14 Three representatives of the Faculties (one each)	12-14 Three Deans of the Faculties (one each)
15-16 Two nominees of the President	15-16 Two nominees of the Visitor.

All members of the Executive Committee should be nominated or elected from amongst the members of the Council.

(*vi*) that the meetings of the Executive Committee be held at least four times a year.

(*vii*) that an Academic Council be consitituted as follows :	(*vii*) that an Academic Council be constituted as follows :
Chairman of the Executive Committee (Ex-offico) —Chairman	Chairman of the Executive Committee Ex-Officio —Chairman
	Deans of the Faculties.
Chairman of all the Boards of Studies.	Chairman of the Committees of Courses.
All Principals of affiliated institutions.	All Principals of affiliated institutions.
Fifteen teachers from affiliated institutions.	Fifteen teachers from affiliated institutions.

One represenentive of the National Institute of Science	One representative of the National Institute of Science.
On representative of the Association of Principals of Technical Institutions (India)	One representative of the Association of Principals of Technical Institutions (India).
Cne representative of the Institution of Engineers (India)	One representative of the Institution of Engineers (India)
One representative of the Indian Institute of Architects	One representative of the Indian Institute of Architects.
One representative of the Indian Cnemical Society	One represenitive of the Indian Chemical Society.
One representative of the Central Board of Irrigation and Power.	One representative of the Central Board of Irrigation and Power.
Ten nomineess of the President to represent other interests.	Ten nominees of the Vistor to represent other interests.

(*viii*) that three Faculties be constituted, each consisting of not more than 20 members.

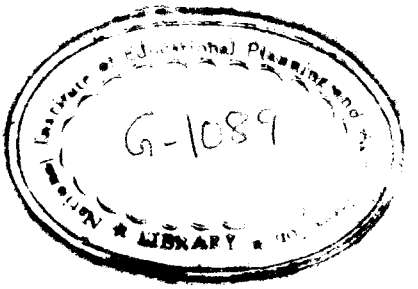
The Faculties may be designated—

(*a*) *Faculty of Engineering* (incorporating the existing Board of Studies in Engineering and Metallurgy)

(*b*) *Faculty of Technology* (incorporating the existing Board of Studies in Chemical Engineering and Chemical Technology and Textile Technology)

(*c*) *Faculty of Applied Arts, Architecture and Business Administration*— (incorporating the existing Boards of

(*i*) Applied Art.
(*ii*) Architecture and Regional Planning.



and (*iii*) Commerce and Business and Administration.)

(*xi*) that the composition of the Faculties be as follows : -

1-5. Members of the Council assigned to the Faculty by the Council—Not more than six.

7-8. Principals of the institutions assigned to the Faculty by the Academic Council.—Not more than two.

9-13. Teachers of subjects assigned to the Faculty by the Academic Council, - Not more than five.

14-17. Other persons on account of their expert knowledge appointed by the Academic Council.—not more than four.

18-20 Persons coopted by the Faculty.—Not more than three.

(*x*) that the faculties should have the power to constitute Committees of Courses, For the present, the following Committees of Courses should be constituted :

Engineering and Metallurgy ;

Chemical Engineering and Chemical Technology ;

Textile Technology ; Applied Arts ;

Architecture and Regional Planning ; and

Commerce and Business Administration.

Such Committees of Courses should consist of not more than 12 members.

(*xi*) that the Executive Committee should have the power to constitute Committees for Recognition.

6. The matter has been examined by the Ministry of Education in consultation with the Central Ministry of Law, who have advised that there would be no legal bar to the introduction of such a bill.

(*xi*) that the Executive Committee should have the power to constitute Committees for Recognition of Institutions and such other committees as may be considered necessary.

A Note on the Powers and functions of the All India Council for Technical Education as a Statutory Body

The All-India Council for Technical Education was set up by a Government of India resolution issued in Navember, 1955, as a result of a recommendation made by the Central Advisory Board of Education that "to stimulate, coordinate and control the provision of educational facilities which industrial development in the post-war period as well as the existing industry will need, there must be an all-India body in supreme charge". This recommendation arose out of the belief that Technical education at higher stages could not, in modern times. be effectively organised on a provincial basis. The Board further recommended that the Council for Technical Education should control policy in Technical education generally and *deal with all Technical institutions above the High school stage except the technological departments of universities.* The Government recognised the need for a planned and balanced development of Technical education and considered that, as a preliminary to such a development, a survey by a single competent body of the existing facilities, and of the probable post-war requirements etc. was necessary and decided that the Council for Technical Education need not immediately be endowed with executive, administrative and controlling powers of any kind, but that its establishment should not be delayed pending agreement on the recommendations of the Board and that the Council should be set up immediately and assigned the task of survey and advice. The Government resolution made it clear that the decision to set up the Council immediately with advisory functions is withont prejudice and at the same time without commitment to the full implementation, at a later date, of the proposals in this behalf of the Central Advisory Board.

2. Three main functions as under were assigned to the Council by the Government resolution referred to above :

(1) Survey of the whole field of Technical education :

(2) Consideration of immediate projects such establishment of Higher Technical Institutions, establishment of Power Engineering courses etc.

(3) Conduct of preliminary investigations with a view to ascertaining the conditions under which the authorities in control of the existing facilities would be prepared to cooperate in an all-India scheme.

3. Under the directions of the council. an exhaustive survey was undertaken and questionnaires were sent out to various institutions, universities and State Governments. The results of this survey have been published and have been very well received. At its first meeting held in April/May 1946 the Council decided that the further work of survey should be carried out by four Regional Committees to be set up under the aegis of the Council, one for the

the East, one for the West, one for the North and one for the South of India. The Committees have not yet been set up but two special officers have been appointed to carry out the preliminary work and proposals are being considered by the Council for setting up the Committees. Meanwhile, the Secretariat of the Education Ministry (Technical Division) have been keeping up-to-date information regarding the intake, the output and other particulars relating to the various courses provided in the different institutions in the country.

4. The recommedations of the Council made from time to time in regard to the immediate implementation of the scheme of development of Technical Education have been found valuable by the Government in allocating priorities and funds for thh various schemes. The scheme for strengthening and improving selected non-government institutions in the country deserves special mention here. As a result of the recommendations of the Council which have been accepted *in toto* by the Central Government, it has been possible for a number of institutions situated in the various parts of India to develop on sound lines and to raise their standards, apart from providing facilities for additional students wherever possible.

5. It was at the first meeting of the Conucil that a decision was taken to set up six Boards of Studies in the following subject :

(*i*) Engineering and Metallurgy ;

(*ii*) Chemical Engineering Chemical Technology ;

(*iii*) Textile Technology ;

(*iv*) Architecture ;

(*v*) Applied Arts ; and

(*vi*) Commerce and Business Administration

These Boards were charged with the responsibility of examining the existing regulations and syllabuses for the award of technical qulifications all over the country and to draw up all India schemes for the award of diplomas and certificates by the Council. Directives were given to the Boards by the Council regarding the standards for the diploma and certificate courses and also with regard to the nature of the courses in general. It was recognised that a new type of course was necessary which, with a lesser academic approach to scientific principles than that of a university degree course in technology, would include at least some fundamental science. It was therefore laid down that the new type of high level courses should be planned to meet industrial requirements with adequate scientfic foundation and that the conditions of entry and the duration of the courses should be comparable to those for universities. Particular emphasis was laid on making the courses more practical than what obtained in the various universities and other institutions and also on the principle of according proper recognition to the day-to-day work of the students during rhe course and not assessing their achievement merely on the basis of a final examination. The need for providing part-time courses of varying standards, from the lowesr to the highest for those already engaged in the industry was also recognised.

The Council noted that the Association of Principals of Technical Institutions had already made a start and was in fact conducting examinations for the award of All-India diplomas. In order that the work already started by the Association of Principals of Technical Institutions might get the necessary impetus and recognition, the Council decided to take over the work of the Association in this respect and charged the various Boards with carrying on this work.

The Boards have done very good work in formulating all-India schemes in the following subjects and most of these have already been approved by the Council from time to time :

(*i*) Civil Engineering

(*ii*) Mechanical Engineering

(*iii*) Electrical Engineering

(*iv*) Metallurgy

(*v*) Commerce and Business Administration

(*vi*) Architecture

(*vii*) Town and Regional Planning

(*viii*) Textile Technology (Cotton, Rayon and Jute)

(*ix*) Applied Art (Sculpture drawing and painting Commercial Art).

(*x*) Chemical Technology

(*xi*) Chemical Engineering

All-India examinations for the award of diplomas and certificates are being conducted at present under the aegis of the Council in

(*a*) Electrical Engineering (Diploma and certificate)

(*b*) Chemical Engineering and Technology (Diploma)

(*c*) Architecture (Diploma and Certificate)

(*d*) Commerce and Business Administration (Diploma and Certificate)

By arrangement with the State Governments, it has been laid down that institutions situated within the boundaries of a particular State could affiliate to the Council for conducting the all-India courses, provided the State Government concerned agreed to such an affiliation. The following institutions are at present affiliated for the conduct of all-India courses :

I. Engineering

1. Delhi Polytechnic, Delhi
2. Government Engineering College, Jubbulpore.

II. Chemical Technology

1. Delhi Polytechnic, Delhi

III. Architecture

1. Bengal Engineering College, Howrah,
2. Delhi Polytechnic, Delhi.

IV. Commerce

1. Delhi Polytechnic, Delhi,
2. City College, Calcutta.
3. Government Commercial Institute, Calcutta.
4. Y. M. C. A. College of Commerce, Madras.
5. Champion Metropolitan College of Commerce, Mysore.
6. S.D. College, Alleppey.

Reports have been prepared by the Council from time to time in regard to the examinations conducted and the results there of.

6. There is a general feeling amongst persons directly connected with Technical education that the time has now come when the recommendations made by the Central Advisory Board of Education in their Plan for Post-War Development in India should be fully implemented i. e. that the Council should now be endowed with executive, administrative or controlling powers and that it should deal with all Technical institutions above the High school standard except the technological departments of the universities. The Council's efforts in the past to ensure Balanced development have met with considerable success. The Council would, however, be in a better position to ensure a balanced and coordinated development of facilities for Technical education if it had a status given to it by statute and also had funds at its disposal for this purpose. It is abundently clear that during its existence over a period of five years the Council has done good work and should continue to develop. At present, it is established by a government resolution which is an executive order. In the interest of future development of Technical education it only seems necessary that the arrangement which now exists by an executive order should be made into one by law.

7. At its last meeting, the Council accepted the principle that it should be made a statutory body. The question arose as to what powers it should have as a statutory body. There will be no two opinions about the desirability of endowing the Council with such powers as are considered neccessary to ensure that the various Technical institutions maintain proper standards. Industrial development is possible only when high standards of education are maintained and employers should have the means of assessing properly the qualifications awarded by institutions. This is only possible when a *Central body* with statutory powers is able to ensure such standards.

Although the responsibility for developing educational facilities rests on the State Governments, because of the fact thae such development involves large expenditure, the State Governments generally have not been able to discharge this function adequately,it has also been observed that while some of the Stath Governments are able to find funds for the purpose others have, for various reasons, been unable to do much in the matter. The result is that development of Technical education has taken place in a manner which is obviously not satisfactory. For development of facilities in the field of education, which caters for the country as a whole and where the products

of the institutions are not intended merely to serve local needs, the supplementing of funds by a central body would ensure proper development. The Council should, therefore, have the power to make grants to various institutions out of the funds that the Central Government may allot to it by way of a block grant, and should have a permanent machinery for assessing the needs of the various institutions for development. The observations made by the Central Advisory Board of Education in their plan for post-war educational development in India may be quoted :

> "This Council will control policy in Technical education generally and deal with all Technical institutions except the Technological Departments of Universities and Technical High schools and Junior Technical schools, which, since they have a purely educational as well as a pre-vocational function, should remain part of the ordinary provincial system. It is a corollary to this proposal that the whole cost of Technical education apart from the exceptions mentioned above should be borne by the Central Government."

The Council has already set up a machinery for affiliating institutions and for providing instruction for a distinct type of courses framed by the various Boards referred to above. It also conducts examinations for the award of All-India Diplomas and Certificates. The need for providing such courses and facilities as distinct from the courses of universities has been recognised. It would be a great pity if, on account of the prejudices which generally prevail concerning diplomas in contrast to degrees, the good work done by the Council in this direction is paralysed. While the courses framed by the Council have given complete satisfaction to those who undergo training in them, their complaint has been that they have not received proper recognition from the employers who ordinarily set a higher premium on degrees. The Union Government and most of the State Governments, however, have issued orders giving recognition to All-India Diplomas as equivalent to degrees for the purpose of appointment to posts for which a university degree has been prescribed as the minimum qualification. In so far as recognition of the Diploma by the industry is concerned, the situation can be met in two ways :

(*a*) by making industry appreciate the value of the All-India Diplomas by a country-wide propaganda in favour of these courses ;

(*b*) by granting degrees to students who pass the present All-India Diploma examinations.

The former course is one which requires great effort and will take time to achieve the desired result. The latter course would enable immediate achievement of the objective. There ought to be no objection to this proposal as the courses framed for the All-India Diplomas are in no way inferior to those for university degrees.

The Inter-University Board has laid down the possession of a degree as a necessary pre-condition in the matter of provision of

facilities for advanced work in universities. Thus, persons not possessing degrees awarded by statutory universities are required to pass the degree examination of a university in order that they may be eligible for consideration for admission to advanced courses. The effect of the resolution of the Inter-University Board is to create in the minds of students the feeling that the degrees are in some way superior to diplomas. The power to grant degrees to students who have completed courses in affiliated institutions would therefore appear to be necessary. It may be mentioned that,] by granting this power to the Council, all that is being done is to put on a regular footing what is being done already by it.

The main powers and functions of the Council as a statutory body will. therefore, be :

(i) to coordinate facilities in Technical education in the country and to ensure proper standards ;

(ii) to develop Technical institutions in the country by giving suitable grants (with proper machinery provided to assess the needs and to ensure judicious spending) ; and

(iii) to confer degrees, diplomas and certificates on students undergoing courses in affiliated institutions. (Institutions forming part of Unitary Universities would not be permitted to affiliate to the Council.)

8. Objections have been raised in certain quarters to the suggestion that the Council should be endowed with the power to grant degrees in technological subjects. The main grounds of objection are :

(*i*) That such a power granted to the Council would cut across the principle of territorial jurisdiction of universities already in existence.

(*ii*) That it is not desirable to establish a university in technical subjects only, as universities should be more comprehensive and should have many faculties to justify their being called universities and that in the interests of technological studies, such studies would benefit greatly if they are carried on where scientific studies in other fields and in the fundamental sciences are being carried on.

The following information relating to the practices in different countries of the world and the problems concerning Technical education in some of them will answer the above objections.

United Kingdom

Some time back, a suggestion was made by the Percy Committee and endorsed by the Scientific Man-power Committee that the Technical colleges should be upgraded so as to be able to train students up to the same standard as that of the university first degree and that such qualifications should be guaranteed by some national body as conforming to national standards. It was suggested that the appropriate national body for this purpose would be a National Council of Technology.

