

**PROCEEDINGS OF THE TWELFTH MEETING
OF THE
ALL INDIA COUNCIL FOR TECHNICAL
EDUCATION**

Held at

New Delhi on 13th April, 1959

MINISTRY OF SCIENTIFIC RESEARCH & CULTURAL AFFAIRS

GOVERNMENT OF INDIA

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

The 12th meeting of the All India Council for Technical Education was held at New Delhi on the 13th April, 1959 at 11-00 A.M. Professor Humayun Kabir, Minister for Scientific Research & Cultural Affairs presided over the deliberations.

The following were present:—

1. Prof. M. S. Thacker Educational Adviser (Technical) to the Government of India.

Members of Parliament

2. Shri P. R. Ramakrishnan Lok Sabha
3. Shri Ganapati Ram Lok Sabha
4. Shri Jaspat Roy Kapoor Rajya Sabha

Planning Commission

5. Shri T. N. Singh

Ministries of Government of India

6. Maj.-Gen. Harkirat Singh Ministry of Defence
7. Shri A. V. Venkateswaran Ministry of Finance
8. Shri S. Abdul Qadir Ministry of Labour & Employment
9. Shri M. Hayath Ministry of Irrigation & Power
10. Shri R. Prasad Ministry of Home Affairs
(Directorate of Manpower)
11. Shri S. Mullick Ministry of Food & Agriculture
12. Shri A. C. Ramchandani Ministry of Information & Broadcasting
13. Shri S. K. Ghosh Ministry of Transport & Communications
14. Shri H. N. Sethna Department of Atomic Energy
15. Shri Baleshwar Nath Central Board of Irrigation & Power

State Governments

16. Shri C. V. D. Murthy Andhra Pradesh
17. Shri Radhika Das Assam
(accompanied by Deputy Director of Technical Education)
18. Shri H. N. Bahuguna Uttar Pradesh
(accompanied by Dr. D. R. Dhingra)
19. Shri T. N. Tolani Bombay

20. Shri L. C. Gupta Madhya Pradesh
(accompanied by Shri
S. K. Dass)
21. Shri J. G. Abraham Madras
22. Dr. H. B. Mohanty Orissa
23. Shri Surajmal Punjab
(accompanied by Shri
D. C. Sharma)
24. Shri L. P. Shahi Bihar
25. Dr. D. M. Sen West Bengal
26. Shri K. Channabasaviah Mysore
27. Shri V. V. Gopalakrishna Kerala
28. Shri B. D. Bhatt Delhi

Industry and Commerce

29. Prof. G. M. Nabar Employers Federation of India
30. Shri G. Y. Mangrulkar —do—
31. Shri A. M. M. Murugappa Federation of Indian Chambers of
Chettiar Commerce & Industry
32. Prof. M. P. Gandhi —do—

Labour

33. Shri Shanta Ram S. Tawde Hind Mazdoor Sabha

University Grants Commission

34. Dr. C. D. Deshmukh

Central Advisory Board of Education

35. Col. B. H. Zaidi

Inter-University Board of India

36. Dr. A. L. Mudaliar

National Council for Rural Higher Education

37. Shri T. S. Avinashilingam
Chettiar M.P.

Association of Principals of Technical Institutions (India)

38. Shri T. Sen
39. Shri V. Lakshminarayanan

Professional Bodies

40. Shri D. P. R. Cassad Institution of Engineers
41. Shri M. P. Chitale Institute of Chartered Accountants

Nominees of Government of India

42. Dr. S. R. Sen Gupta
43. Shri Fazal I. Rahimtoola

Chairmen of Regional Committees—(Ex-officio)

44. Lala Shri Ram Northern Regional Committee
 Dr. A. L. Mudaliar Southern Regional Committee
 (Representing Inter-University
 Board also)

Chairmen of All India Boards of Technical Studies (Ex-officio)

45. Dr. V. K. R. V. Rao Commerce
 Lala Shri Ram Textile Technology
 (Chairman, Northern Regional
 Committee)
46. Shri N. K. Mitra Engineering & Technology
47. Shri S. H. Parolkar Architecture & Regional Planning
48. Dr. G. P. Kane Chemical Engineering & Chemical
 Technology

Secretary

Shri G. K. Chandiramani

Shri P. L. Verma, Member, Union Public Service Commission, Shri S. C. Sen, Principal, Delhi Polytechnic, Delhi and Dr. A. N. Khosla, Vice-Chancellor, University of Roorkee attended by special invitation.

Shri L. S. Chandrakant and other officers of the Technical Education Division of the Ministry were also present.

The following members were unable to attend :—

1. Shri K. G. Saiyidain Educational Adviser to the Govern-
 ment of India

Ministries of Government of India

2. Dr. A. Nagaraja Rao Commerce & Industry
3. Shri S. S. Khara Department of Mines & Fuel,
 Ministry of Steel, Mines & Fuel
4. Shri B. C. Mathur Department of Steel, Ministry of
 Steel, Mines & Fuel
5. Shri K. S. Krishnaswamy Works, Housing & Supply
6. Director, Mechanical Railway Board
 Engineering
7. Shri D. C. Das Department of Communications,
 Ministry of Transport & Communi-
 cations

State Governments

8. Shri G. A. Mukhtar Jammu & Kashmir
9. Shri V. G. Garde Rajasthan
10. Shri P. C. Saxena I.A.S. Himachal Pradesh

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| 11. Shri N. M. Patnaik | Tripura |
| 12. Shri S. D. Bahuguna | Manipur |
| Industry & Commerce | |
| 13. Shri B. F. Goodchild | Associated Chambers of Commerce
of India |
| 14. Shri Bharat Ram | —do— |
| 15. Shri T. R. Gupta | All India Organisation of Industrial
Employers |
| 16. Shri Nandkishore Sakarla | —do— |
| Labour | |
| 17. Shri Michael John | Indian National Trade Union
Congress |
| 18. Shri B. K. Nair | —do— |
| 19. Shri P. Subbramaniah | National Federation of Indian
Railwaymen |
| National Institute of Sciences of India | |
| 20. Prof. S. K. Mitra | |
| Chairmen of Regional Committees (Ex-officio) | |
| 21. Shri J. J. Ghandy | Eastern Regional Committee |
| 22. Shri Kasturbhai Lalbhai | Western Regional Committee |
| Chairmen of the All India Boards of Technical Studies (Ex-officio) | |
| 23. Prof. V. N. Adarkar | Applied Art |
| Shri J. J. Ghandy | Management |

The Chairman spoke in moving terms about the loss suffered by the country in the death of Dr. J. C. Ghosh, who had worked all his life for the cause of education. Dr. Ghosh had been a member of the Council from its inception and had served it well and truly. It would be difficult to fill in the void caused by his death. Members stood in silence for a minute in memory of late Dr. J.C. Ghosh and passed the following condolence resolution :—

“The All India Council for Technical Education places on record its deep sense of loss and profound sorrow at the passing away of Dr. J.C. Ghosh. Dr. Ghosh had been a member of the Council since its inception and his advice and guidance to the Council on all occasions was most valuable in the cause of Technical education in the country. With his passing away, the Council has suffered an irreparable loss.”

The Chairman welcomed the members of the Council to the meeting and delivered his inaugural address. A copy of the address is at Annexure I.

The Council thereafter proceeded with the consideration of the Agenda (Annexure II).

Item No. 1 :—To confirm the minutes of the 11th meeting of the Council

It was reported that the minutes of the eleventh meeting held at New Delhi on the 24th March, 1958 had been circulated to the members and no comments had been received. The minutes were confirmed.

Item No. 2 :—To report the membership of the Reconstituted Council

Secretary reported that since the Agenda papers had been circulated, (1) Shri G.P. Kane had been elected as the Chairman of the Board of Studies in Chemical Engineering & Chemical Technology; (2) Shri M.P. Chitale had been nominated as a representative of the Institute of Chartered Accountants, India; (3) The Ministry of Steel, Mines & Fuel had been given one more seat to represent the Department of Steel and Shri B.C. Mathur was nominated to this seat; (4) Shri Nagendra Singh had been nominated as the representative of the Department of Transport in the Ministry of Transport & Communications, and (5) The Ministry of Transport & Communications had been given one more seat to represent the Department of Communications in the Ministry and Dr. D. C. Das had been nominated to this seat.

The Council noted its membership as reconstituted.

Item No. 3 :—To report the Action taken on the Recommendations/ Decisions of the Council made at the 11th meeting

Competitive tests for admission to Engineering Colleges

The Council noted with regret that the State Governments had not responded favourably to the suggestion made by it at the last meeting regarding the holding of common entrance examinations on regional basis for the purpose of admission to the Engineering Colleges in the country. Only six State Governments had replied to the communication sent by the Centre and all the six Governments had rejected the proposal.

The Council was of the view that the State Governments had not generally appreciated the situation from the point of view of the candidates seeking admission to engineering courses and had probably apprehended that the holding of common admission tests would lead to interference by the Regional or the Central Board in the matter of admission to the State Government and other institutions. It was explained that it was not the intention that Regional Examination Boards or the Central Coordinating Agency should take decisions on applications for admissions. These Boards would only render a service in that they would make available to the authorities of the various institutions in the country, their assessment of the candidates based on a common standard. Decisions on applications would still lie with the individual States and

Colleges, but the candidates will not have to undergo the hardship of appearing for a number of examinations held by individual institutions.

During the course of discussion on this matter, the question of reservation of seats in colleges for various classes and communities came up. The general concensus of opinion was that measures designed towards the improvement of conditions and larger provision of opportunities for Engineering Education for Backward Classes were necessary but such measures should not lead to large "wastages" in the colleges. Opportunities should be afforded to only those who are capable of profiting from them.

After a long discussion during which conflicting view points were put forward, the Council came to the conclusion that sufficient data was not available to it on the basis of which it could make any definite and detailed recommendations on the problems pertaining to admissions including the reservation of seats for any specified classes or categories of candidates. The Council desired that its Secretariat should collect the information and submit a detailed note to it at its next meeting.

Pending the submission of the note and its consideration by the Council, it was decided that common admission examinations may be organised for the Higher Technological Institutes set up by the Central Government and such other Central and State Institutes as may agree to join the scheme voluntarily. The question of holding such tests on a Regional basis for the entire country may be held in abeyance.

Interest-free Loans for Hostels

Secretary informed that in the case of the Centrally sponsored new engineering colleges and polytechnics, Government had decided to grant interest-free loans for hostels. The Council hoped that this principle will be made applicable to other technological institutions in the country.

Training & Placement Officers

In view of the importance of organised practical training for technical students, the Council decided to request the University Grants Commission to reconsider its decision on the question of appointment of Training & Placement Officers in the University Departments of Engineering.

Teachers for Technical Schools

The Council was of the view that greater collaboration should be brought about between the technical institutions and industry, both private and Government sponsored. It would be to the mutual advantage of both the Institutions and Industry if arrangements can be made for exchange of personnel. Industry should provide part-time teachers to the educational institutions in greater numbers.

Item No. 4 (a) :—To consider the proposal of the Education Minister, Madras for a change in the system of election of members of States in respective Regions on the Coordinating Committee

The Council decided to amend the constitution of the Coordinating Committee to provide for rotational representation of States on the Coordinating Committee on a yearly basis.

Item No. 4 (b) :—To elect representatives of the Council on the Coordinating Committee

The Council noted that in view of the decision taken under item 4 (a) and the arrangements already existing for rotational representation of Members of Parliament, action need to be taken to elect one member on the Coordinating Committee from out of the other members of the Council.

Prof. M.P. Gandhi was elected by the members concerned.

Item No. 5 :—To report the decisions of 27th meeting of the Coordinating Committee held on 18th October, 1958 (other than those covered by Item Nos. 6, 7 & 8)

The report was recorded.

Item No. 6 :—To consider the Recommendations and Decisions of the All India Boards of Technical Studies

(A) Engineering Board : The Council endorsed the view of the Board that candidates who have passed the Higher Secondary Examination in the Technical Stream should be admitted direct to the 2nd year of the National Certificate courses (or State Diploma courses) under certain conditions.

The Council decided that Universities be requested to formulate Degree courses for the benefit of those who had passed the National Certificate courses or equivalent State Diploma courses. Such courses should be available both on full-time and part-time basis. Wherever Universities did not provide such facilities, the State Boards may formulate Advanced Diploma courses of equivalent standard. The Advanced Diploma courses should be organised only at selected institutions. Facilities should also be organized for preparing students for examinations held by the Institution of Engineers (India).

The Council accepted the recommendations for provision of five-year Integrated courses after Higher Secondary in place of the existing four-year courses after Intermediate Science with the following additional instructional facilities in a college admitting 120 students to the first year:—

Buildings (plinth area)	16,000 sq. ft.
Equipment & furniture	Rs. 1.44 lakhs.

Staff : Professors (Physics, Mathematics & Chemistry).	3
Readers & Lecturers	5
Junior Lecturers (or Teaching Assistants).	4
Maintenance Expenditure ..	Rs. 20,000 per annum.

The Council agreed with the view of the Board that the scheme for the expansion of facilities for training in Agricultural Engineering be deferred.

The Council endorsed the view of the Board that training for the award of a diploma in Automobile Engineering should be organised only for those students who have completed the diploma course in Mechanical Engineering.