More recently, the National Advisory Council on Education for Industry and Commerce appointed by the Minister of Education, U K,. has reported on the "Future Development of Higher Technological Education" and has tackled the various problems confronting the U.K. in this field. According to the report submitted by the National Council, the essential requirements in the U.K. are :

(1) The development of advanced courses at the "first award" and "post-graduate" levels conducted in an atmosphere of freedom and experiment. The courses should be planned to meet industrial requirements with adequate scientific foundation ; the conditions of entry and the duration of the courses should be comparable to those for universities.

(2) Radical improvement is necessary in the accommodation, equipment and financing of Technical colleges, and in the salaries and conditions of teachers employed. The colleges undertaking this advanced work should be allowed, as soon as conditions permit, to transfer more elementary courses to other institutions.

(3) An inducement is necessary in the shape of a suitable award to encourage students to undertake these advanced courses. At present the only awards are the external degrees of London University in a limited number of technologies, the awards of other external examining bodies, and awards made by the colleges themselves.

(4) A suitable body, which carries prestige and will ensure high standards, is required to make this award.

While agreeing that the universities have a specific function to perform in the development of Technological education and that their work should be more closely related to fundamental science than to that of the Technical colleges, the Council considers that the Technical colleges should provide more high-level courses of degree standard and courses for post-graduate work. The Council also feels that a suitable award is necessary to encourage students to undertake these advanced courses and that this should be made by a central body called the "Royal College of Technologists". The Council has recommended that the Royal College should be a self-governing independent corporate body and should consist of a Court assisted by a Council and an Academic Board. Further, both the Council and the Academic Board should have the power to establish sub-committees including in the case of Academic Board, Boards of Studies. The Council has stressed the need for developing new courses and the need to improve the conditions of Technical colleges.

United States of America

Within the territorial jurisdiction of a university, Technical institutions enjoying the status of universities award graduate, post-graduate and doctorate degrees in technological subjects. The Massachusetts Institute of Technology and the California Institute of

Technology are two such examples. In the city of New York, there are as many as five universities.

Czechoslovakia

In Prague, there are three universities :

(*i*) the Charles University having the Faculties of Theology, Medicine, Philosophy and Pedagogics ;

(*ii*) the University of Political and Social Sciences ; and

(*iii*) the Technical University having the Faculties of Constructional Engineering, Architecture, Civil Engineering, Mechanical Engineering, Chemical Engineering. Agriculture and Forestry.

Yugoslovia

There are universities solely devoted to Technical studies *viz.*, Belgrade, Lgublgana and Sagreb.

Sweden

There are two universities solely devoted to technology *viz.*, the Charles University of Technology and the Royal Institute of Technology.

Western Europe

There are universities for Humanistic Studies. Side by side there are the 'Technische Hochschules' performing functions and enjoying privileges of universities.

The Zurich Polytechnic, the 'Technische Hochschules' in Berlin, tuttagart and Copenhagen are some of the examples of such leading institutions.

Existence of Technical universities or equivalent institutions in a number of countries and the tendency to bring them into being in other countries clearly indicate that the objection of territorial jurisdiction has no real significance.

The suggestion that it is not desirable to establish universities for technical subjects only has been refuted by many authorities. While the need for including Humanistic Studies in the curricula of technical courses has been strongly emphasised (Incidentally, this has been taken care of in the schemes framed by the All-India Council for Technical Education through their Boards of Studies), it has been considered desirable by some authorities that instruction for technical qualifications be provided separately. In this connection, it would be interesting to note the observations of Lord Cherwell when discussing the case of a Technical university in the U.K.

> *Cross Fertilisation* : "It is often objected that undergraduates in an engineering university would lose a great deal by not rubbing shoulders with undergraduates reading for arts degrees. This claim is really rather ingenuous. Men reading for engineering degrees in the modern world have precious little time or

occasion to rub shoulders with their arts colleagues except in residential Universities like Oxford and Cambridge. The fact that a student at the Imperial College is a member of the University of London is really seldom the reason why he may care to broaden his mind by discussing theological questions with students of King's College. He associates mainly with the people working in his own department. And if occasionally undergraduates from the various constituent colleges of London University meet at dramatic societies and dances, does this contribute materially to a wider and more humane outlook ?"

And again discussing Liberal education later, Lord Cherwell says :

"What counts is whether an institution is a place of learning, not which particular subjects are practised, and learning can exist just as well in a modern technical university as in some of the more ancient foundations."

The Times Educational Supplement in its editorial dated Friday, 3rd June 1950 said :

"A final powerful argument for the technical university is that it would allow the whole business of technological education to be reviewed and experimented in as a whole. One grows exasperated to hear claims on behalf of the humanizing influence of ordinary universities or technologists. These claims are made by members of universities who, for all the attempts to broaden a technologist's education, have never themselves gone farther than sponsoring odd sets of voluntary lectures on general themes. When these are arranged they are praised, and rightly, for they are better than nothing ; but it is impossible to accept what has so far been done along these lines in British Universities to consider themselves as the proper home of all higher technology. Viewed as engineers solely, the products of British Universities may possibly stand comparison with those of any in the world, but in general education, which of all things might have been expected from the academic connexion, those who know them best say they are far behind. This failure of the universities to educate technologists is not the least of reasons for expecting great improvements in the lively atmosphere of a new technological institution."

9. The fundamental problem in technological education is the training of men with first class ability to fill to the best advantage the varied technological posts in the fields of production, invention, design, research and management in industry, and the adaptation of the present educational framework to meet the needs of the industry and the individual to the full.

A technologist of first class ability concerned with the productive side of an industry is as vital to that industry's health and progress as a similarly able technologist whose main interest lies in development, research or design. While their initial education

may emphasise differing aspects of the broad field of technological knowledge. both men should be regarded by industry as having equal claims for promotion to the highest posts of management and control.

Within the wide range of educational provision for technology, both universities and Technical colleges will play most important parts. Their respective contributions may differ in type but are complementary in character. The distinctive feature of the Technical college is that the main emphasis in its courses is on the practical application of scientific principles to design and production. There is an urgent need for the provision of new courses in the colleges more readily adaptable to the changing techniques of current industrial production than are the normal types of university courses. For reasons both practical and psychological however, the whole question of new courses is inextricably bound up with the award to be granted at the end of such courses which shall connote an appropriate standard at least equivalent to university degree courses and be so recognised.

The proposal to endow the Council with powers to grant degrees does not suggest that the universities will cease to perform the functions that they have been performing in respect of Technological education. If in progressive countries like the U K., the U.S.A., and Continental countries, Technical education could be imparted in several ways, there is no reason why the new and distinctive type of courses devised by the Council should not be given recognition in the shape of conferment of degrees.

10. As has been already stated, courses exist and examinations are conducted and the power now sought to be given to the Council merely aims at giving the qualifications due status and recognition to enable the students going out of the colleges to take their rightful positions in industry. It has also to be recognised that there exist in India institutions of a specialised character, such as the Indian School of Mines which would welcome such a move whereby degrees are awarded to their students by a Central National Body.

11. The decision to set up Regional Committees of the All-India Council for Technical Education which would have the power to conduct All-India Examinations and to maintain proper standards in the institutions falling within the all-India scheme visualises the proposed development. Wherever in a region, sufficient number of institutions participate in the All-India scheme, supervision of the courses of study and examinations would be the responsibility of the Regional Committees or perhaps Regional Technical Universities. These universities might grow round the Higher Technological Institutions proposed to be established or already existing. It is not the intention of the scheme to superimpose a system of external examinations on an all-India basis which will dominate training in institutions. It is, in fact, intended that the institutions, when properly upgraded, enjoy the greatest possible freedom for experiment on the part of the teachers

and for research on the part of the students and staff to develop specialised types of teaching to suit the overgrowing needs of the subjects under their purview. It is visualised that, in due course, the various institutions would conduct their own examinations on the basis of which degrees and diplomas of the Council may be awarded. The Council will, no doubt, establish a machinery to ensure that the instructions and the examinations conducted by the various institutions are up to the required standards. The step now proposed is the first stage of this development.

ANNEXURE 5

ITEM NO. 6 OF AGENDA

All India Council for Technical Education

Sixth Special (Meeting)

Memorandum

The All-India Council for Technical Education at its meeting held on the 24th and 25th July, 1950, considered the following item:—

Item No 16. To discuss the draft bill for the Registration of Engineers in India.

A copy of the memorandum which was submitted on the above item is appended hereto.

The Coordinating Committee of the Council had considered the memorandum at its meeting held in May, 1950, and had expressed the following views :

> "The Committee recognised the necessity for a measure of this kind so that engineers may be registered. The Committee was, however, of the view that a separate Council as contemplated in the bill was unnecessary and that the All-India Council for Technical Education could perform this function. A bill is proposed to be introduced to give statutory powers to the Council and this additional function could be included in the list of functions. The matter would be considered by the Council at its next meeting".

The Council after some discussion had decided that the views of the Institution of Engineers (India) should be made available to the members and that further discussion be deferred to this Special Session. The views of the Institution are still awaited and it is hoped to make them available to the members before the meeting of the Council.

It was hoped that members directly interested would communicate their views to the Secretary of the Council. The latter has, however, not received any such communication.

Memorandum

Memorandum on Item 16 of the Agenda for the fifth meeting of the All India Council for Technical Education.

Item No. 16. To discuss the draft bill for the Registration of Engineers in India.

The Government of India in the Ministry of Works, Mines and and Power propose to enact a bill for the regulation of the profession

of engineers in India. A summary of the essential provisions of the Bill is given below :

Objectives

Whereas it is expedient to provide for the regulation of the profession of engineers and for that purpose to establish a Council of Engineers, it is hereby enacted as follows :

CHAPTER I

PRELIMINARY

1. Short Title, Extent and Commencement

This Act may be called the Engineers' Act, 1949. It extends to all the provinces of India and also to other acceding States to the extent to which the Dominion Legislature has power to make laws for that State with respect to the matters dealt with in this Act. It shall come into force in any province or acceding State on such date or dates as the Central Government may, by notification in the official gazette, appoint.

2. Intermediate

In this Act "Council" means the Council of Engineers of India. constituted under (1) above ; "Prescribed" means prescribed by rules or regulations made under this Act ; "Recognised Qualification" means any engineering qualification specified in the first or second schedule ; "Register" means the Register of Engineers maintained under the Act ; "Registered Engineer" means any person possessing any of the recognised qualifications whose name is, for the time being, entered in the Register.

CHAPTER II

THE COUNCIL OF ENGINEERS OF INDIA

3. Constitution and Composition of the Council.

The Central Government may, as soon as possible, constitute a Council consisting of the following members :

(*a*) one member elected by the members of the Senate of each of the universities in the Provinces of India or acceding States having a Faculty of Engineering ;

(*b*) one member elected by the members of the Governing Body of each of the engineering institutions specified in the first schedule ;

(*c*) one member elected by the Registered Engineers from each of such regional constituencies as may be specified in this behalf by the Central Government, by notification in the official gazette.

(*d*) ten members nominated by the Central Government ;

(*e*) ten members nominated by the Council of Institution of Engineers (India)

(*f*) one member nominated by each Provincial Government ; and

(*g*) nine members chosen to represent the acceding States in the prescribed manner.

4. The Council shall be a body corporate by the name of the Council of Engineers (India) having perpetual succession and a common seal with power to acquire and hold property, both movable and immovable, and shall by the said name sue or be sued.

5. There shall be a President and a Vice-President who shall be elected by the members of the Council from among themselves in the prescribed manner ; provided that for one year from the first constitution of the Council after the commencement of this Act, the President shall be a person nominated by the Central Government from among the members of the Council who shall hold office during the pleasure of the Central Government.

6. Office and Servants of the Council

The Council shall appoint a Registrar who shall be the Secretary to the Council and shall have such powers and perform such duties as may be assigned by or under this Act. The Council may also appoint such other officers and servants as it seems necessary to enable it to carry out its functions under this Act.

The Council may constitute from among its members an executive committee and such other committees as the Council deems necessary to carry out the purposes of this Act.

CHAPTER III

REGISTRATION OF ENGINEERS

7. Qualifications for Entry of Names in the Register

Any of the following persons shall be entitled to have his name or the name of the association entered in the Register :—

(*a*) any person who possesses any of the recognised qualifications provided that in the case of any person who is not domiciled in India the Council may prescribe such further conditions as it may think fit ;

(*b*) any person who possesses any of the qualifications specified in the 3rd schedule and who is not less than 30 years of age ;

(*c*) any firm or company or association or other body of individuals, whether incorporated or not, which is engaged in the business of engineering, provided that the business of such association in so far it relates to engineering is under the control, management and supervision of a Registered Engineer.

8. Description of Persons Whose Names are Entered in the Register

(*a*) Any person possessing any of the recognised qualifications shall, on his name being entered in the Register, be entitled to take and use the words "Registered Engineer" after his name as part of the description of his professional status.

(*b*) Any person possessing any of the qualifications specified in the third schedule shall, on his name being entered in the Register, be entitled to take and use the words "Associate Registered Engineer" after his name as part of the description of his professional status.

9. Effect of Non-registration

(*i*) After the expiration of one year from the coming into force of this Act :

(*a*) no certificate required by or under any law from an engineer shall be valid unless it is granted by a Registered Engineer ;

(*b*) no suit or proceeding for the recovery of any fee, reward or emoluments for or in respect of any work done as an engineer shall be instituted in any court by or on behalf of any person unless that person has his name entered in the Register.

(*ii*) After the expiration of two years from the coming into force of this Act, no person other than a Registered Engineer shall, except with the sanction of the Central Government, hold any appointment as an engineer under the Central or Provincial Government or the Government of an acceding State, or in any school, college, university, or other institution which is supported either wholly or partially by public or local funds.

10. Power to Acquire Information as to the Course of Study, Training and Examinations

The Council may require every institution, which grants any recognised qualification specified in the first schedule, to furnish all information as to the course of study, training and examinations to be undergone for obtaining such qualifications and as to any other matter connected therewith.

11. Inspection and Examinations

(*i*) The Council may appoint as many inspectors as it deems necessary to attend to any examination held by the institutions which grant recognised qualifications specified in the first schedule.

(*ii*) Inspectors appointed in (*i*) above shall submit reports to the Council on the sufficiency of every examination to which they attend and of any other matter with regard to which the Council may require them to report provided that such inspectors shall not in any way interfere with the course of examinations.

12. Recognition of Qualifications

Any authority or institution in a Province of India or an acceding State which grants an engineering qualification not specified in the first schedule may apply to the Central Government to have such a qualification recognised; and the Central Government after consulting the Council and after such other inquiry as it may think fit, may, by notification in the official gazette, amend the first schedule so as to include such qualification therein.

13. Withdrawal of Recognition

(*i*) When the Council is satisfied after such inquiry as it thinks fit that the course of study, training and examination of an institution which grants any recognised qualification specified in the first schedule are not such as to make persons obtaining such qualification fit to be Registered Engineers, the Council may submit a report to the Central Government recommending the withdrawal of the recognition from such institutions.

(*ii*) The Central Government may, after considering the report of the Council and making such further inquiry as it thinks fit, withdraw, by notification in the gazette, recognition from that institution on such terms and conditions and for such period as it thinks fit, and the first schedule shall be deemed to be amended accordingly.