In regard to the specialised training of surveyors and computers, the Council agreed with the view of the Board that there was no need for such training. The Council endorsed the view of the Board that there was no justification for increase in the accommodation for teaching staff in the first degree institutions suggested by the Northern Regional Committee.

(B) Architecture Board : In view of the growing importance of land-scape architecture, the Council endorsed the recommendation of the Board that Post-graduate courses in Land-scape Architecture be organised at the School of Town and Country Planning, Delhi and the Indian Institute of Technology, Kharagpur.

The Council generally agreed with the view that teachers in architectural schools should be sent abroad for further training to acquaint themselves with the latest developments and that in addition to the United Kingdom, countries like Italy, Mexico and Japan should also be considered for training. Efforts should be made to secure such training facilities under the International Aid Programmes.

(C) Board of Chemical Engineering & Chemical Technology : The Council accepted in principle the scheme of training of Operators in Chemical Industries formulated by the Board.

The Council endorsed the recommendation of the Board regarding the reorganisation of training course in Silicate Technology.

Item No. 7 :—To consider the Recommendations/Decisions of the Regional Committees of the Council

Western Regional Committee

The Council approved the recommendation of the Western Regional Committee that Architecture courses should not be organised at the Birla Vishwakarma Mahavidyalaya, Anand.

The Council accepted the recommendation of the Regional

Committee that the Federation of Gujerat Mills and Industries, Baroda be permitted to establish a centre at Baroda for training in foremanship and supervision on the lines of the scheme formulated by the All India Council for Technical Education and approved an annual recurring grant of Rs. 4,000 for the purpose. The recommendation of the Regional Committee that the course may be conducted through the regional language instead of English was accepted with the proviso that the success of the course be evaluated after a period of two years.

In regard to the recommendation of the Regional Committee that equipment required for technical institutions be imported in bulk by the Central Government and distributed to institutions, the Council decided to consider the question after the report of the Lala Shri Ram Committee on buildings and equipment is available.

Having regard to the dearth of facilities for practical training available in the country in relation to large output of institutions, the Council expressed the view that compulsory practical training for a specified period should not be laid down for the award of a degree or diploma.

The Council agreed with the view of the Regional Committee that Central coordination machinery should exist for the purpose of organising practical training and accepted the suggestion that the Western Regional Office should coordinate the work for graduates and diploma holders in Engineering and Technology and the Director of Technical Education, Bombay should do so for the training of craftsmen in the State of Bombay.

The Council did not think it necessary at this stage to increase the value of the practical training stipends for degree holders from Rs. 150 to Rs. 250 p.m. and that for diploma holders from Rs. 100 to Rs. 150 p.m.

The Council approved the proposals for the development of Puranmal Lahoti Smarak Technical College, Latur. The Council did not, however, recommend that the pattern of assistance be different from the one approved by the Central Government for all such institutions.

The Council approved the scheme prepared by the Regional Committee for the development of the Central Technical Institute, Gwalior for provision of diploma courses in Mechanical and Electrical Engineering. The Council noted that the State Plan included provision for the purpose. The Council further recommended the deletion of condition No. 4 which *inter alia* stated that students passing the final examination will be awarded diplomas after they have undergone practical training for a period not less than six months.

The Council decided to forward to the University Grants Commission the recommendations of the Regional Committee for additional grants to

the Lakshminarayan Institute of Technology, Nagpur University to provide for the introduction of fuel technology and oil technology as electives in the Chemical Engineering Degree Course.

The Council approved the proposal of the Regional Committee that the present intake into the Architecture course in the J. J. School of Arts, Bombay be increased from 80 to 100.

The Council approved the introduction of a three-year diploma course at the Government Training Institute, Khar in place of the present two-year course.

The Council approved the recommendation of the Regional Committee that the intake in the Govindram Saxeria Technological Institute, Indore may be increased from 100 to 120.

The recommendations of the Council for development of Technical education in the region are given below. These are subject to the usual financial scrutiny :—

Name and Class of Institution	Buildings	Equipment & Furniture	Total	Additional Recurring (Ultimate)	Loans for Hostels
	Rs.	Rs.	Rs.	Rs.	Rs.
Bombay					
1. Training Centre for Foremanship and Supervision, Baroda (Non-Government)	...	...	...	4,000	...
2. Puranmal Lahoti Smarak Technical College, Latur (Non-Government)	3,23,000	4,31,700	7,54,700	1,26,000	2,82,000
3. Laxminarayan Institute of Technology, Nagpur (Non-Government)	38,400	1,14,000	1,52,400	61,500	...
4. J. J. College of Architecture, Bombay (Government)	42,000	93,000	1,35,000	35,000	9,98,000
5. Government Tanning Institute, Khar. (Government)	46,000	51,200	97,200	...	...
Madhya Pradesh					
Central Technical Institute, Gwalior	1,15,000	4,65,500	5,80,500	3,46,642	3,00,000

The Council recommended that the Indian Institute of Technology, Bombay may organise courses in Rolling Mill Engineering for persons working in the Rolling Mills as also for fresh Mechanical Engineering graduates. For this purpose, the services of an expert may be secured from the U.S.S.R.

Eastern Regional Committee

The Council reiterated its decision taken at the 11th meeting held

on the 24th March, 1958 that Standing Committees should be set up by the Regional Committees to watch the progress of schemes of Technical education in their respective areas and suggested that the Eastern Regional Committee may appoint such a Committee.

In the light of the views expressed by the Regional Committee and the information furnished by the State Government and taking into consideration the requirements for additional Metallurgists in the Third Plan period, the Council decided that the Bihar Institute of Technology, Sindri, should be approved as a centre for degree course in Metallurgical Engineering.

The Council approved the scheme prepared by the Regional Committee for the establishment of a Polytechnic at Belghuria.

The Council approved the scheme for the establishment of a Polytechnic at Bhadrak as recommended by the Regional Committee.

The Council agreed in principle, with the recommendation of the Eastern Regional Committee that the College of Engineering and Technology, Jadavpur may be given a rehabilitation grant for the specific purpose of purchasing equipment which cannot be repaired and put into commission. The Council recommended the replacement of the existing unserviceable boiler of a Babcock Wilcox Boiler as a special case. The Council further expressed the view that grant under this head should be limited to the amount required for the specific purpose of replacement and not for the purchase of additional equipment.

The Council approved the recommendation of the Regional Committee that additional accommodation may be sanctioned for the Assam Engineering College, Gauhati.

The Council approved the scheme of development of the Tripura Polytechnic, Agartala, formulated by the Regional Committee.

The recommendations of the Council for development of Technical education in the region are given below :—

Name and Class of Institution	Buildings	Equipment & Furniture	Total	Additional Recurring (Ultimate)	Loans for Hostels
	Rs.	Rs.	Rs.	Rs.	Rs.
West Bengal					
1. Pelghuria Polytechnic, Belghuria (Government)	9,80,000	11,00,000	20,80,000	2,53,736	...
2. College of Engineering & Technology, Jadavpur University (Non-Government)	...	5,67,140	5,67,140	...	...
Orissa					
Bhadrak Polytechnic, Bhadrak (Government)	2,80,000	11,00,000	20,80,000	2,35,268	6,34,500

Name and Class of Institution	Buildings	Equipment & Furniture	Total	Additional Recurring (Ultimate)	Loans for Hostels
	Rs.	Rs.	Rs.	Rs.	Rs.
Bihar					
Training Centre in Foremanship & Supervision, Jamshedpur (Non-Government)	...	...	...	16,000	...
Assam					
Assam Engineering Institute, Gauhati (Government)	4,93,000	...	4,93,000	...	...
Tripura					
Tripura Polytechnic, Agartala (Government)	6,67,500	7,31,500	13,99,000	*6,00,000	7,20,000
TOTAL	31,20,500	34,98,640	66,19,140	11,05,004	13,54,500

*From 1957-58 to 1964-65.

Northern Regional Committee

The Council approved the scheme prepared by the Regional Committee for the establishment of a Polytechnic at Handia.

The Council approved the scheme prepared by the Regional Committee for the establishment of a Polytechnic at Chandauli.

The Council did not accept the proposal of the Regional Committee that the Polytechnic at Nainital should be shifted to Almora. The Council was of the view that the polytechnic could continue to be at Nainital but that the State Government should ensure the provision of the necessary facilities for surveying and other aspects of work.

The Council approved the scheme prepared by the Regional Committee for establishment of the Murlidhar Gajanand Technical Institute, Mathura.

The Council approved the scheme prepared by the Regional Committee for the establishment of a Polytechnic at Khurja. The Council further recommended that in determining the grants to be paid by the Central Government, due note should be taken of the donation of Rs. 10 lakhs received by the State Government from Shrimati Indumati Jatiya for the Institute.

The Council approved the scheme of development of the P.M.V. Technical Institute, Mathura as formulated by the Regional Committee. The Council further recommended that the grants to the Institute should be made in accordance with the normal pattern.

The Council approved the schemes of development for the Civil Engineering School, Lucknow and the Hewett Engineering School, Lucknow as formulated by the Regional Committee but expressed the

view that Central Grants should be sanctioned to them only after the manner in which the additional expenditure will be shared between the State Government and Management of the Institutions is settled.

The Council approved the scheme of the Regional Committee for construction of hostels in the institutions in the region and recommended sanction of loans (interest-free) for the purpose.

The Council approved the recommendation of the Regional Committee that the College of Engineering and Technology, Muslim University, Aligarh, may be sanctioned a sum of Rs. 27,000 for constructing additional buildings with a plinth area of 1,681 sq. ft. The Council decided to forward this recommendation to the University Grants Commission.

The Council approved the recommendation of the Regional Committee that full-time National Certificate course in Textile Technology be organised at the Government Textile Institute, Kanpur.

The Council approved the recommendation of the Regional Committee that additional buildings and equipment may be provided to the M.B.M. Engineering College, Jodhpur, for its normal development.

The Council's recommendations regarding development of Technical education in the region are given below :—

Name and Class of Institution	Buildings	Equipment & Furniture	Total	Additional Recurring (Ultimate)	Loans for Hostels
	Rs.	Rs.	Rs.	Rs.	Rs.
Uttar Pradesh					
1. Polytechnic at Handia (Government)	3,96,800	6,28,600	10,25,400	1,49,690	...
2. Polytechnic at Chandauli (Government)	3,96,800	6,28,600	10,25,400	1,49,690	...
3. Polytechnic at Nainital (Government)	3,96,800	6,28,600	10,25,400	1,49,690	3,75,000
4. Murlidhar Gaianand Technical Institute Hathras, (Government)	1,79,100	10,79,590	12,58,690	3,01,350	...
5. Seth Ganga Sagar Jatia Technical Institute, Khurja (Government)	6,77,604	10,85,200	17,62,804	2,88,390	4,50,000
6. P.M.V. Technical Institute, Mathura (Non-Government)	1,82,716	4,54,200	6,36,916	2,88,390	3,00,000
7. Civil Engineering School, Lucknow (Non-Government)	...	3,91,050	3,91,050	2,88,390	...
8. Hewett Engineering School, Lucknow (Non-Government)	1,45,524	3,83,550	5,29,074	2,88,390	...
9. College of Engineering & Technology, Muslim University, Aligarh (Non-Government)	27,000	...	27,000	...	...
Rajasthan					
M.B.M. Engineering College Jodhpur (Government)	2,59,700	4,65,421	7,05,181	...	...
TOTAL	26,42,104	57,44,811	83,86,915	19,03,980	11,25,000

The Council recommended the appointment of full-time supervisors in the Training Establishments.

Southern Regional Committee

The Council approved the scheme for establishment of a Polytechnic at Kancheepuram as formulated by the Regional Committee.

The Council approved the scheme of development of the Mehboob Nagar Polytechnic as recommended by the Regional Committee.

The Council approved the scheme for establishment of a Government Polytechnic at Cannanore as formulated by the Regional Committee.

The Council approved the scheme formulated by the Regional Committee for the establishment of Government Polytechnics at Tumkur and Channapatni.

The Council approved the scheme for construction of students' hostels in the various institutions as formulated by the Regional Committee and recommended grant of interest-free loans for the purpose.

The Council's recommendations regarding development of Technical education in the region are given below :—

Name and Class of Institution	Buildings	Equipment and Furniture	Total	Additional Recurring (Ultimate)	Loans for Hostels
	Rs.	Rs.	Rs.	Rs.	Rs.
Madras					
1. Bhakthavatsalam Polytechnic, Kancheepuram (Non-Government)	7,59,000	9,03,880	16,62,880	1,60,000	...
2. Sankar Polytechnic Sankarnagar (Non-Government)	...	...	...	...	4,50,000
Mysore					
1. Government Polytechnic Tumkur (Government)	7,59,000	7,21,635	14,80,635	1,60,000	...
2. Government Polytechnic Chennapatna (Government)	7,59,000	9,03,880	16,62,880	1,60,000	...
3. Gulbarga Engineering College Gulbarga (Non-Government)	...	...	...	...	6,00,000
Andhra Pradesh					
Mahbubnagar Polytechnic, Mahbubnagar (Government)	5,50,000	8,61,000	14,11,000	1,40,000	...
Kerala					
1. Government Polytechnic, Cannanore (Government)	7,59,000	9,03,880	16,62,880	1,60,000	...
2. Sreenarayana Polytechnic Quilon (Non-Government)	...	...	...	...	4,50,000
3. Carmel Polytechnic, Alleppey (Non-Government)	...	...	...	...	2,00,000
TOTAL	55,86,000	42,94,275	78,80,275	7,80,000	17,00,000

Item No. 8 :—Post-Graduate Development Committee

The Council considered the recommendations of the Post-Graduate Development Committee at its meeting held on 7-12-1958 and 11-4-1959.