14. Qualifications Granted Outside India

(*i*) Where the Central Government is satisfied after consulting the Council and making such inquiry as it thinks fit that an engineering qualification granted by any authority in any country outside India is of such a standard as to make the persons obtaining such qualifications fit to be Registered Engineers, the Central Government may, by notification in the gazette, amend the second schedule so as to include such qualification therein.

Provided that no person other than a person domiciled in India possessing such qualifications shall be qualified to have his name entered in the Register unless by the law and practice of that country persons domiciled in India are permitted to enter and practice as engineers in that country.

CHAPTER IV

REGISTER

15. The Council shall maintain in the prescribed manner a Register of Registered Engineers which shall include the following members :

(*a*) In the case of persons other than an association—his full name, date of birth, domicile, residential and professional addresses, the date on which his name is entered in the Register, his qualifications, and any other particulars which may be prescribed.

(*b*) In the case of an association its corporate name, if any, or a name by which it is commonly known, its address, and any other particulars which may be prescribed.

16. The Registrar shall in every year on or before a date to be fixed in this behalf by the Council cause to be printed and published in the prescribed manner a list of the names and qualifications of all persons (including associations) for the time being entered in the Register with such particulars as have been prescribed and on the publication of such a list the previous lists, if any, should be deemed to be superseded. Every court or authority shall presume that the latest list published under the Act is correct and that any person whose name is not entered in the list, is not a Registered Engineer.

CHAPTER V

REGIONAL COUNCIL

17. Constitution and Functions of Regional Councils

(i) The Council may constitute such Regional Councils as and when it deems fit for one or more of the Regional constituencies that may be specified by the Central Government.

(ii) The Regional Councils shall be constituted in such a manner and exercise such functions as may be prescribed.

CHAPTER VI

MISCELLANEOUS

(i) The members of the Council and the officers and servants of the Council should be deemed to be public servants within the meaning of the Indian Penal Code.

The Central Government may, by notification in the official gazette, make rules to carry out the purposes of this Act.

SCHEDULES

The first Schedule

(See paragraphs 2, 12, and 13)

Recognised qualifications granted in the Provinces of India and acceding States.

1. Recognised Engineering Qualifications.	2. Engineering Institution.	3 Abreviation for Registration	4. Remarks.

The Second Schedule

(See paragraphs 2 and 14)

Recognised Qualifications granted outside India.

The Third Schedule

(See paragraphs 7 (b) and 8 (b)

The views of the Council are sought on the draft provisions of the proposed bill.

ANNEXURE 6

Item No. 7 of the Agenda

TRAINING
IN
INDUSTRIAL ADMINISTRATION AND BUSINESS MANAGEMENT

REPORT OF

THE JOINT COMMITTEE ON INDUSTRIAL ADMINISTRATION AND BUSINESS MANAGEMENT
OF
ALL- INDIA BOARDS OF TECHNICAL STUDIES.

OCTOBER 1950.

INTRODUCTION

At its meeting held on the 22nd April, 1948 the All-India Council for Technical Education resolved that Joint Committee representing the All-India Boards of Technical Studies in Engineering, Commerce. Chemical Technology and Textile Technology should be constituted for the purpose of examining the question of training in Industrial Administration and Business Management and to prepare a scheme for organising such training in the country.

In pursuance of the above resolution a Joint Committee representing the All-India Boards of Technical Studies was set up in December, 1948. Subsequently, it was thought desirable to enlarge the composition of the Committee so as to include some prominent industrialists as well as representatives of the Ministries of Finance and Home Affairs of the Government of India. The present composition of the Committee is as follows :—

1. Sir J. C. Ghosh, (Chairman)
   Director, Indian Institute of Technology,
   Kharagpur,
2. Mr. S. B. Bapat,
   Joint Secretary and Principal,
   Indian Administrative Staff
   Training Centre,
   Ministry of Home Affairs,
   New Delhi.
3. Sir A. Paul Benthall,
   c/o Bird & Co..
   Calcutta.

4. Mr. M. S. Bhatnagar,
   Joint Secretary,
   Ministry of Finance,
   New Delhi.

5. Prof. M. P. Gandhi,
   c/o Gandhi & Company.
   Bombay.

6. Sir Jehangir J. Ghandy,
   Resident Director,
   The Tata Iron and Steel Co., Ltd.
   Jamshedpur.

7. Mr. P.N. Joshi,
   Principal, Victoria Jubilee Technical Institute,
   Bombay.

8. Mr. A. N. Khosla,
   Chairman, Central Water Power Irrigation and Navigation Commission,
   New Delhi.

9. Mr. K.M. Naik,
   Director, Associate Industries Ltd.,
   Calcutta.

10. Mr. S.D. Oke,
    Manager, Jam Mills,
    Bombay.

11. Mr. Shri Ram,
    New Delhi.

12. Mr. C.R. Rao,
    Technical Adviser,
    The Tata Chemical Company Ltd..
    Bombay.

13. Dr. S.R. Sen Gupta,
    Principal, Bengal Engineering College,
    Calcutta.

14. Mr. J.A. Taraporewala,
    Joint Director of Technical
    Education, Government of Bombay,
    Bombay.

15. Mr. L.S. Chandrakant, (Secretary)
    Asst. Educational Adviser,
    Ministry of Education,
    New Delhi.

At its first meeting held on May 11, 1950 the Joint Committee decided to set up a Sub-Committee consisting of the following:

1. Sir Jehangir J. Ghandy (Chairman)
2. Sir A. Paul Benthall

3. Mr. Ashoke Chatterjee,
   Economic and Social Welfare Adviser,
   Martin Burn Ltd.,
   Calcutta.

4. Mr. D.C. Driver,
   Deputy Agent, Tata Iron and Steel Company Ltd.,
   Calcutta.

5. Mr. D.K. Sanyal,
   Head of the Department of Social Welfare,
   Calcutta University,
   Calcutta.

6. Mr. P.F.S. Warren,
   Chairman, Jessop and Co. Ltd.,
   Calcutta.

7. Mr. H.N. Nanjundiah, (Secretary)
   Officer on Special Duty,
   Indian Institute of Technology,
   Kharagpur.

to prepare a scheme for the Eastern Region of India on training in Industrial Administration and Business Management with special reference to the facilities to be provided for such training at the Indian Institute of Technology at Kharagpur

The Sub-Committee submitted its report in July, 1950 which was considered by the Joint Committee at its second meeting held on October 6, 1950. The Joint Committee generally approved of the report and adopted it with certain modifications. The report of the Sub-Committee is presented in the following pages. The Modifications subject to which the Joint Committee adopted the report are given as foot notes.

CALCUTTA SUB-COMMITTEE ON TRAINING IN INDUSTRIAL ADMINISTRATION AND BUSINESS MANAGEMENT

Members of the Sub-Committee

Sir Jehangir J. Ghandy, C.I.E.,
Director, Tata Industries Ltd.
Calcutta. (Chairman)

Sir A. Paul Benthall, K.B.E,
Dy. Chairman, Bird and Co. Ltd., and F.W. Heilgers Co. Ltd., Calcutta.

Mr. Ashoke Chatterjee, B.A. (Cantab).
Economic and Social Welfare Adviser, Martin Burn Ltd., Calcutta.

Mr. D.C. Driver, M.A. (Cantab), Bar-at-Law,
Deputy Agent, Tata Iron and Steel Co. Ltd.,
Calcutta.

Mr. D.K. Sanyal. M.A., O B.E.,
Head of the Department of Social Work and Secretary to the Appointments and Information Board, Calcutta University, Calcutta.

Mr. P.F.S. Warren, B.A. (Cantab), Mech. Sc. Tripos, A.M I.C.E., A.M.I.E. (India).
Chairman, Jessop and Co., Ltd.,
Calcutta.

Mr. H.N. Nanjundiah, B.E., M.S. (Columbia),
Officer on Special Duty, Indian Institute of Technology,
Kharagpur. (Secretary).

Terms of Reference

'To prepare a scheme for the Eastern Region of India on Training in Industrial Administration and Business Management with special reference to the facilities to be provided for such training in the Indian Institute of Technology at Kharagpur."

ORGANISATION
OF
TRAINING IN INDUSTRIAL AND BUSINESS MANAGEMENT
IN
THE EASTERN REGION OF INDIA

CONTENTS

Summary of Main Recommendations

1. All undergraduate students in Engineering, Technological and Commercial colleges should be introduced to management subjects, and for this purpose, suitable elementary courses should be taught during the final year or two years of their undergraduate studies. The content of these courses should be standardised in all institutions. (Para 5 and 6).

2. Facilities should be provided for the immediate institution of a programme of part-time day and evening courses in management subjects at selected universities, starting with the Calcutta University, and the Government of India should be requested to consider rendering all possible assistance to the Calcutta University in the early implementation of this programme. (Paras 7 and 8).

3. A post-graduate department for training exclusively in Industrial and Business Management may be set up at a place near Calcutta, say Barrackpore, as an organ of the Indian Institute of Technology at Kharagpur. (Paras 9 to 12).

4. As an alternative, a post-graduate department of Industrial and Business Management should be set up at the Indian Institute of Technology at Kharagpur at an early date. (This alternative has been developed in detail in this Report, as we have been specially charged to do so, according to our Terms of Reference). (Paras 13 to 49).

5. Short-term refresher courses in management subjects should be arranged during the vacation periods at the Indian Institute of Technology at Kharagpur for the benefit of junior executives in business and industry. Government officers and labour leaders. (Paras 50 and 51).

6. As a long-term plan, there should be at least one Administrative Staff College for each of the Northern, Southern, Eastern and Western regions of India, established on the lines of the Administrative Staff College in London. (Paras 52 and 53).

7. The assistance of Chambers of Commerce and other Industrial, Professional and Trade Associations of this region, should be sought for the purpose of ascertaining all possible ways in which the business and industrial community could cooperate with the All-India Council for Technical Education in the scheme of training for management, (Paras 54 and 55).

I. **Introduction**

1. Considering the scope of the terms of reference of the Sub-Committee, we feel that the time made available to us is far too short for the preparation of a comprehensive enough report, covering all the ramifications of training in Industrial Administration and Business Management. We may mention that the Percy Committee and the Urwick Committee who were entrusted with similar work in the United Kingdom took about a year to complete their reports. Limited by the time factor, we have, of necessity, been constrained to confine ourselves to an indication of the nature of the problem and the broad lines along which its solution should be attempted, so that speedy results may be obtained.

2. The supreme need for increasing production and raising the standard of living of our people by improving the efficiency of manufacturing and distributive processes calls for specially trained personnel in management at all levels and in all fields. We need

not mere scientists and technologists but "Scientists and Technologists who can also administer and organise" and we need them in larger numbers than ever before. It must be remembered that a majority of men who possess technical qualifications engage at a later date in managerial functions.

3. The observations made by the University Education Commission appointed by the Government of India in their report published during 1949 in respect of the training of Engineer Administrators, Executives, etc., are worthy of notice in this connection, relevant extracts therefrom being reproduced in Appendix 'K' for reference.

4. The following remarks of the Percy Committee in 1945 concerning the need for education in management in the United Kingdom are, in our opinion, fully applicable to our country at the present time :

> "The highly trained technician is often ignorant of the principles of industrial organisation and management and that he often shows no inclination to accept administrative responsibility. Admittedly there is much that can be learnt in this field only from experience; but there is a body of knowledge, awareness of which may greatly facilitate the process of learning. This body of knowledge should be made available both at the undergraduate and the post-graduate stages.
>
> "At the undergraduate stage, we do not suggest any elaborate study of such subjects as Scientific Management, Industrial Psychology, Costing Systems, Methods of Wage Payments, but we are convinced that the ignorance of the main findings of these studies is a real handicap to men who would otherwise be highly qualified for administrative work. The practical difficulties are real and we fully recognise them. The body of knowledge which we have in mind can be taught only by those who have a thorough practical and theoretical grasp of it ; and the present literature on this subject in this country is generally of a poor quality, lacking the intellectual content of a sound mental discipline. But these difficulties cannot justify almost the complete avoidance, in the academic courses of technicians, of subjects the ignorance of which is a severe handicap to them in later business life. It is an extravagant waste of talent to forego this large potential source of able administrators."

II. Undergraduate Studies

5. Drawing upon the experience in industrially advanced countries like the United Kingdom and the United States of America, we are convinced that there is plenty of scope for organised education for management and that youngmen who reveal aptitude for managerial work can be better prepared by such education to take up responsible managerial positions in industry and business. This task, however, of detecting the aptitude for managerial work in young men

and giving them the appropriate education and training to develop such aptitude into a profession is by no means an easy one. We feel that this task can be greatly facilitated by introducing students in Engineering, Technological and Commercial colleges to management subjects with a broad coverage during the final year or two years of their undergraduate courses.

6. There is a feeling that the present system of Commercial education in this country does not have sufficient practical bias to equip the students passing through such institutions for managerial careers in business. To assess the extent of justification for this feeling, a thorough investigation into the nature of the courses offered and their contents, the standard of instruction prevailing in various institutions, the importance given to managerial subjects, etc., would be necessary. To this end, an organised opinion survey may be profitably conducted by interviewing various educational and employing authorities. In any event, it is necessary to replace the present uncoordinated "action by individual authorities by some planned and agreed arrangement". The All-India Council for Technical Education should address itself to this problem at an early date and devise measures for the eradication of the existing deficiencies in this regard. The All-India Board of Technical Studies in Commerce and Business Administration should be requested to include in the comprehensive survey, which it proposes to carry out on the state of commercial education in the country, that important aspect which relates to Business Management so that the existing deficiences in respect of the scope and content of commercial courses relating to Business Management may be brought out and suitable measures for their eradication devised.

III. Part-time Day and Evening Studies

7. The most effective way, in our opinion, of promoting education in management subjects is to provide opportunities for part-time day and evening studies for the benefit of large numbers of junior executives who work in business and industry in the metropolitan districts of large cities like Calcutta. Such opportunities can best be provided at centres which are linked by convenient means of transport with where the majority of the candidates reside. We are confident that business firms would grant part-time day release at their discretion to such of their junior executives as decide to study management subjects on a part-time day basis.

8. In view of what has been said before, we strongly recommend that facilities should immediately be provided for instituting a programme of part-time day and evening courses in management subjects at the Calcutta University as detailed in Appendix 'A' and that the Government of India should render all possible assistance to the Calcutta University in the early implementation of this programme. While organising the programme of part-time day and evening courses in management subjects at the Calcutta University, the attention of the University should be invited to the necessity of making proper selection, on all-India basis, of junior executives in business firms for undergoing the part-time course.

IV. Post-Graduate Studies

9. Concerning the organisation of post-graduate studies in management subjects at the Indian Institute of Technology at Kharagpur, we feel that Kharagpur may not be an ideal location for the purpose of such studies for reasons indicated below :

(*i*) The distance of Kharagpur from Calcutta would make it somewhat difficult for the students to visit industrial and business firms as frequently as they should in connection with their training for management.

(*ii*) Industrial and business executives who are experts in specific fields of management may not find it convenient to visit Kharagpur often enough and give lectures in their specialised fields to post-graduate students.