The Council accepted the recommendation of the Post-Graduate Development Committee that additional building grant of Rs. 15,000 and equipment grant of Rs. 1 lakh be sanctioned to the Indian Institute of Science, Bangalore for the organisation of the Post-Graduate Course in Automobile Engineering.

The Council endorsed the recommendation of the Post-Graduate Development Committee that steps should be taken to evolve a procedure which will ensure that funds sanctioned by the Central Government from time to time are made available to the institutions as expeditiously as possible by the State Government concerned.

The Council endorsed the recommendation of the Post-Graduate Development Committee that the following qualification pay may be sanctioned to the technical personnel :—

- | | |
|---|--------------|
| (1) For holders of Master's Degree in
Engineering and Technology | Rs. 50 p.m. |
| (2) For holders of Doctor's Degree in
Engineering and Technology | Rs. 125 p.m. |

The Council further suggested that special pay may be given to teachers who had acquitted themselves very well even though they may not have obtained post-graduate qualifications as above.

The Council endorsed the recommendation of the Post-Graduate Development Committee that the expenditure on the appointment of subordinate staff for post-graduate courses should also be admissible for the purpose of Grant-in-aid from the Central Government.

The Council endorsed the recommendation of the Post-Graduate Development Committee regarding courses of study and syllabii. In regard to the designation of awards, the Council endorsed the following recommendations of the Committee :—

(1) The Master's degree awarded at the end of post-graduate course should be in Engineering or Technology with an appropriate nomenclature like M. E. or M. Tech. or M.Sc. (Engineering/Technology).

(2) The major field in which the degree has been awarded viz. Mechanical Engineering, Civil Engineering, Electrical Engineering should be specified.

(3) The particular branches of specialisation e.g. Highway Engineering, Heat Power Engineering, etc. should be specified.

The Council accepted the scheme of the Post-Graduate studies and research in Chemical Engineering as formulated by the Post-Graduate Development Committee and approved the estimates of cost for organising post-graduate courses at the centres given below :—

- (i) College of Engineering & Technology, Jadavpur.
- (ii) J.V.D. College of Science & Technology, Andhra University.
- (iii) A.C. College of Technology, Madras.
- (iv) College of Technology, Banaras Hindu University.
- (v) Laxminarayan Institute of Technology, Nagpur University.
- (vi) Department of Chemical Technology, Bombay University.
- (vii) Indian Institute of Science, Bangalore.
- (viii) Indian Institute of Technology, Kharagpur.

The estimates of cost are as follows :—

- | | |
|---|--|
| (1) Accommodation | 1,200 sq. ft. net area (excluding verandahs, Stairs, thickness of walls, etc.) |
| (2) Laboratory fittings furniture and measuring instruments | Rs. 10,000/- |
| (3) Recurring expenditure | Rs. 500/- per student per year. |
| (4) Research Assistant | One in the scale of Lecturer or in the scale of Rs. 350-850 as recommended by All India Council for Technical Education. |

The Council accepted the recommendations of the Post-Graduate Committee that Research Units in Chemical Engineering be established at the following institutions and grants be given to them as shown below :—

Estimated Cost for Research Units

1. Jadavpur University—For research in Chemical Engineering Plant Design and Construction, Hydrogenation and related aspects.

Buildings :—Shed for Boiler and a small workshop

20' x 30' — cost Rs.6,000.

Equipment :— Rs. 7,605.

- | | |
|---|-------|
| 1. One vacuum pump and blower | 580 |
| 2. Air compressor, 15 cfm, 50 psig. | 2,000 |
| 3. One D.C. Ammeter 0-10 Amps, and one A.C. ammeter 0-15 | 250 |
| 4. One D.C. Voltmeter, 0-10 volt, and one A.C. voltmeter 0-220 | 325 |
| 5. One "Perspex" electrolytic cell with membranes and electrodes. | 400 |
| 6. One Rheostat, 25 ohms, 10 amps. | 200 |

7. Power Drill	500
8. Variable transformers (two 7.5 amps)	450
9. One portable gas welding set	600
10. Two laboratory mixers, 1/60th h.p.	800
11. Pressure gauges (two)	500
12. Circulating Pumps (two) stainless.	1,000

Total : 7,605

Recurring— 1 Mechanic Rs. 960/-

Contingencies & Working Expenses Rs. 2000/- per year.

Research Scholarships—6 (including those already sanctioned by the Government).

2. Laxminarayan Institute of Technology, Nagpur University—

For research in Reaction Kinetics, Electrolysis, Fuels.

Buildings : Nil.

Equipment : Rs. 5,000/- (as given below)

1. Rotameters (2)	2,000
2. Particle size determination unit	1,000
3. Gas Analyser	1,000
4. Circulating pumps (2)	1,000

Recurring : Consumables and contingencies Rs. 2,500/- per year.

Laboratory Attendant	1
Research Scholarships	2

3. Department of Applied Chemistry, University College of Science & Technology, Calcutta University—For research in Liquid-Liquid Extraction; Heat Transfer and Catalysis.

Buildings : Nil.

Equipment : Rs. 9,100/-

1. Variable Speed adjustment motor 1/2 h.p.	200
2. Automatic time switch	200
3. Microvolt meter (2)	1,000
4. Circulating pumps (2)	200
5. Low Range Rotameter Set	1,000
6. Special liquid-liquid extraction apparatus	5,000
7. Thermal conductivity gas analyser	1,500

Total : 9,100

Recurring : Consumables and contingencies — Rs. 2,500/- per year.

Research Scholarships 2

4. J.V.D. College of Science & Technology, Andhra University—

For research in Liquid-Liquid Extraction ;
Heat transfer.

Buildings : Nil

Equipment : Rs. 36,000/-

Potentiometer
Interferometer
High Speed Camera
Flowmeter & Pumps
Three Phase Gang variac Rs. 36,000

Recurring : Consumables and contingencies Rs. 2,000/- per year.

Research Assistant 1
Research Scholarships 4

5. Department of Technology, Annamalai University—For research in Heat Transfer ; Sulphonation.

Buildings : Nil

Equipment : Rs. 10,000/- for the construction of necessary apparatus, measuring instruments etc.

Recurring : Consumables and contingencies Rs. 1,000/- per year.