10. The above objections, however, can be largely overcome if, as stated in paragraph 22 later, Wednesdays (instead of Sundays) are observed as weekly holidays in the Institute. In that case, the students may undertake visits to industrial and business firms on Wednesdays and the visiting lecturers may visit Kharagpur on Sundays.

11. It should be remembered that the special capacity for the "application of general principles to particular problems of production and utilisation" required of Management personnel can best be developed if they 'live' in an environment of business and industry while undergoing training. In any balanced scheme of education in management studies at post-graduate level, it is therefore necessary that practical experience should not only precede, but also accompany and follow such studies.

12. On a balance of considerations, we feel that it might have been more convenient, if it were possible to set up the Post-graduate Department of Industrial and Business Management at a place near Calcutta, say Barrackpore, as an organ of the Indian Institute of Technology at Kharagpur, rather than at Kharagpur. In view of the fact that residential college facilities are an essential pre-requisite for its successful working, the Department of Industrial Administration and Business Management should be located at Kharagpur in the Indian Institute of Technology and the question of locating it in Calcutta or in the suburbs of Calcutta should be considered by the Governing Body of the Institute.

13. But, as, according to our Terms of Reference, we have been charged to prepare a scheme with special reference to the facilities to be provided for training in Industrial and Business Management at the Indian Institute of Technology at Kharagpur, we set forth in the succeeding suggestions concerning the organisation of a department for this purpose at Kharagpur.

14. We are agreed that the department should be started on a graduate basis, offering courses in Industrial Engineering, Business

Management and Industrial Administration, with the object of training men ultimately to occupy responsible managerial positions in industry and business.

15. Post-graduate studies in management subjects are best undertaken by men with high intellectual capacity, a liberal outlook on life, seriousness of purpose, maturity, interest in administrative problems and leadership potentialities. Besides, the standard of general education required of candidates should be that of a university degree or any other equivalent qualifications, before they are admitted to pursue advanced studies in management subjects. In addition to the various qualifications stated, resourcefulness, sense of responsibility and ability to come to quick decisions should also be included.

16. Men with high academic achievements and at least two years' experience in business or industry are likely to benefit most from the formal instruction in such subjects. Training opportunities should, however, be given to such men also, as, though not possessing high academic qualifications, reveal a special aptitude for managerial work. The duration of practical experience to be prescribed for admission to the course should be at least three years.

17. We have not been able to assess the exact number of men specially trained in management that we may need in the future. Our estimate of the number of students to be trained at the Indian Institute of Technology as shown in Appendix G is based only on the maximum possible facilities that the Institute can offer in this field of studies. We have, however, no doubt, that the entire demand of this region cannot be met by this Institute alone and so, we must not place exclusive reliance on the Institute to train all the future managers and senior administrators that business and industry in this region may require. The provision of facilities for part-time day and evening courses in the Calcutta University as outlined in Appendix 'A' must also be considered as a part of the total scheme and supplementary to the full-time facilities proposed to be provided at Kharagpur.

18. If the Calcutta University or any other university of this region is able to provide any additional facilities, such as full-time and refresher courses, it should be encouraged to do so.

19. We are conscious of the fact that we are recommending a scheme of full-time courses for graduate students of a type that is new to our country. We also realise that the scope of employment for personnel specially trained in management is limited at the present time. But in view of the contemplated large scale industrialisation of the country in the near future, we believe that there will be a demand for such men in ever increasing numbers. An illustrative list of the possible avenues of employment for such men in modern industry and business is given in Appendix 'B'.

20. In designing the courses, we should aim to balance technical training with management training, with a broad content of several aspects of industry and business. Every effort should be made to

develop in the trainees originality, judgment, and intuitive insight, which they could apply in their approach to the solution of new and changing problems that they may be called upon to face in actual practice. The 'Case System' of studies should, as far as possible, be adopted, and the students given problems from actual industrial and business organisations for investigation, analysis and solution.

21. Owing to the scarcity of well qualified teachers in the country in this field, it is essential to secure the services of industrial and business executives who are specialists in particular fields of management as visiting lecturers, so that the weight of their valuable practical experience can be brought to bear on the instruction imparted to the post-graduate students at the Institute.

22. We understand that necessary arrangements will be made by the Government of India to provide suitable week-end accommodation for visiting lecturers and that it is proposed to observe Wednesdays as weekly holidays in the Institute instead of Sundays. This will no doubt be a good arrangement, for, as stated earlier in paragraph 10, it will enable business executives to come to Kharagpur as visiting lecturers and the students to visit industrial and business firms, on their respective off-days rather than on working days.

23. Besides, our suggestion that the duration of the terms for each set of courses be limited to 13 weeks, 7 weeks and 13 weeks as indicated in the chart in Appendix 'C' will obviate the necessity for any long-period commitments on the part of the visiting lecturers.

24. It is not possible to bring into relation with money the valuable services the visiting lecturers would render to the Institute. We feel that it would be but proper to pay them their travelling expenses, treat them as guests of the Institute during their stay at Kharagpur, and in addition, give them an honorarium of Rs. 100/- per visit.

25. We find that while lack of facilities for part-time and full-time studies in management has been one of the main factors responsible for the present scarcity of well-qualified teachers in this field, the gap, according to the estimates of the Scientific Man-Power Committee, between the supply of, and the demand for, Engineering, Technology and Commerce graduates will only widen with the years, increasing still further the existing deficiency of teachers in management subjects. We hope, however, that the Department of Industrial and Business Management at Kharagpur will gradually help to reduce a large part of this deficiency. The objective of the Department of Industrial Administration and Business Management to be established in Kharagpur should be to fill the existing gap in respect of a cadre of highly trained administration and the management personnel and towards this objective the Department, to begin with, should only train such of those who are already in employment. Later on, the course should be made available to some extent to fresh entrants who have not had any previous industrial or managerial experience so that a continuous flood of trained personnel to meet the requirements of the expanding business and industry may be achieved.

26. As the techniques and processes of management are continually advancing in foreign countries like the United Kingdom and the United States of America, it is essential that the teaching staff of the Department should be enabled to visit these countries for purposes of study and thus keep themselves abreast of modern knowledge and qualify themselves all the better for senior teaching positions in the Department. We, therefore, recommend that a few selected members of the teaching staff, who have worked in the Department for at least five years, should be given opportunities to visit universities, industrial plants and business firms in foreign countries for a period of six to eight months, on the condition that they would serve the Department for a minimum period of five years on their return. In addition to visits to foreign countries the staff of the Department should also visit industrial concerns and business organisations in this country.

27. Pending, however, the training of young men of our country to occupy senior teaching positions in the Institute, we think it advisable to import sufficient number of senior staff members from abroad during the initial stages of operation and development of the Department.

28. Although there are several distinct fields of management, like financial, production, development, distribution, purchasing, transport, maintenance, personnel, and office, we do not suggest the inclusion of highly specialised courses in all these fields, as part of the training, during the first five years of operation of the Department.

29. In making our recommendations for the organisation of the Department, we have deemed it fit to provide for general introductory training in all fields of management, with specific training in sub-groups of two or three allied fields only, with a view to train only three classes of management men, viz, "Industrial Engineers, Business Managers and Industrial Administrators," whom business and industry need urgently at the present time. Although there is considerable overlapping in the scope of work of these three classes of management men, there is this distinction that they must be trained with different emphasis on certain allied phases of management, depending upon their aptitudes, qualifications and background. A functional classification of management personnel whose training is planned in this report is indicated in the chart in Appendix 'D'.

30. Industrial Engineers are basically those engineers whose particular emphasis during training must be on the physical control of the organisation and products.

Entrance Standard : A recognised degree in Engineering Candidates with high academic achievements with a minimum of two years' practical experience in industry to be preferred.

Period of Training : One full academic year.

The courses of instruction should be designed to cover the following subjects :

'Background' Subjects	'Tool' Subjects
Principles of Accounting	Production Engineering and Time and Motion Study
Principles of Industrial Economics	Industrial Plant Operation
Personnel Management and Industrial Psychology	Statistical Methods and Quality Control
Office Management and Methods	Standards and Safety Engineering
Corporation Finance	Design of Manufacturing Enterprises.
Industrial Organisation and Management	Cost Accounting

Seminars, Case Studies, Field Trips and Thesis Project.

31. Business Managers are basically commerce men, whose particular emphasis during training must be on the financial and economic control of the organisation and the distribution of products.

Entrance Standard : A recognised degree in Commerce or allied subjects. Candidates must have worked for a minimum period of two years in business firms or other positions carrying equivalent responsibilities.

Period of Training : One full academic year.

The courses of instruction should be designed to cover the following subjects :

'Background' Subjects	'Tool' Subjects
Assumed elementary knowledge in some or all of the following fields ; deficiencies to be made good as necessary in individual cases.	Business Organisation and Management.
Accounting.	Cost Accounting.
Banking and Insurance	Economic Statistics
Business Law	Economic Analysis
Economics	Corporation Finance
Marketing	Foreign Trade
Statistics	Mercantile and Business Law
Economic Geography	Marketing, Distribution and Transportation
Personnel Management	Office Management and Methods

Seminars, Case Studies, Field Trips and Thesis Project.

32. Industrial Administrators are basically men of leadership potentialities, whose particular emphasis during training must be on the human and financial control of the organisation, including public relations.

Entrance Standard : A University degree in arts or science. Candidates with a minimum of two years' organisational and administrative experience to be preferred.

Period of Training : Two full academic years.

The courses of instruction should be designed to cover the following subjects :

'Background' Subjects	**'Tool' Subjects**
Principles of Accounting	Industrial Plant Operation
Principles of Industrial Economics	Cost Accounting
Industrial Organisation and Management	Corporation Finance
Office Management and Methods	Economic Statistics
Economic Geography	Economic Analysis
Statistics	Industrial and Labour Legislation
Banking and Insurance	Personnel Management including Public Relations and Industrial Psychology
Marketing	
Factory Management	Regional and Industrial Planning
	Public Finance and Public Utilities

Seminars, Case Studies, Field Trips and Thesis Project.

33. Whether the candidates of this department should be awarded a degree or a diploma on completion of their training in their respective fields of study is a matter which will have to be decided by the Institute authorities on wider considerations applicable to the entire Institute. We have therefore made no recommendations in this connection. We may however, point out that the award, whatever be its form, should be distinguishable from the diploma proposed to be granted by the Calcutta University for part-time studies.

34. The number of courses per term and the number of hours of instruction in the form of lectures, guided and tutorial study and home-work assignments per week should be as indicated in Appendix 'E'.

35. In recommending the details of the scheme, we are fully conscious of the fact that we are dealing with a branch of studies that is new to this country. As such we do not wish to impose a rigid set of courses or details on the authorities who will be actually engaged in the detailed planning and building-up of the Department. We have only indicated the initial steps, leaving the Department free to adapt itself to the changing circumstances and regional needs. The activities of the Department should be kept under constant review and new standards of instruction prescribed as and when found desirable on the basis of experience.

36. Formal examinations should by no means be the criteria to qualify a candidate for an award in management studies. Ability to analyse current problems and practices through 'Case Studies', regularity of attendance, regularity in library and home work, active participation in discussion groups, capacity for precise presentation of facts in term papers and the final thesis, and the capacity for original thinking and research should all be taken into consideration before granting the award. As short-period tests, held more frequently, help to keep the students more regular in their studies, we feel that there should be at least one test at the end of every 20 hours of instruction in each course, rather than one final examination at the end of the term.

37. We also recognise the ultimate need for advanced training for candidates who may wish to prepare for specialised positions in industry and business or for those who hope to become teachers in particular management subjects. Accordingly, we recommend the introduction of courses of guided study and research, leading to a Doctor's degree in Management, after the Department has sufficiently developed to be able to offer such facilities. Distinguished scholastic attainments of the candidates through original research rather than the length of their stay at college or other residential requirements should be the criteria for awarding such a degree.

38. Considering the nature of courses offered, we think that the most appropriate name for the Department will be, "Department of Industrial and Business Management."*

39. Post-graduate students of all other departments of Engineering and Technology in the Institute should be taught to appreciate the importance of economic problems as well as the problem of human relations in industry and business through a series of basic courses in subjects like, industrial relations and industrial economics.

40. As regards the strength and composition of the teaching staff for the Department, our estimates approximately conform to the provisions in the Sarker Committee's Interim Report, according to which,

> "the strength of the teaching staff (exclusive of laboratory assistants and demonstrators) to be provided should be

* The Department to be established should be called "DEPARTMENT OF INDUSTRIAL ADMINISTRATION AND BUSINESS MANAGEMENT".

fixed in the scale of one teacher per ten students for basic courses and one teacher per five students for instruction in special subjects".

41. Depending upon the variety of subjects taught and the number of courses offered, a certain minimum number of teachers capable of imparting instruction in related groups of subjects will be necessary, irrespective of the number of students taking such courses. In our efforts to make a modest beginning, we mean to limit the number of students trained during the early stages so that they may not lack suitable employment opportunities after they graduate, but there can be no compromise regarding the number or quality of the staff necessary for the Department. Our emphasis must be on the quality of the graduates and not on mere numbers. While admitting persons sponsored by organisations for the training, the Department should receive the assurance that the trainees will be absorbed by the spensorers in suitable responsible positions so that the training imparted would be fully taken advantage of.

42. With this end in view, we recommend that the Department should ultimately have the following staff at the end of its third year of operation :

Professor and Head of the Department	1
Associate Professor	1
Assistant Professors	4
Lecturers	6
Total	12
Visiting Lecturers	As required

43. The strength and composition of the teaching staff during the successive years of operation from the commencement of the Department should be as indicated in Appendix 'F'.

44. As the number of students can be substantially increased, with no accompanying increase in the teaching staff, we recommend that the ultimate number of students to be trained in the Department at any one time be about 100 as detailed in Appendix 'G' the strength of the teaching staff remaining constant after the fourth year.

45. A library of 600 books on management subjects at an estimated cost of Rs. 15,000/- is considered quite adequate for the needs of the Department to start with. Special attention should be paid to the collection of financial, economic and statistical information on the current production and performance of industrial and business firms, as such data form the backbone of management studies.

46. As new literature in all fields of management is constantly springing up, and it is essential that the students and staff of the Department should keep themselves well-posted with the latest

trends in the subject, we recommend that a minimum of 80 periodicals of interest to management men be subscribed to regularly at an estimated maximum expenditure of Rs. 4,000/- per annum.

47. As modern business methods and processes are becoming increasingly mechanised, it is necessary to acquaint the students with the actual working, use and advantages of accounting, computing tabulating, punching, printing, duplicating, and addressing machines, calculators, office equipment, communication facilities etc. For this purpose, we recommend that a fully equipped Business Laboratory (consisting of Accounting, Statistical and Office Equipment Laboratories) be established at an estimated cost of Rs. 1,50,000/- at an early date.

48. We also recommend that a fully equipped Time and Motion Study Laboratory be set up in course of time at an estimated cost of Rs. 50,000/-.

49. *Estimated Capital and Recurring Expenditure*

Details indicated in Appendices H, I and J, pertaining to the accommodation required and the minimum capital and recurring expenditure, have been worked out mainly on the basis of the data given in the Sarker Committee's Interim Report. We cannot help feeling, though, that the figures pertaining to many items of expenditure detailed in the Sarker Committee's Interim Report are now out of date and therefore have had to be revised. According to our estimates, the Department will require a total capital outlay of Rs. 13,00,000/- and an annual recurring expenditure of Rs. 3,40,000/- The net expenditure per student per annum will probably be about Rs. 3,400/- which is substantially higher than the average of Rs. 1,820/- for the entire Institute indicated in the Sarker Committee's Report. Our estimates are higher as they provide for costs of construction at the rate of Rs. 14/- per sq. ft. of floor area (which are the current rates), instead of Rs. 10/- per sq. ft. as in the Sarker Committee's Report, and include a provision of 5 per cent on the costs of buildings for maintenance and upkeep and a provision of 17½ per cent for dearness allowance for the staff, neither of which has been provided for in that Report, Further, our scheme does not include undergraduate studies at all, whilst the Sarker Committee's Report does, and such studies cost less to provide than exclusively post-graduate studies. It is also possible, under our scheme, to increase the number of students up to 120, if necessary, without a proportionate increase in the expenses of the Department, thus bringing down, to some extent, the net expenditure per student per annum.

V. Refresher Studies

50. The Indian Institute of Technology should also organise short-term intensive refresher courses in management subjects during vacatiton periods for the benefit of such junior excutives in business and industry, government officers and labour leaders as may wish to avail of these opportunities. And we feel that employing authorities should give proper recognition to such extra qualifications, so as to provide the necessary incentive to management studies.

51. Such vacation courses will also keep the Institute and its staff usefully engaged throughout the year and enable the available residential academic facilities to be utlised more effectively than would be possible otherwise.

VI. Administrative Staff College

52. As a long-term plan we accept the proposal made by the parent committee that an Administrative Staff College to be established in this country on the lines of the Administrative Staff College in London for providing facilities for bringing about cross-fertilisation of ideas of different groups and classes of men engaged in administrative and managerial work, each with long experience in a different field—civil service, local government, production, sales, secretarial, accounting, personnel management, bank, insurance, transport, etc.

53. We feel that owing to the large size of our country in comparison with the United Kingdom, only one such college as now proposed will not be adequate to the needs of our country and that there should be a college for each of the Northern, Southern, Eastern and Western regions of India. We also feel that Delhi may not be the best place for this purpose, to start with, and that it would be better if the first college for the Eastern or the Western region were established in Calcutta or Bombay, either of which will afford better facilities than Delhi for bringing together men from various fields.

Whereas the establishment of four Administrative Staff Colleges may be justified on the basis of the geographical size of the country the present conditions would not permit of more than one such institution and, therefore, for the present, effort should be concentrated on the establishment of only one institution. The institution should, however, come into being as an enterprise of the industrial and commercial community of the country and the government's part should be restricted to providing initial facilities by way of land and buildings for the establishment of the institution. The Administrative Staff College in the U.K. was started solely on the initiative and with the support of individuals and groups drawn from the highest ranges of industry, local government, education, commerce and business organisations and its success is solely due to these individuals and groups. It has been able to maintain its individuality and importance only because it has not functioned as a government institution ; and the great support extended by the industrial and commercial community in the U. K. has sustained the institution in its unique programme of training. Similar enlightenment should be created in this country for the establishment of an Administrative Staff College and to this end the proposal should be submitted to prominent industrial and commercial groups and individuals of the country to take initiative in the matter.

VII. Cooperation with the Business and Industrial Community

54. It is essential that full cooperation of the business and industrial community of this region be enlisted in order to organise

and develop the proposed Post-graduate Department of Industrial and Business Management at Kharagpur successfully. We recommend that the assistance of Chambers of Commerce and other Industrial, Professional and Trade Associations of this region be sought for the purpose of ascertaining the nature and extent of cooperation the Institute can expect from their members. There are many ways in which they can help, such as ;

(*i*) by deputing one or more members of their staff every year for advanced training at the Institute ;

(*ii*) by sending their experts to teach advanced courses in management at the Institute ;

(*iii*) by providing proper facilities to the students of the Institute for their field work ;

(*iv*) by providing possible avenues of employment to specially trained management personnel in their specific fields ; and

(*v*) by providing opportunities for the junior members of the teaching staff of the Department to observe the techniques and processes of modern management in actual practice during their vacation months.

55. We recommend that a comprehensive circular be prepared and distributed amongst the members of the association through their respective Presidents for this purpose, and also personal contacts be established through a responsible liaison officer, so as to expedite matters.

For the successful working of the Department the cooperation of all industrial concerns, business organisations, etc., in the country is an essential pre-requisite. For ensuring this cooperation a suitable questionnaire should be circulated to all concerned followed by personal visits by the Secretary of the Committee to collect necessary data. The data thus collected should be collated and final proposals in regard to duration of training, scope and content of the courses of training, number of persons to be trained every year etc., should be formulated. The final proposals should also contain a programme for bringing about necessary cooperation between commerce, industry and the Department for making available the services of experts employed by the former for part-time work in the Department. For this purpose the Sub-Committee should be enlarged so as to include some more prominent industrialists and the enlarged Committee should be designated as "Standing Advisory Committee on Industrial Administration and Business Management (Eastern Region)". The Committee should also function as a Standing Liaison Committee between the Department and commerce and industry.

56. In conclusion, we would like to express our gratitude to Mr. H. N. Nanjundiah, our Secretary, for his invaluable help during our deliberations as well as in the preparation of this Report.

(Sd) J. J. Ghandy
Chairman
A. P. Benthall
A. Chatterjee
D. C. Driver
D. K. Sanyal
P. F. S. Warren

H. N. NANJUNDIAH
Secretary
July 1950

APPENDIX 'A'

Report by Mr. D.K. Sanyal containing Suggestions for the Provision of facilities for part-time day and evening Courses in Industrial Administration and Business Management at the Calcutta University

It is an admitted fact that business today is a far more complex affair than it has been in the past and this complexity is likely to increase. On commercial side, it now involves interaction with Government Departments and national policy, both domestic and foreign. On the scientific side, it now involves closer attention to fundamental research and the wider application of science in production, distribution and organisation. On the operative side, it requires men better qualified for the selection, allocation and training of employees and for helping to maintain good morale and efficiency within business undertakings. The increased complexity can only be dealt with properly if business has an adequate supply of the ablest type of mind fully trained in the science of administration and management.

Object

Uptill now, no attempts have been made in India for providing a scientific course of study in Industrial Administration and Business Management, a subject which is assuming increasing importance in the present-day complex economic organisation. It is, however, essential that such a course should be organised with certain amount of caution and from the utilitarian point of view, the instruction should be given with adequate amount of practical bias. At the initial stage, a modest beginning should be made and for this purpose, only those who are associated with business organisations and industrial undertakings should be first admitted into the course. It is suggested, therefore, that for the first five years the admission to the course should be restricted to junior executives. After this period, the whole position should be reviewed and if necessary, a full-time day course extending over a period of two years should be introduced in which those who are keen to enter either into industry or into business should be admitted after very careful scrutiny. During this period of five years, it would be possible to ascertain as to what extent the business world is prepared to take advantage of a course like this, as well as the needs for such trained men. It can be confidently hoped that in view of the increasing demand for scientifically trained industrial executives, the proposed course will be able to enlist the active support of the business world.

Organisation

The courses should be organised by the University of Calcutta in collaboration with the Department of Industrial and Business Management of the Indian Institute of Technology at Kharagpur and various Chambers of Commerce. Endeavours should be made for enlisting the cooperation of business houses with a view to persuading them to take advantage of the course by sending their junior executives. At the same time, as far as possible, the teaching staff should be supplemented by inviting men actively associated with business as 'Guest Speakers' for taking advantage of their practical experience.

Control

A committee should be appointed by the university, with not more than 12 members. The Vice-Chancellor of the University should be the ex-officio Chairman, and the Head of the Department of the Industrial and Business Management of the Indian Institute of Technology the ex-officio Vice-Chairman of the Committee. Of the remaining ten members, two shall be nominated by the University and the rest by various Chambers of Commerce. This committee shall be responsible for organising, staffing and executing the scheme.

The Course

There shall be one course, with two groups, one specialising in Business Management and the other in Industrial Administration. There shall be altogether eight subjects in each group, of which four should be 'Background' subjects, common to both the groups. It is my idea that the following subjects should be considered as 'Background' subjects :

(*a*) Accounting Principles including Principles of Costing.

(*b*) Applied Economics, covering Industrial Development and Finance.

(*c*) Economic Statistics and Economic Analysis.

(*d*) Personnel Management and Business Psychology.

The 'Tool' subjects for the group, 'Business Management' will be :

(*a*) Business Organisation and Management, including Office Methods.

(*b*) Mercantile Law.

(*c*) Public Finance and Public Utilities.

(*d*) Marketing, Distribution and Transportation.

The 'Tool' subjects for the group, 'Industrial Administration' will be :

(*a*) Industrial Organisation and Management including Industrial Plant Operation,

(*b*) Industrial Law and Factory Legislation.

(*c*) Industrial and Public Relations.

(*d*) Purchasing, Storekeeping and Transportation.

Besides lectures on these subjects, excursions will be arranged to various business houses and industrial organisations to enable the students to have a first-hand knowledge of the set-up of these units.

Admission

It is to be considered whether in the beginning any hard and fast rule should be laid down regarding academic qualificatious of the candidates or only graduates in any faculty will be admitted. Personally, I feel that we should not be very particular about any special academic qualification. We can, however, insist that the candidates should have three years' experience in a business house or industry for being eligible for admission

Institution

It is proposed that every subject should be covered in course of a minimum of 30 lectures in each subject. The period of one lecture will be 55 minutes and the classes will be held on three days in a week between 4.30 and 6.30 p.m. The first term will begin on the 2nd July every year and will end on the 31st December with a break of one month for Puja holidays The second term will begin on the 2nd January and will continue up to the 31st May. During the first term, the 'Background' subjects will be taught, which would mean that the students of both the Industrial Administration and Business Management groups will have common lectures. During the second term, 'Tool' subjects will be taught, which would mean that the students of Business Management and Industrial Administration will have separate classes.

Total Number of Lectures

On the basis of the suggestion already made, it will be necessary to arrange for 120 lectures for 'Background' subjects and 240 lectures for 'Tool' subjects. In other words, arrangements will have to be made for a total number of 360 lectures for covering both the courses during the academic year, consisting of two terms. Besides, it is proposed that 20 special lectures, of which ten will be delivered in each term, shall have to be organised by inviting 'Guest Speakers' who will talk to the students on different aspects of Industrial Administration and Business Management.

Coordination

For the purpose of efficient running of the course, it will be necessary on the one hand to conduct classes in a very business-like way and at the same time to enlist the cooperation of the business houses to take advantage of those courses. For the achievement of these two ends, it would be necessary to place some one in charge of the course who has got both academic attainments and necessary contacts with the business world and he should be designated as the Head of the Department.

Examination

At the end of the course, an examination will be held and successful candidates will be awarded a Diploma in Business Management or Diploma in Industrial Administration. A fee of Rs. 100/- will be charged by the University from each candidate appearing at the examination, the usual rate for professional examinations.

Income

It is suggested that the tuition fee of Rs. 300/-, to be paid in one instalment, should be charged for the whole course from each student. This will not be unreasonable. It may be mentioned that the tuition fee charged by the Manchester College of Technology for a similar course is £20 from students in British Isles and £30 from outsiders. This tuition fee might be paid by the employers concerned who should also be prepared to provide sufficient 'Study Time' to their junior executives for attending these courses. If it be assumed that the total number of students to be admitted into each group should not exceed 20, then, at the rate of Rs. 300/- per student, the income from tuition fees will amount to Rs. 12,000/- (40 x300) every year.

Expenses

It is proposed that for each lecture to be delivered, the lecturer should be paid at the rate of Rs. 40/- as honorarium. This would mean that, for a total number of 360 lectures, the lecturers have got to be paid a total amount of Rs. 14,400/- per annum. Besides, it is proposed that the 'Guest Speakers' should be paid at the rate of Rs. 50/- per lecture which would mean that, for 20 lectures, the amount to be provided for will be Rs. 1,000/-. Expenses in connection with the 'Study Visits' is estimated at Rs. 1,000/ .

Administration

The University of Calcutta will undertake the responsibility for providing classrooms, facilities for using the University Library and for organising the course. Office work in connection with the course will also be the responsibility of the university and the employers will be kept informed about the attendance of their nominees to the classes at the end of every month. For this purpose, the university should be paid a lump grant of Rs. 30,000/- per annum, which includes the honorarium to the Head of the Department. It is also suggested that, at the initial stage, a capital grant of Rs. 10,000/- should be made to the university for the purpose of purchasing books, equipment, etc.

Budget

Income	Rs.	*Expenditure*	Rs.
Tuition fee from 40 student @ Rs. 300/-	12,000	Honorarium to Lecturers	14,400
		Honorarium to Guest Speakers	1,000
		Study Visits	1,000
		Books, Journals, etc.	3,600
		Honorarium to the Head of the Department	10,000
*Deficit	30,000	Organisational expenses to Calcutta University	12,000
Total	42,000	Total	42,000

*This deficit will correspondingly increase if the number of admissions be less than budgeted for.

In case the scheme becomes a success, it is proposed to run the two-year course for those who are not deputed by business and industry and the one-year course for those who would be working in business houses and industries. It is also proposed that this Department of Industrial Administration and Business Management shall be located in the building which is going to be constructed for the All-India Institute of Social Welfare and in the meanwhile, accommodation will be provided in the university buildings.

APPENDIX B

An Illustrative List of Possible Avenues of Employment for Specially Trained Management Personnel in Modern Industry and Business

Industrial Engineers

- Works Manager (Production)
- Production Engineer
- Methods Engineer
- Planning and Progress Engineer
- Time Study Engineer
- Quality Control Engineer
- Safety and Standards Engineer
- Mass Production Designer
- Cost Analyst
- Job Analyst
- Product Research and Development Engineer
- Industrial Statistician
- Industrial Economist
- Engineering Appraiser
- Technical Assistant
- Management Consulting Engineer
- Industrial Cooperative Manager

Teacher in Industrial Engineer and other related fields.

Business Managers

- Office Manager for Trading Firms
- Import-Export Agency Manager
- Sales Manager
- Purchase Officer
- Advertising Manager
- Marketing Officer
- Accounts Officer
- Financial Manager
- Commercial Manager
- Business Economist
- Branch Organiser
- Company Director
- Commercial Secretary
- Commercial Cooperative Manager
- Market Research Officer
- Insurance and Patents Officer
- Budget Officer

Teacher in Business Management and other related fields.