Research Scholarships 4
Research Assistant 1

6. A.C. College of Technology, Madras University, Madras—For research in Heat Transfer ; Mass Transfer.

Buildings : Nil

Equipment : It was decided that the college should prepare a revised list of equipment required for research in the above fields which should be examined further for making the necessary recommendations.

Recurring : Consumables Rs. 2,000/-

Research Assistant 1
Research Scholarships 4

7. College of Technology, Banaras Hindu University, Banaras

It was decided that the research unit to be established at the College should carry out work in Fluidisation, Heat Transfer and related aspects. It was also decided that the college should be requested to formulate its requirements in respect of equipment, recurring expenditure etc. which should be examined further by the experts for making necessary recommendations.

8. Government Engineering College, Trivandrum

The Council accepted the estimates of cost prepared by the Post-Graduate Development Committee for the organisation of Post-graduate Course in Hydraulics, Irrigation Engineering and Flood Control at the College of Engineering, Trivandrum, at an estimated cost of Rs. 1.25 lakhs for buildings (Plinth area 8900 sq. ft.) Rs. 2.90 lakhs for equipment and Rs. 28,000 recurring.

The Council approved the proposal that a Professorship be sanctioned for the Government Engineering College, Trivandrum instead of a Reader for the post-graduate course in Electric Machines Design.

The Council endorsed the recommendations of the Post-Graduate Development Committee that the value of Post-Graduate Studentships should be fixed at Rs. 250/- per mensem and Research Fellowship at Rs. 400/- per mensem. The Council also endorsed the recommendation that the institution concerned should set up Selection Committees for selecting suitable candidates for the award of Post-graduate Studentships and Fellowships and that normally only First Class graduates should be awarded Studentships.

The Council accepted the revised estimates proposed by the Post-Graduate Development Committee for the Radio and Communication Engineering courses and Research in the field at the Indian Institute of Science, Bangalore. The revised estimates are now as under :—

1. Buildings—Accoustical Laboratory	Rs. 3,95,000
2. Buildings—Laboratories for Advanced Electronics, Advanced Line Communication, Ultra Short & Micro-Wave Engineering	Rs. 2,16,500
Total :	Rs. 6,11,500

The Council accepted the scheme of research development in Engineering and Technology formulated by the Post-Graduate Development Committee and recommended the following grants for the various institutions as under :—

Name of the Institution	Subject/Field of Research Unit	Estimated cost	
		Non-Recurring	Recurring
1. Victoria Jubilee Technological Institute, Bombay.	Theory of Machines Vibration and Lubrication	Rs. 57,000 (Equipment)	Rs. 9,000 p.a.
2. --do--	Electrical Engineering	1,00,000 (Equipment)	33,600 p.a.
3. M. S. University, Baroda. Faculty of Technology.	Electrical Engineering	7,500	4,000 p.a.

Name of the Institution	Subject Field of Research Unit	Estimated cost	
		Non-Recurring	Recurring
		Rs.	Rs.
4. M. S. University, Patna Faculty of Technology	Textile Chemistry	1,000 (Equipment)	...
5. Government Engineering College, Jabalpur	Tele-Communication Engineering	Nil	12,000 p.a.
6. College of Engineering, Guindy	Civil Engineering	5,000	2,200 p.a.
7. --do--	Tele-Communication Engineering	Nil	5,400 p.a.
8. --do--	Electrical Engineering	Nil	7,000 p.a.
9. Government College of Techno- logy, Coimbatore	Civil Engineering	4,000 (Equipment)	6,100 p.a.
10. --do--	Mechanical Engineering	Nil	10,000 p.a.
11. --do--	Electrical Engineering	6,000	9,000 p.a.
12. National Institute of Engineer- ing, Mysore	Electrical Engineer- ing	Nil	4,500 p.a.
13. Institute of Radio Physics and Electronics	Advanced Electronics	1,41,500	28,800 p.a.
14. Bihar Institute of Technology, Sindri	Automobile Engineering	Nil	4,500 p.a.
15. --do--	Applied Electronics	14,000	4,500 p.a.
16. --do--	Stress Analysis	Nil	4,500 p.a.
17. Bengal Engineering College, Sibpore.	Physical Metallurgy etc.	63,000	15,300 p.a.
18. --do--	Stress Analysis	25,000	10,800 p.a.
19. --do--	Electrical Machine Design	1,500	9,800 p.a.
20. --do--	Hydraulic Engineering	21,000	12,000 p.a.
21. --do--	Applied Mechanics	32,000	10,800 p.a.
22. College of Mining & Metallurgy, Banaras Hindu University	Physical Metallurgy etc.	34,500	15,300 p.a.
23. A.C. College of Technology, Madras University	Textile Technology.	15,400	Nil
Total :		5,43,400	2,20,300 p.a.

The Council endorsed the decision of the Post-Graduate Development Committee to set up a Commission to evaluate the progress of Post-Graduate courses at different centres and to suggest suitable measures for their improvement and for the further development of Post-Graduate education in the country.

The Council noted that facilities for advanced work in High Voltage Engineering were available at present in the Indian Institute

of Science, Bangalore, Victoria Jubilee Technical Institute, Bombay, Engineering College, Banaras Hindu University, College of Engineering & Technology, Jadavpur University, Bihar Institute of Technology, Sindri and the Indian Institute of Technology, Kharagpur. In view of these facilities, the Council endorsed the recommendation of the Post-Graduate Development Committee that no additional centres need be developed for advanced work in High Voltage Engineering at this stage.

Item No. 9 : **To report the setting up of a Sub-Committee in (A) Commerce Education : (B) Mining Education :**

The note was recorded.

Item No. 10 : **To Consider the report of the Sub-Committee of the University Grants Commission regarding incorporation of the Engineering Schools as Departments of Universities**

The Council was of the view that in the present situation, it was neither practicable nor necessary to incorporate Engineering Colleges as Departments of Universities. The Council, however, recognised the necessity for intimate contacts between Engineering Colleges and Universities to which they are affiliated. The Council was of the view that this objective could be realised by the following measures :—

1. Engineering Colleges should have governing bodies which should include representatives of the Universities to which they are affiliated.
2. As far as possible, new Engineering Colleges should be located at such centres which have also institutions functioning for other disciplines viz., Humanities, Sciences etc. Every effort should be made to promote corporate life between the students of Engineering Colleges and the students of other institutions. Efforts should also be made to promote the growth of institutions for other disciplines near or around the existing Engineering Colleges.

The Council observed that all the State Governments who had replied to the suggestion for the incorporation of engineering institutions as Departments of Universities were against the proposal and desired that the views of the State Governments may be brought to the notice of the University Grants Commission.