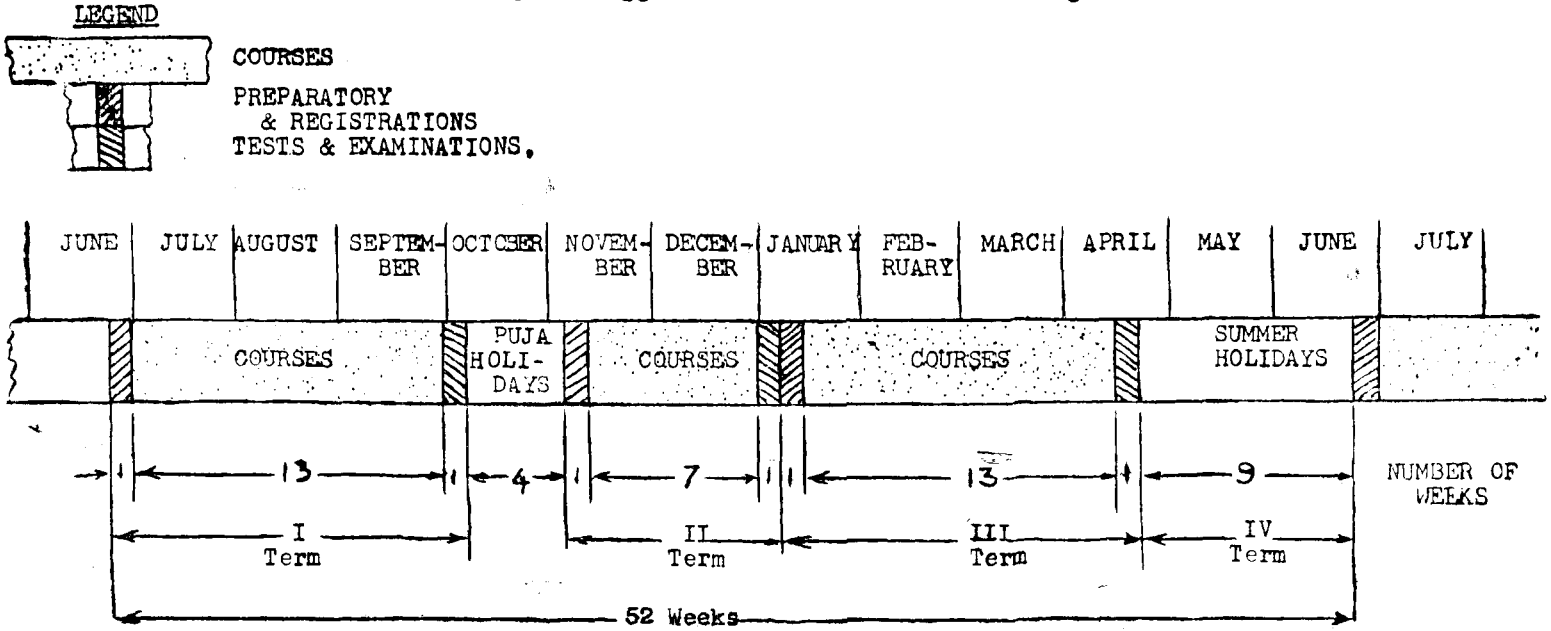
Industrial Administrators

- General Manager
- Asst, General Manager
- Executive Officer
- Administrative Assistant
- Company Director
- Secretary to the Board of Directors
- Financial Manager
- Accounts Officer
- Industrial Relations officer
- Labour Contracts Negotiator
- Labour Arbitration Representative
- Industrial Cooperative Administrator
- Planning and Development Officer

Teacher in Industrial Administration and other related fields.

APPENDIX C

Chart Showing the Suggested Plan of Instruction During the Year



BEGINNING OF YEAR (ONE YEAR ACADEMIC) END OF YEAR

Note:— One extra week is allowed in each term to take care of holidays, absenteeism, etc. This acts as a cushioning time for making good the lost time. The length of terms is taken as 12, 6 and 12 weeks respectively for the purpose of calculating the number of hours available for instruction.

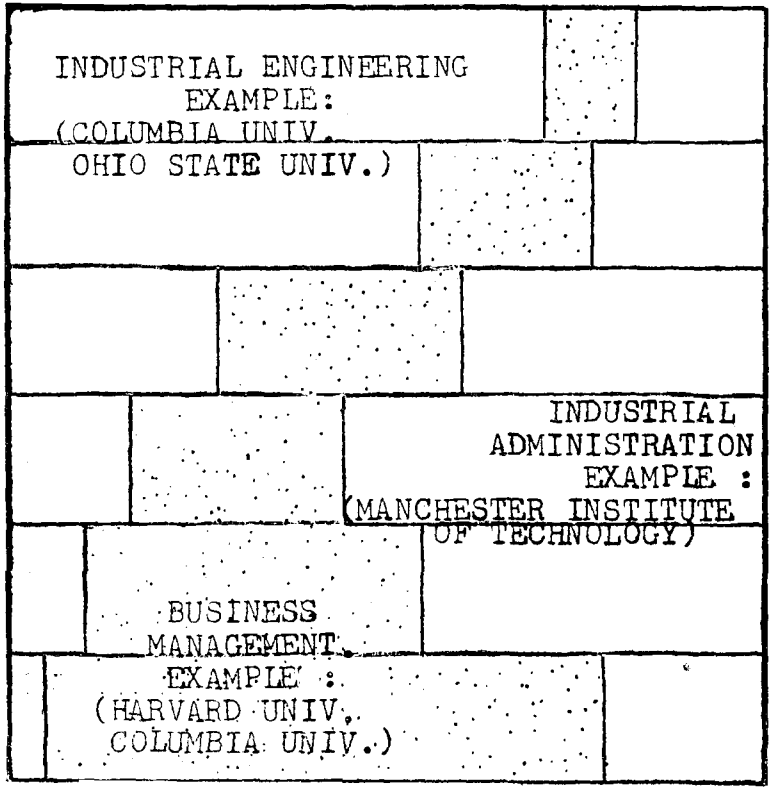
Refer to Appendix E for details of the number of courses and hours of work during each term.

APPENDIX D

Chart Showing the Functional Classification of Management Men Whose Training is Planned in this Report

(Refer to Paragraphs 28 to 32 and Appendix B for further clarification)

SCOPE OF WORK



FIELDS OF STUDY

PRODUCTION ENGINEERING

STATISTICAL METHODS

ORGANISATION AND MANAGEMENT

HUMAN RELATIONS

ECONOMICS, ACCOUNTING AND FINANCE

MARKETING, DISTRIBUTION AND TRANSPORTATION

APPENDIX E

The Number of Courses and Hours of Work

	I Term	*II Term*	*III Term*	*Total*
Number of weeks available for instruction during one academic year	12	6	12	30
Desired number of hours of instruction per week	30	30	30	...
Total number of hours of instruction	360	180	360	900
Desired average number of hours of instruction per course.—				
Lectures	36	36	36	...
Guided and Tutorial	24	24	24	...
Total	60	60	60	...
Maximum number of courses offered	6	3	6	15
Average number of hours of instruction per course per week :—				
Lectures	3	6	3	...
Guided and Tutorial	2	4	2	...
Total	5	10	5	...
Approximate number of hours of home and library work per course per week	3	6	3	...
Total number of hours of work per course per week	8	16	8	...
Total load on students per week (number of courses multiplied by the number of hours per course)	48	48	48	...
Load on students per day (Six days a week)	8	8	8	...

APPENDIX F

The Strength of the Teaching Staff

Year of operation		21	3	4	5	6
Hours of work per week :						
Industrial Engineering	30	30	30	30	30	30
Business Management	30	30	30	30	30	30
Industrial Administration ;						
First Year	30	30	30	30	30	30
Second Year	...	30	30	30	30	30
For other Departments	...	10	10	20	20	20
**Total Load on the Department	90	130	130	140	140	140
Strength of the teaching staff :						
Professor	1	1	1	1	1	1
Associate Professor	...	1	1	1	1	1
Assistant Professors	3	3	3	4	4	4
Lecturers	4	6	6	6	6	6
Total full-time staff	8	11	11	12	12	12
Visiting Lecturers		—As found necessary—				

Load on the teaching staff :

	Hours of work per week						
Professor	6	6	6	6	6	6	6
Associate Professor	8	...	8	8	8	8	8
Assistant Professors	10	30	30	30	40	40	40
Lecturers	12	48	72	72	72	72	72
**Total Load on Staff		84	116	116	126	126	126

**Note that the gap between the total load on the Department and the total load on staff is made up by conducting a few courses in common for the students of the different sections of the Department and by availing the services of visiting lecturers as necessary.

APPENDIX G

The Strength of Students

Year of operation	1	2	3	4	5	6
Total number of students in the Department :						
Industrial Engineering	12	12	18	18	25	25
Business Management	12	12	18	18	25	25
Industrial Administration :						
First Year Class	12	12	18	18	25	25
Second Year Class	...	12	12	18	18	25
	36	48	66	72	93	100
Total number of students newly admitted	36	36	54	54	75	75
Total number of students graduating	24	36	48	54	68	75

APPENDIX H

Details of Accommodation Required

College Requirements :

	sq. ft.
Two Classrooms (for 30 students at 15 sq. ft.)	900
Two Classrooms (for 50 students at 15 sq. ft.)	1,500
One Assembly Hall (for 120 students at 15 sq. ft.)	1,800
One Laboratory Hall (for 30 students at 25 sq. ft.)	750
One Laboratory Hall (for 50 students at 25 sq. ft.)	1,250
Departmental Library and Reading Room	500
One Professor's Room	300
One Associate Professor's Room	300
Four Assistant Professor's Rooms	1,200
One Research Assistants' Room	400
One Visiting Lecturers' Room	400
Total	9,300
Plus one-third for walls, passages, etc.	3,100
Total	12,400

Residence Requirements

Students : Approximately one-thirtieth of the total provided for 3,000 students in the Sarker Committee Interim Report	22,100

Staff

Six Senior Staff (2,000 sq. ft. each)	12,000
Six Junior Staff (1,500 sq. ft. each)	9,000
Eight Instructors (1,000 sq. ft. each)	8,000
Six Servants' Quarters (250 sq. ft. each)	1,500
One Guest House for Visiting Lecturers	2,000
Total requirements for staff	32,500
Total accommodation required	67,000

APPENDIX I

Capital Expenditure

	Estimates per Sarker Committee Report	*Estimates of the Sub-Committee*
	Rs.	Rs.
Library Books	15,000	15,000
Laboratory Equipment	2,00,000	2,00,000
Furniture	30,000*	70,000
Buildings (67,000 sq. ft.)	6,70,000**	9,38,000***
Water Supply, Sewage, etc.	50,000*	75,000
Total.	9,65,000	12,98,000
or, say	10,00,000	13,00,000

Notes :—

* Approximately one-thirtieth of the total provided for 3,000 students in the Sarker Committee's Interim Report.

** At Rs. 10/- per sq. ft.

*** At Rs. 14/- per sq. ft.

APPENDIX J

Recurring Expenditure

	Estimates per Sarker Committee Report.	*Estimates of the Sub-Committee*
Salaries to Staff : (mean salary p.m.)	Rs.	Rs.
One Professor	1,750	2,750
One Associate Professor	1,250	1,250
Four Assistant Professors	3,200	3,200
Six Lecturers	2,700	3,120
Six Instructors and Assistants	1,500	1,500
Two Junior Clerks	400	400
Six Bearers	300	450
Six Sweepers etc.	...	300
Total	11,100	12,970
Mean annual expenditure on salaries	1,33,200	1,55,640
plus 10% for Provident Fund, leave, etc.	13,320	15,564
Plus 17½% for dearness allowance.	23,310	27,237
Total	1,69,830	1,98,441
Plus honorarium to Visiting Lecturers	...	20,000
Total salaries to teaching staff	1,69,830	2,18,441
Other expenses, such as, library books, periodicals, scholarships, gas and electricity, municipal charges, office expenses, travelling expenses, conservancy, etc.	35,400	60,000
Interest and Sinking Fund at 5% on capital of Rs. 9,65,000	48.250	...
on capital of Rs. 12,98,000	...	64,900
Maintenance and upkeep charges at 5% on building costs of Rs. 9,38,000	...	46,900
Total annual recurring expenditure	2,53,480	3,90,241

Income :

Admission fee (at Rs. 25/-for, 100 students)	...	2,500
Tuition fee (at Rs. 200/- for. 75 students)	15,000	...
Tuition fee (at Rs. 300/- for, 80 students)	...	24,000
Seat, furniture, rent, etc. (at Rs. 100/- for 100 students)	10,000	10,000
Rent from staff quarters (10% of salaries)	13,320	15,564
Total income for the Department	38,320	52,064
Net annual recurring expenditure	2,15.160	3,38,177
or, say	2,20,000	3,40,000

APPENDIX K

Extracts from the Report of the University Education Commission (December 1948—August 1949) Volume I.

(Chapter VIII—Engineering and Technology)

IV. Types of Training for Engineers.

Page 227. "Classification of Engineers—The engineering profession has become so much diversified that in order to consider intelligently the demand for engineering services and the adequacy of available educational resources, a classification of engineers is desirable. The British Committee set up the following classification:

1. Senior Administrators and Executives.
2. Engineer-Scientists, Design and Development Engineers.
3. Engineers required for Producation, Operation, Maintenance and Sales.
4. Technical Assistants and Designer Draftsmen.
5. Draftsmen, Foremen and Craftsmen.

"A supply of men in all these grades in the right proportion is essential for the rural, industrial and other technical development of the country."

Page 228. "Grade I—Engineer Administrators, Executives, etc.—As civilisation grows more and more complex, and new discoveries in science and technology are being put to large-scale use, great engineering adventures are being undertaken in every country, fot example, the Tennessee Valley Schemes and the Atomic Energy Projects inthe U.S.A. and the great hydro-electric and river development projects in different countries of the world, including our own. Earlier we had the great railway and canal projects. The organisation of large factories like the Tata Iron and Steel Company falls in the same category.

"The ideal head of such an organisation should be an executive who is also an engineer, scientist or technician and who has an intimate knowledge of the science and technique of the particular undertaking, both on the theoretical and practical sides and besides has knowledge of finance and business administration, and can handle large bodies of men. Such combinations are rare among professional engineers or scientists, and therefore very often such posts are filled by lawyers, financiers, or even political leaders. Though some of these administrators have done their job well, there have been many failures or cases of gross mismanagement. It is preferable that engineers and scientists are put in charge of such jobs.

"Our government has planned a number of river-valley projects, and large industrial establishments under Central control. The success of these undertakings will depend upon the right kind of administrators and executives for their management.

"The particular combination of qualities which ripen into the effective executive and administrator cannot always be foreseen. Frequently large concerns find their leadership in men who have proved their ability in small undertakings. About the best insurance for providing executives for large projects is the existence of a large variety of small and medium sized industries and other economic undertakings. They provide training ground and apprenticeship for large responsibilities. Courses including Industrial Engineering which prepare men for such leadership of small undertakings is about the best contribution that can be made by engineering education for this class of engineers and administrators."

XI—The Need for New Types of Engineering and Technical Institutions.

Page 246. .....it would be wise for such engineering schools to make it possible for their teachers to visit other countries where industrial methods are greatly advanced, and to become acquainted with the methods of successful smaller industrial concerns. The teacher of industrial relations, of production methods, of marketing, etc., might explore in his own field. In this way engineering and business practice might soon be abreast of those in the industrially most advanced nations. India greatly needs a new type of engineering training, which will combine good technical and business education with pioneering in the processes of production and marketing.

"Engineers previously classified in this chapter as of Grade I (administrators and executives) need not be supermen. They may be reasonably intelligent men with the right kind of training. If there are in the country a large number of small industries headed by such men, occasionally one will have exceptional executive ability and will move to more far reaching responsibilities, public or private.

"The technical phases of such training may be mechanical, electrical or chemical engineering on a foundation of general engineering science. The business phases should include such subjects as accounting, industrial relations, production methods, and business ethics".

INDIAN INSTITUTE OF TECHNOLOGY
KHARAGPUR

DEPARTMENT OF
INDUSTRIAL ADMINISTRATION AND BUSINESS MANAGEMENT

PROVISIONAL

PROGRAMME OF COURSES

AND

SYLLABUS

92

PROVISIONAL

Programme of Courses in Business Management.

(One-Year Course) .

	Hours per week	
	Lectures	*Tutorial & Practical*
I TERM : (12 weeks)		
B.M. 201 Business Organisation and Management	2	...
B.M. 202 Advance Accounting	3	4
B.M. 203 Business Statistics	4	3
B.M. 204 Purchasing, Storekeeping & Material Control	4	3
B.M. 205 Advanced Economics	4	...
* Industrial Relations & Personnel Management	2	...
B.M. 206 Industries and Resources of India	2	2
	21	12
Total	33	
II TERM (6 weeks)		
B.M. 207 Office Management and Methods	2	2
B.M. 208 Cost Accounting	3	4
B.M. 209 Economic Statistics	4	3
B.M. 210 Public Finance and Taxation	2	...
B.M. 211 Market Research and Sales Forecasting	4	3
B.M. 212 Economics of Transportation	4	...
B.M. 213 Business Ethics and Sociology	2	...
	21	12
Total	33	
III TERM : (12 weeks)		
B.M. 214 Economic Analysis	4	...
B.M. 215 Banking and Insurance	4	3
B.M. 216 Business Finance and Budgetary control in Business	4	3
B.M. 217 Mercantile Law	2	...
B.M. 218 Advertising and Sales Management	2	2
B.M. 219 Principles of International Trade	4	...
B.M. 220 Seminar in current business problems	...	3
	20	11
Total	31	

NOTE : * Same as for Industrial Engineers,

VISITS TO BUSINESS FIRMS

I Term	6 visits
II Term	3 visits
III Term	6 visits
Total	15 visits

BUSINESS MANAGEMENT REPORT

A Business Management Report should be submitted at the end of the III Term on a specific problem.

PROVISIONAL

Programme of Courses in Industrial Engineering

(One-Year Course)

	Hours per week	
	Lectures	*Tutorial and Practical.*
I TERM (12 weeks)		
I.E. 101 Principles of Industrial Accounting	4	3
I.E. 102 Industrial Economics	2	...
I.E. 103 Industrial Plant Operation	4	3
I.E. 104 Engineering Statistics	4	3
I.E. 105 Industrial Relations and Personnel Management	2	...
I.E. 106 Industrial Organisation and Management	2	...
I.E. 107 Engineering Materials, Production Methods and Processes	4	2
	22	11
Total	33	
II TERM : (6 weeks)		
I.E. 108 Cost Accounting	4	...
I.E. 109 Corporation Finance	4	3
I.E. 110 Production Planning and Control	4	...
I.E. 111 Machine Tools	2	2
I.E. 112 Metrology	2	2
I.E. 113 Jigs and Fixtures	2	2
I.E. 114 Job Evaluation and Wage Incentives	4	2
	22	11
Total	33	

	Hours per week	
	Lectures	*Tutorial and Practical.*
III TERM : (*12 weeks*)		
I.E. 115 Time Study and Motion Economy	4	3
I.E. 116 Design of Manufacturing Enterprises	2	3
I.E. 117 Statistical Quality Control	4	4
I.E. 118 Budgetary and Higher Control in Industry	2	...
I.E. 119 Estimating and Rate Fixing	2	2
I.E. 120 Industrial Standardization	2	...
I.E. 121 Seminar in Industrial Engineering	...	3
	16	15
Total	31	

WORK VISITS

I Term	6 visits
II Term	3 visits
III Term	6 visits
Total	15 visits

INDUSTRIAL ENGINEERING REPORT

An Industrial Engineering Report should be submitted at the end of the III Term on a specific production problem relating to any particular industry.

Provisional

Programme of Courses in Industrial Administration

(*Two-Year Course*)

First Year

	Hours per week	
	Lectures	*Tutorial and Practical.*
I TERM : (*12 weeks*)		
I.A. 301 Principles of Accounting-I	4	4
I.A. 302 Fundamentals of Economics	4	...
I.A. 303 Industrial History and Structures	2	...
** Industries and Resourses of India	2	2
* Industrial Organisation and Management	2	...
* Industrial Plant Operation	4	3
* Engineering Materials, Production Methods and Processes	6	...
	24	9
Total	33	

	Hours per week	
	Lectures	*Tutorial and Practical.*
II TERM : (6 weeks)		
I.A. 304 Principles of Accounting-II	4	3
I.A. 305 Elements of Engineering	4	4
I.A. 306 Social Economics	4	...
I.A. 307 Labour Economics and Trade Unionism	4	...
** Office Management and Methods	2	2
** Public Finance and Taxation	2	...
** Economics of Transportation	4	...
	24	9
Total	33	
III TERM : (12 weeks)		
I.A. 308 Accounting Analysis, Interpretation and Reporting	3	2
I.A. 309 Elements of Industrial Statistics	2	3
I.A. 310 General Psychology	3	...
I.A. 311 Administrative Theory and Philosophy of Management	4	...
I.A. 312 Public Utilities and Rate Regulation	2	...
** Banking and Insurance	4	3
* Time Study and Motion Economy	4	3
	22	11
Total	33	

Second Year

I TERM : (12 weeks)		
I.A. 313 Personnel Management and Industrial Psychology	4	...
I.A. 314 Public Relations	2	...
** Advanced Accounting	3	4
** Business Statistics	4	3
** Purchasing, Storekeeping and Material Control	4	3
** Advanced Economics	4	...
* Industrial Economics	2	...
	23	10
Total	33	

Note : * Same as for Industrial Engineers.

** Same as for Business Managers.

		Hours per week	
		Lectures	*Tutorial and Practical.*
II TERM : (*6 weeks*)			
I.A. 315	Collective Bargaining and Labour Legislation	2	...
I.A. 316	Industrial Cooperation	2	...
I.A. 317	Industrial and Regional Planning	2	...
**	Cost Accounting	3	4
**	Economic Statistics	4	3
**	Market Research and Sales Forecasting	4	3
*	Job Evaluation and Wage Incentives	4	2
		21	12
	Total	33	
III TERM : (*12 weeks*)			
I.A. 318	Personnel Techniques	2	2
I.A. 319	Corporation Finance and Investment Policies	4	3
**	Economic Analysis	4	...
**	Mercantile Law	2	...
**	Advertising and Sales Management	2	2
*	Design of Manufacturing Enterprises	2	3
*	Budgetary and Higher Control in Industry	2	...
I.A. 320	Seminar in Current Industrial Problems	...	3
		18	13
	Total	31	

WORK VISITS

I Term	6 visits
II Term	3 visits
III Term	6 visits
Total	15 visits

INDUSTRIAL ADMINISTRATION REPORT

An Industrial Administration Report should be submitted at the end of the Second Year on a specific administrative problem relating to any particular industry.

Note : *Same as for Industrial Engineers.
**Same as for Business Managers.

Syllabus

The following brief syllabus of subjects taught is indication of the nature of topics covered and the object in view. They are by no means complete. Detailed syllabuses will be worked out when the Department gets organised.

I.E. 101: **Principles of Industrial Accounting** (48 hours lectures 36 hours tutorial and practical)

A study of the basic principles and procedures of accounting and the use of accounting data in the management and control of industrial enterprises ; book-keeping ; methods of obtaining, recording, classifying and reporting financial estimates of values and changes therein ; principal accounting statements and their meaning ; use of machines in industrial accounting.

I.E. 102: **Industrial Economics** (24 hours lectures)

Principles of economy applied to industry with illustrations ftom practice ; cost determination, interest, valuation and depreciation, economic worth ; economic break even point and costs per unit of output of a variety of products and industries ; interpretation of financial statements ; relative worth of alternatives.

I.E. 103: **Industrial Plant Operation** (48 hours lectures ; 36 hours tutorial and practical)

The general organisation and management of an industrial plant ; the development of modern industrial methods ; plant location and layout : materials, their purchase, storage, handling and control ; routing, scheduling and despatching ; the manufacturing plant ; plant services, their operation and maintenance ; organising the work-place for unit operations for low-cost production.

I.E. 104 **Engineering Statistics** (48 hours lectures ; 36 hours tutorial and practical)

Graphical analysis ; observational mathematics and the use of theory of probability and statistical methods in scientific inference applied to engineering problems ; measures of central tendencies, dispersion, skewness, and kurtosis ; the application of the normal, chi-square, student's 't' Binomial, and Poisson distributions to engineering problems ; linear regression of one variable, and simple correlation ; sampling theory, tests of significance, and engineering applications of sampling theory.

I.E. 105: **Industrial Relations and Personnel Management** (24 hours lectures)

The background, need for, and advantages of formal organisation of personnel administration ; wages, hours, and working conditions ; training and education in industry ; trade unions and collective bargaining techniques ; economic engineering, and personal aspects of industrial safety and health problems ; employee welfare and other service activities.

I.E. 106 : **Industrial Organisation and Management** (24 hours lectures)

The theory and practice of organising industrial enterprises ; authority and responsibility ; decision, planning, preparation and review ; systems of communication and response ; control and evaluation ; functions of the board of directors ; leadership and top management ; trusteeship responsibility ; scientific management from Taylor to date and growth of management as a profession ; recent trends in management.

I.E. 107 : **Engineering Materials, Production Methods and Processes** (48 hours lectures ; 24 hours tutorial and practical)

Designing for mass production ; economic use of raw materials in manufacturing ; survey of general purpose low-cost methods and equipment used for processing engineering materials ; manufacturing methods and selection of equipment for specific industries of local importance.

I.E. 108 : **Cost Accounting** (24 hours lectures)

A study of the basic principles and procedures of cost accounting ; production, distribution and financial costs ; use of cost information in administration ; job orders, process and standard cost systems, the cost to possess and its behaviour ; determination and adjustment of burden ; costs as a basis of pricing and rate fixing ; statistical determination of cost determinants.

I.E. 109 : **Corporation Finance** (24 hours lectures ; 18 hours tutorial and practical)

National income and savings ; channeling of savings into the funds of the industrial enterprise ; banking system and its significance as a source of short and long-term funds ; specific sources and application of funds in different types and sizes of enterprises ; financial ratios ; financial structure and controls ; financial instruments and their maturity ; divorce of control from ownership ; mergers and holding companies ; reorganisation ; emphasis is placed on the development of analytical techniques as a basis for financial judgments.

I.E. 110 : **Production Planning and Control** (24 hours lectures)

Analysing the product with reference to methods of producing same commensurate with the quantity to be produced ; methods of production organisation and analysis of operations involving men, material and machines ; the design and application of control mechanisms, forms and procedures ; the study of production planning and control in continuous and intermittent operations of various sizes ; relating budgeting to production.

I.E. 111 : **Machine Tools** (12 hours lectures ; 12 hours tutorial and practical)

The economics and operation of machine tools and equipment typically found in various manufacturing industries ; special purpose machines and combinations for mass production of specific products.

I.E. 112 : **Metrology** (12 hours lectures ; 12 hours tutorial and practical)

Use and operation of specialised measuring instruments, gauges, and machines ; direct and indirect methods of measurement ; standards, their preparation and maintenance ; angular measurements ; optical measurements ; precision measurements ; limits and fits ; selective assembly ; special problems in measurements ; manufacture of gauges ; testing of gauges ; surface finish.

I.E. 113 : **Jigs and Fixtures** (12 hours lectures ; 12 hourstu torial and practical)

The fundamentals of work simplification ; selection and application of jigs, fixtures and gauges in modern production ; the production of precision surfaces ; interchangeable manufacture as applied to specific industries.

I.E. 114 : **Job Evaluation and Wage Incentries** (12 hours lectures ; 12 hours tutorial and practical)

The job and its elements ; job analysis and specification ; job rating ; correlating the worker and the job ; wage and salary administration ; incentive systems ; recruitment and aptitude testing ; elements of industrial psychology.

I.E. 115 : **Time Study and Motion Economy** (48 hours lectures ; 36 hours tutorial and practical)

A study of the theories and techniques of motion and time study as applied to the various aspects of work organisation and simplification ; application of these techniques in job descriptions, time computations, setting standards, work-place layout etc. ; demonstration of time-studying specific manufacturing operations.

I.E. 116 : **Design of Manufacturing Enterprises** (24 hours lectures ; 36 hours tutorial and practical)

The principles and methods used in estimating the probable economic characteristics of proposed industrial projects ; layout of the organisation of such projects and the specification of technical, financial and other requirements : estimates of probable returns on capital invested.

I.E. 117 : **Statistical Quality Control** (48 hours lectures ; 48 hours tutorial and practical)

A study of the techniques and procedures appropriate for the control of industrial operations ; collection, analysis and interpretation of production data ; industrial sampling theory and statistical tests applicable to controlling quality in raw materials, goods in process, and finished products ; control charts ; methods for summarising and reporting to management the results of control activities.

I.E. 118 : **Budgetary and Higher Control in Industry** (24 hours lectures)

A study of budgeting methods in industry ; requirements for the introduction of budgeting procedure in a business ; preparation,

execution and control of the budget ; sales, production, expense and investment budgets. Emphasis is on the principles involved rather than on the technical accounting procedures.

I.E. 119 : **Estimating and Rate Fixing** (24 hours lectures ; 24 hours tutorial and practical)

Rate fixing and time study ; principles involved in fixing rates for specific machine shop and other manufacturing operations ; graphic charts and tables for the determination of working times ; process layouts and cost estimates ; plant capacity and arrangement ; effective utilisation of plant capacity.

I.E. 120 : **Industrial Standardisation** (24 hours lectures)

Purposes of standardisation ; definition and characteristics of a standard ; the techniques of formulating, introducing and maintaining standards ; organisation of a standards department in industrial concerns ; relations with technical societies and national and international standards bodies.

I.E. 121 : **Seminar in Industrial Engineering** (36 hours tutorial and practical)

The economic design of selected types of industrial plants presented by students under the guidance of the professor in-charge ; the proposal, the layout, investment, and working capital requirements ; raw material and production problems, equipment ; costs of operation, earnings and other technical and financial details.

B.M. 201 : **Business Organisation and Management** (24 hours lectures)

Methods of organising business enterprises ; proprietorship ; companies and corporate organisations ; conversion from one type of undertaking to another ; functional responsibilities of different departments within the business ; business problems in the order they would be encountered in a new business, survey of a new venture, promotion, organisation, personnel, operation, control, expansion or liquidation ; ways and means of organising and controling men and activities so as to obtain effective coordination ; scientific management ; recent trends in management ; problems of large-scale organisation ; external relationships.

B.M. 202 : **Advanced Accounting** (36 hours lectures ; 48 hours tutorial and practical)

Preparation and interpretation of financial reports as an essential business tool ; reporting to top management, stock-holders and creditors ; study of specific company accounting procedures ; accounting problems in consolidations, mergers and reorganisation ; mechanised accounting principles and practice.