Item No. 11: To consider the proposals received from the Ministries of the Government of India and State Governments regarding various aspects of Technical education

Specialized training courses in Electronics especially in Radar Techniques

The Council observed that on the recommendations of the Post-Graduate Development Committee and the All India Council for Technical Education, post-graduate courses covering electronics, radar techniques and allied fields had already been established. The Council suggested that the special requirements of the Indian Meteorological Department may be taken into account by the institutions conducting these courses when they formulate their courses of studies.

Integration of Pre-Professional Courses with Professional Courses

The Council noted that it had already recommended the introduction of the Five-Year Integrated Courses for first degree in Engineering and the Central Government had decided to give financial assistance for the purposes on the same scale as for development of first degree institutions.

The Council recommended that the decision of the Central Government be communicated to the State Government and Universities quickly so that integrated courses may be introduced by them as soon as possible.

Training of Technical Teachers

The Council expressed the view that time was not yet ripe for establishing centres for training of technical teachers in each State. The Central scheme of training teachers in selected institutions is about to be implemented. The results of this scheme should be watched before extending the scheme as proposed.

Recognition of Architectural Studies and giving of grants

The Council noted that Architectural institutions recognised by Government were already being given Central assistance on the recommendations of the respective Regional Committees.

Enhancement of Grants for Equipment

The Council did not agree to the suggestion that the existing practice of referring cases to the Regional Committee for purchase of equipment at increased prices, where such increase was more than 25% of the price indicated in the model list, be reviewed. The Council considered such references as necessary to prevent suppliers from taking advantage of the situation and quoting exorbitant and varying prices to different institutions. The Council noted that a Committee under

the Chairmanship of Lala Shri Ram is engaged in the task of revising the estimates of cost of equipment in the model list.

Equipping the Regional Colleges with foreign assistance

The Council expressed the view that it may be difficult to secure foreign assistance for equipment and staff for all the Regional colleges. The Council, however, recommended that Central arrangements may be made for securing equipment for these institutions so that the projects may be speedily implemented.

Increase in the ceiling of the cost of furniture for a Polytechnic admitting 120 students

The Council was of the view that the amount already recommended namely Rs. 35,000 should be adequate. The Council, however, recommended that the Regional Committees may consider a revision of this figure in individual cases having regard to the cost of timber and labour charges in any particular area.

Purchase of equipment at lowest prices quoted

The Council was of the view that the granting of permission to buy equipment at the lowest rate quoted regardless of its relation to the original estimates would be undesirable as there would be no safeguard against profiteering by the suppliers.

Increase in maintenance recurring grants for diploma students

The Council was of the view that the present ceiling of Rs. 100/- per annum per student for diploma students should generally be satisfactory. However, the question may be examined by the Regional Committees and the matter referred to the Council later for final decision.

Development of P.M.V. Technical Institute, Mathura

The Council did not favour acceptance of the suggestion of the Government of U. P. that for providing a Civil Engineering Diploma Course in the P.M.V. Technical Institute, Mathura the scale of assistance to be given to the Institute be the same as admissible for "Expansion Programme."

Ratio of Plinth area to floor area for Institution buildings

The Council observed that the question of ratio of plinth area to floor area was under examination by the Lala Shri Ram Committee on equipment and buildings.

Office accommodation for Technical Staff

The Council did not agree with the suggestion that additional office accommodation may be provided for teaching staff.

Item No. 12 : To Consider the Recommendations of the expert Committee regarding condensed Overseer Courses

The Council expressed the view that it was neither necessary in normal circumstances nor practicable or desirable to organise a condensed two-year diploma course in Civil Engineering after Intermediate Science.

Item No. 13 : To consider the progress of Technical Education under the Second Five-Year Plan

The note was recorded.

Item No. 14 : To consider the measures to be taken for the formulation of the Third Five-Year Plan of Technical Education

The Council was informed that the Planning Commission had constituted a Working Group to assist in the preparation of the Third Five-Year Plan of Technical Education, and the recommendations of this Group will be placed before the Council for consideration.

In the general discussion on this item the following points emerged :-

- (i) The ratio of diploma holders to degree holders is low. Greater activity will have to be embarked on for diploma training and more polytechnics will require to be set up.
- (ii) Consolidation rather than expansion should be the key note of the activity during the Third Five-Year Plan, particularly at the degree level. Expansion programme should be undertaken cautiously after a full examination of the employment position regarding graduates.
- (iii) Great emphasis should be laid on the provision of part-time courses, refresher courses and correspondence courses. The greatest weakness in the arrangement for Technical Education and training today is that there is no adequate provision for a person to rise from the shop floor to executive position.
- (iv) The quality of teaching should be greatly improved. In addition to the Teachers Training Programmes for teachers, provision should be made to enable senior teachers to go abroad for short periods to acquaint themselves with the latest developments.
- (v) Teaching of Physics, Chemistry and Mathematics at the school level should be strengthened.
- (vi) The question whether there should be any positions lower than that of Lecturer in the Degree Institutions should be considered. The present conditions point towards the necessity of abolishing such posts.

Item No. 15 : To Consider a proposal for the establishment of a Foundry and Forging Training Centre at Ranchi

The Council appointed an Expert Committee consisting of the following to work out the details for the Foundry and Forging Training Centre :—

- (i) Chairman Heavy Engineering Corporation (Chairman)
- (ii) Shri Prantal Patel
- (iii) Shri J. B. Patel
- (iv) Shri S. Viswanathan
- (v) Shri D. L. Deshpande
- (vi) A nominee of the Railway Board
- (vii) A nominee of the All India Foundrymen's Association
- (viii) Professor of Foundry Engineering at the Indian Institute of Technology, Kharagpur
- (ix) A representative of the Ministry of Commerce and Industry

The Committee will make recommendations on the question of location of the Centre at Ranchi or any other suitable place.

Item No. 16 : To Elect Representatives from amongst the Non-official Members of the All India Council for Technical Education on the Regional Committee of the Council.

The Council permitted the Secretary to withdraw this item from the agenda.

Item No. 17 : To Nominate a Representative of the All India Council for Technical Education on the Merchant Navy Training Board under the Ministry of Transport and Communications (Department of Transport).

The Council nominated Shri B. Sengupta, Principal, Victoria Jubilee Technical Institute, Bombay as its representative on the Merchant Navy Training Board.

Item No. 18 : Proposal to establish a Training Centre in Foremanship and Supervision at Jamshedpur by the Tata Iron & Steel Company

The Council accepted the proposal of the Tata Iron & Steel Company to establish a Training Centre in Foremanship and Supervision at a cost of Rs. 16,00,00/- recurring in accordance with the scheme approved by the Council.

Item No. 19 : Centrally Sponsored Engineering Colleges.