B.M. 203 : **Business Statistics** (48 hours lectures, 36 hours tutorial and practical)

Methods of analysing business and economic data ; Basic statistical concepts in presenting results of analysis ; Methods of summa-

rising unclassified and classified data : construction and use of index numbers ; analysis of time series ; simple correlation analysis ; elements of sampling.

B M. 204 : **Purchasing, Storekeeping and Material Control** (48 hours lectures ; 96 hours tutorial and practical)

Functions of the purchasing department in business concerns ; problems and methods of purchasing ; organisation of the Department ; specifications, standards, contract provisions ; sources of supply, methods of inventory ; warehousing of materials, storage. layout and accessibility of stores ; materials handling ; systems of records ; specialised storage ; buying in relation to sales policy ; budgeting for purchasing ; inspection, issue and control of materials.

B.M. 205 : **Advanced Economics** (48 hours lectures)

The work of leading economic analysts—Adam Smith, David Ricardo, Alfred Marshall ; Karl Marx, Thornstein Veblen, W.C, Mitchell, J.M. Keynes ; the functions of an economic system ; national income ; economic fluctuations, business forecasting. risk and insurance ; analysis and measurement of demand, behaviour of costs ; price determination ; capital formation ; company policy in relation to public policy ; monopoly.

B M. 206 : **Industries and Resources of India** (24 hours lectures ; 24 hours tutorial and practical)

A study of the geography of India in terms of its position in resources, raw materials, manufactured products, consumer and capital goods with reference to population ; changing regional pattern of economic activities ; problems of manufacturing industries comparison with the economies of industrially advanced countries ; probable economic changes in the near future.

B.M. 207 : **Office Management and Methods** (12 hours lectures ; 12 hours tutorial and practical)

The relation of the office to the general business ; Organisation of the office in a business concern ; functional responsibilities of different sections in the office ; office routines ; flow of work ; office equipment and machines ; indexing and filing systems ; personnel administration ; selection and training of personnel ; delegation of authority ; accounting and financial control ; coordination with manufacturing and sales agencies ; public relations ; measurement of office work and setting of standards, planning and scheduling office work.

B,M. 208 : **Cost Accounting** (18 hours lectures ; 24 hours tutorial and practical)

A study of the basic principles and procedures of cost accounting ; methods of determining unit and standard costs ; material, labour and services ; purchasing, distribution and administrative costs : pricing and pre-determination of costs ; cost reporting to top-management ; forms and procedures used in specific businesses ; variances and control.

B.M. 209 : **Economic Statistics** (24 hours lectures ; 18 hours tutorial and practical)

A systematic development of statistical methods with reference to their application in economic research ; statistical inference methods ; simple, multiple, and partial co-relation and variance analysis ; statistical induction and testing of hyphotheses ; small and large samples ; index numbers ; measurement of productivity ; analysis of time series and business cycles.

B.M. 210 : **Public Finance and Taxation** (12 hours lectures)

A general introduction and history of public finance ; general theories and principles of taxation ; incidence of taxation ; current systems of local, State and Central taxation ; sources of public revenues ; classes of public expenditure ; fiscal policies ; public debts ; budgets national, State and local ; effects of taxation on business policies and practices, particularly incometax.

B M. 211 : **Market Research and Sales Forecasting** (24 hours lectures ; 18 hours tutorial and practical)

Problems of discovering, measuring, and appraising the size and character of markets for specific commodities or groups of commodities ; methods of market research ; functions of a market research department ; sources of data and methods of their collection ; sampling techniques and design of experiments ; planning of field surveys ; current market indices ; preparation of reports and application of findings ; statistical methods used in forecasting sales.

B.M. 212 : **Economics of Transportation** (24 hours lectures)

A survey of the history and growth of the several types of transportation ; their organisation, operation and economic characteristics ; present position of transportation in the Indian economy ; general principles of pricing and the growth and content of rates ; service regulations ; selection of proper forms of transportation to suit specific commodities ; relative merits of the different forms of transportation ; problems of inland and overseas transportation

B.M. 213 : **Business Ethics and Sociology** (12 hours lectures)

The conduct of business policies in relation to the individual, community, and the State ; ethical aspects of contract, pricing, distribution, and marketing ; development of social services, social insurance, and care of special groups ; the place of business in relation to the development of the public social services ; professional ethics and conduct ; etiquette in business

B.M. 214 : **Economic Analysis** (48 hours lectures)

Determination of National Income and its fluctuations ; composition and pricing of national output ; economic factors underlying cyclic variations ; international similarities in these fluctuations; forecasting through application of the economic model and statistical indicator techniques ; basic sources of information on economic movements and analysis of collected data ; forces determining the state of business ;

B M. 215: **Banking and Insurance** (48 hours lectures; 36 hours tutorial and practical)

Credit theory and credit control; money and currency; banking system in India; Indian banking sy tem compared with the U.S. and the U.K. systems; commercial bank lending policies; money market analysis; foreign exchange; hazards of business and insurance; principles underlying premium rates and reserves; discussion of insurance problems; planning prevention, under-writing, governmental regulations, adjustments, agency, social insurance. The aim is to develop an appreciation of the place of banking and insurance in business.

B.M 216: **Business Finance and Budgetary Control in Business** (48 hours lectures; 36 hours tutorial and practical)

Management of enterprise financing; financial problems arising out of extensions and contractions; promotive activities; financial instruments; budgetary integration of the financial activities of business enterprise; investment policies: analysis of securities; criteria for the selection or rejection of issues; organisation, operation and regulation of security markets; budgetary practice in business concerns; preparation, execution, and control of the budget; sales, production, expense, and investment budgets; top management control and coordination.

B.M. 217: **Mercantile Law** (24 hours lectures)

Law of contracts; formation, enforcement and discharge of contracts; laws of the market; rights and liabilities of buyers and sellers; legal aspects of social control of business through governmental agencies; legal aspects of patents, copyrights and trade marks; laws of insurance; laws affecting management of labour; partnership and institutional laws; laws of transportation.

B.M. 218: **Advertising and Sales Management** (24 hours lectures; 24 hours tutorial and practical)

Sales promotion methods to secure consumer and trade acceptance of products and services; advertising and use of salesman as tools in accomplishing a desired promotive task; advertising methods, choice of themes, selection of media, copy and layout techniques, methods of testing effectiveness; selection, training, supervision and control of salesmen; control of sales operations and role of price policy; analysis of sales activities and measurement of market potentials; selection of channels of distribution; wholesale and retail marketing; restrictions and state regulations; installation and service activities; special problems as selective selling, reciprocity, specifications, stock turnover, brand selling, bids, etc.

B.M. 219: **Principles of International Trade** (48 hours lectures)

Historical background; import and export techniques; financing imports and exports; relation between foreign trade and national income, prices and exchange rates; analysis of world trade in selected commodities with emphasis on explanation of trends and fluctuations;

doctrines of free trade and practice, aims, methods and results of Indian Tariff and Trade Agreement systems ; bilateral trade-balancing, imperial preference systems ; use of exchange controls, quotas and other regulatory devices ; Havana charter ; problems and policies relating to foreign investment ; position of India in world trade ; means of transport in international trade.

B.M. 220 : **Seminar in Current Business Problems** (36 hours tutorial and practical)

Students in small groups will present comprehensive investigations on any specific managerial problem of business under the guidance of professor-in charge ; the subjects may relate to accounting, banking, insurance, business laws, economics, finance, labour relations, management, marketing, transportation or other related fields.

I.A. 301 : **Principles of Accounting-I** (48 hours lectures ; 48 hours tutorial and practical)

Double entry ; organisation of accounts ; trial balance; trade and profit and loss accounts ; appropriation accounts ; balance-sheet ; the cash forecast ; bad debts ; depreciation ; reserves ; revenue and capital branch accounts ; manufacturing accounts ; investment. This basic course emphasises techniques essential to professional accounting.

I.A. 302 : **Fundamentals of Economics** (48 hours lectures)

Nature of economical loss ; development of economic life ; fundamental concepts of economics ; goods, wealth, income, value, utility and price ; laws of supply and demand ; production, plant ; labour, capital and related concepts. This basic course emphasises the fundamental principles of economics.

I.A. 303 : **Industrial History and Structure** (24 hours lectures)

Medieval economic organisation ; early modern economic organisation : modern economic organisation ; structure of industry in the Indian economy in relation to other sectors ; economic structure of the basic industries of India.

I.A. 304 : **Principles of Accounting-II** (24 hours lectures ; 18 hours tutorial and practical)

Use and interpretation of financial reports and statements ; special problems regarding balance-sheets, profit and loss statements, surplus, depreciation, holding companies, consolidations, mergers and dissolutions. This course emphasises the accounting techniques and accounting machine employed in industry.

I.A. 305 : **Elements of Engineering** (24 hours lectures ; 24 hours tutorial and practical)

The aim of this course is to give a general background knowledge of engineering to non-technical students. The topics selected will be such as would be beneficial to administrators in industry. Emphasis is laid on the operation and maintenance of equipment used in factories.

I.A. 306 : **Social Economics** (24 hours lectures)

The social frame work , population ; national captital ; social capital ; national income ; social income ; disparities in income ; poverty ; unemployment ; social security and its implications ; working conditions ; state intervention regarding wages, hours, working conditions; holidays, etc., the problem of women workers and child labour ; broad aspects of a planned economy ; social surveys.

I.A. 307 : **Labour Economics and Trade Unionism** (24 hours lectures)

Labour problems of an industrial society ; wages theory and practice ; depression and technological unemployment ; disability and discrimination ; the trade union in industry ; world trade union history ; Indian trade union history ; organised labour today ; present day labour problems ; protecting the wage and the wage-earner ; future for labour in India.

I.A. 308 : **Accounting Analysis, Interpretation and Reporting** (56 hours lectures ; 24 hours tutorial and practical)

A study of the methods of analysis and interpretation of accounting data and the development of accounting reports for use in the administration of business and industry and the solution of various problems ; application of accounting control to industry ; case problems involving accounting policy approached from administrative viewpoint ; determination of profit ; asset valuation ; determination of net wealth ; consolidated statements ; reporting to top manage ment stock-holders and creditors.

I.A. 309 : **Elements of Industrial Statistics** (24 hours lectures ; 36 hours tutorial and practical)

Tabulation ; errors . average, dispersion ; index number ; correlation ; time series ; graphical methods of presenting statistical and economic data ; sources of statistics and their uses ; nature and use of official statistics ; census of production ; monthly digest of statistics.

I.A. 310 : **General Psychology** (36 hours lectures)

The origin and control of human activity ; individual differences basic concepts of psychology ; the central nervous system and behaviour ; sensory functions ; receptors and effectors ; the problem of development ; motivation and emotion in social life ; attention, perception and learning ; thought and judgment , the individual and society, abilities and tests, intelligence ; personality.

I.A. 311 : **Administrative Theory and Philosophy of Management** (48 hours lectures)

The theory and practice of industrial administration processes and techniques, comparison with military and governmental undertakings ; administrative organisation ; departmentation ; delegation ; coordination ; staff and functional authority ; effect of size on organisation ; objectives and goals ; planning and control ; long-

range planning ; standards and measurement of performance, leadership and training as related to control ; scientific management from Taylor todate ; growth of management as a profession ; recent trends in management ; large-scale organisation and management ; the basic life-cycle of any enterprise decision, planning, preparation and review ; systems of communication and response ; analysis and synthesis ; why men work ?

I.A. 312 : **Public Utilities and Rate Regulation** (24 hours lectures)

An economic study of the organisation and control of public utilities such as electrical, gas, water, bus, and railway utilities. The concept of a public utility and the problems of regulation that are implied by this concept ; types of control execised by Public Service Commissions ; valuation and rate regulation ; fair return ; justification of operating expenses ; the determination of proper rate schedules as among different classes of customers and services ; Capitalisation, security regulation ; holding companies and combinations ; relative advantages of private and public ownership.

I.A. 313 : **Personnel Management and Industrial Psychology** (48 hours lectures)

The background, need for, and advantages of formal organisation of personnel administration ; typical personnel departments in small and large organisations ; functional classification of personnel work ; personnel records and forms ; special problems in personnel administration and management ; joint consultation ; the use of psychology in personnel administration ; job and worker analyses ; use and characteristics of psychological tests ; employment tests in use ; conditions of work and productivity ; industrial training ; accidents and the safety problem ; fatigue and monopoly ; worker motivation and morale.

I A. 314 : **Public Relations** (24 hours lectures)

Principles of handling public relations in business, government, labour and social institutions ; public relations planning ; publicity programmes in large and small organisations ; methods of obtaining public opinion on company policies and products ; promotive activities ; organisation and management of public relations departments in specific companies.

I.A. 315 : **Collective Bargaining and Labour Legislation** (12 hours lectures)

The origin and theory of collective bargaining ; some trade union policies and practices ; role of collective bargaining in determining hours, wages and working conditions ; protective clauses ; a typical trade union contract ; public interest in collective bargaining ; negotiation, arbitration, and settlement of disputes ; an appraisal of the current and proposed laws affecting labour and industry.

I.A. 316 : **Industrial Cooperation** (12 hours lectures)

Cooperation as the essence of human activity ; history of cooperation ; status of ccoperatives in India in fields other than

industry ; need for cooperation in industry ; village industries and cooperation ; industrial cooperatives and regional self-sufficiency in manufacturer-consumer products ; role of cooperation in specific industries of India ; cooperative industrial research.

I.A. 317 : **Industrial and Regional Planning** (12 hours lectures)

Analysis of strategic problems affecting regional specialisation of industries ; extent of regional self-sufficiency in India ; case for regional self-sufficiency ; managerial problems of planning and control of capital expenditures when several States are involved in the development of a region ; process of private capital formation from the viewpoint of public policy ; problems of pooling financial resources ; industrial planning from the viewpoint of what is possible of attainment ; comparative study of the several plans prepared in India ; critical study of the current plans.

I.A. 318 : **Personnel Techniques** (24 hours lectures ; 24 hours tutorial and practical)

The course covers in detail the latest techniques and methods used by personnel managers and industrial engineers in selecting, training, rating, paying and other dealings with personnel in particular ; recruitment, aptitude testing, industrial training, supervision and foremen status, grievance procedure, promotion and transfer, employee merit rating, safety drives, suggestion systems, employees' health services, company magazines and miscellaneous personnel services. Emphasis is laid on the application of principles to specific situations.

I.A. 319 : **Corporation Finance and Investment Policies** (48 hours lectures ; 36 hours tutorial and practical)

Methods of enterprise financing, banking system and its significance as a source of short and long-term funds, specific sources and application of funds in different types and sizes of enterprises, financial ratios, financial instruments and their maturity, national income and savings, channeling of saving into the funds of the industrial enterprise, formulation of investment policies, analysis of securities, criteria for the selection or rejection of issues, organisation, operation and regulation of security markets, holding companies, mergers and consolidations re-organisations, dissolutions.

I.A. 320 **Seminar in Current Industrial Problems** (36 hours tutorial and practical)

Students in small groups will present comprehensive investigations on any specific management problem in industry under the guidance of the professor-in-charge. The topics may relate to the human or financial control of the industrial organisations.