The Council noted that the Minister for Education, Kerala State had withdrawn his proposal regarding the establishment of a Centrally Sponsored Engineering College in Kerala instead of in Mysore State at Mangalore under the Scheme of Special Expansion of Technical Education in the Second Five-Year plan. As for his proposal to establish Centrally sponsored engineering colleges in the States of Kerala, Orissa, Punjab, Assam and Rajasthan, the Council recommended that the matter may be considered in the context of the formulation of the Third Five-Year Plan.

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

ANNEXURE I

Speech delivered by

PROFESSOR HUMAYUN KABIR

**Minister for Scientific Research & Cultural Affairs
and Chairman of the All India Council for Technical
Education on the occasion of the 12th Meeting of the
All India Council for Technical Education held on
the 13th April, 1959 at New Delhi**

Friends,

I have great pleasure in welcoming you to this twelfth meeting of the All India Council for Technical Education.

Before we begin our work, I must refer to the great loss the Council has suffered through the death of Dr. J.C. Ghosh. Last year, the Council mourned the death of Maulana Azad and this year we have lost in Dr. Ghosh another great figure in the field of Technical education in this country. I am sure the Council would like to place on record its appreciation of his services by standing in silence for a minute.

I

I shall first report briefly on the expansion which has taken place during the year in various fields of Technical education. One of the major recommendations of the Council was the establishment of eight new regional engineering colleges and 27 new polytechnics in addition to a new College of Engineering and Technology at Delhi to take over the degree courses at present available in the Delhi Polytechnic. The Government of India have accepted the recommendation and will provide for the colleges 100 per cent and for the diploma institution 50 per cent of the non-recurring expenses. The Secretariat of the Council is formulating a *coordinated* scheme for the engineering colleges to ensure adequate physical and teaching facilities so that the high standards set by it are maintained. The Regional Committees of the Council are similarly considering detailed schemes for the diploma institutions. The implementation of this scheme will add 2,035 additional seats in degree courses and 4,020 seats in diploma courses. We have written to the State Governments and it is my hope that these institutions will start functioning before long.

You will remember that this scheme for the establishment of new colleges and polytechnics was intended to supplement the efforts made during the previous year to expand facilities in existing institutions.

Nineteen colleges and 41 polytechnics have increased their admissions and provided 2,400 places in degree classes and 4,000 places in diploma classes over the number admitted before 1957. It must have been a great strain on the teaching staff of these institutions to cope with these additional numbers and I should like to thank them for the way in which they have responded to this challenge. I would also like to compliment the institutions for the progress they have achieved in such a short time.

The Council in its meeting of 1957 had recommended that the Government of India should adopt an 'Open Door' policy whereby a private agency wishing to establish an engineering college or a polytechnic should be given assistance from public funds. The Council also recommended that State Governments should be given much greater freedom to make adjustments in their Plans to provide for the establishment of a larger number of technical institutions. I am glad to report that both these recommendations were accepted and the policy behind them has yielded significant results. Seven new engineering colleges and 18 polytechnics have been established as a result of private initiative. Of these, as many as 16 institutions have been started since the last meeting of the Council in 1958.

The State Governments have also recognised the need of expanding facilities of engineering and technical education in order to cope with the demand for engineers that resulted from the greater emphasis on industrial development in the Second Five-Year Plan. The Plan originally provided for the establishment of only five engineering colleges and 22 polytechnics by State Governments. You will be glad to hear that this figure has been raised to 18 engineering colleges and 45 polytechnics. In fact, during 1958-59 alone, seven engineering colleges and 25 polytechnics have been established in the country.

As a result of the efforts of the Council and with the cooperation of various interests concerned, there has been an almost twofold increase in the intake in the degree and diploma institutions during a period of two years. In 1956, the intake was 6,632 in degree courses and 10,242 in diploma courses. In 1958, it was 11,100 in degree courses and 19,560 in diploma courses. It is estimated that by 1961 the intake will be about 13,500 for degree courses and 25,000 for diploma courses. By 1966, the degree courses should, I feel, admit 20,000 and the diploma courses at least 50,000 students per year.

Without the devoted work of the Council and its committees this rapid expansion would not have taken place. Their job has not been limited merely to recommending or sanctioning the extra numbers for

admission. Members of the Regional Committees and their Visiting Committees have rendered invaluable assistance in assessing the requirements of buildings, equipment and staff to cope with this large increase and in helping in the proper maintenance of standards. They have also exercised an overall supervision on the progress of the schemes.

Another welcome feature has been the remarkable progress at the post-graduate level. As you will remember, there were hardly any facilities for post-graduate study or research in engineering or technology before 1947. Today, we have 77 post-graduate courses organised in 21 institutions distributed in all parts of the country with some 500 students taking advantage of the facilities offered in them.

The Government of India have taken a further step in April 1958 to encourage post-graduate study and research. The entire non-recurring and recurring cost of courses approved by the All India Council for Technical Education is now borne by the Centre. The number of scholarships available for students has also been appreciably increased.

There is however one aspect of post-graduate studies to which I would like to draw your special attention. In all advanced countries, industry takes a direct interest in such courses by endowing scholarships and chairs for advanced work. American private industry employs a larger number of pure scientists and research workers than all American universities, State Departments and research organisations combined. In Germany, the Chemical and Electrical industries provided the largest facilities for such post-graduate studies and research. These Western countries have rightly looked upon them as investments which have yielded rich returns. I am sorry to say that Indian industry has not as yet shown the same enlightened self-interest. I would appeal to the representatives of industry and commerce who are members of this Council to take the lead in associating industry more closely with such advanced work and I hope that before the Council meets next time there will be an appreciable increase in the number of students at the research and post-graduate level sponsored by industry.

The Indian Institute of Technology, Kharagpur has already reached an enrolment of over 1600. Out of them 200 are engaged in post-graduate courses and research. It is now providing ten courses at the under-graduate and 35 courses at the post-graduate level. It has so far turned out 19 doctors, 242 masters or post-graduate diplomates and 944 first-degree holders. Drawn from all parts of India, its students have already earned high praise and appreciation from employers in different industries and Government Departments and laid the foundation of a tradition which augurs well for its future.

You will remember that the Indian Institute of Technology, Bombay was started in July 1958 and the foundation stone of its main building laid by the Prime Minister in March this year. We are planning to start the Madras Institute in July 1959 and the Kanpur Institute in July 1960.

I am sure that the Council will join with me in thanking the International agencies and the many friendly countries who have helped us in establishing these Higher Institutes by providing distinguished teachers and also equipment on a generous scale.

II

I shall now turn to an important recommendation of the Council for the reorganisation of engineering and technology courses in the country. The Secondary Education Commission had proposed that there should be a one-year pre-professional course followed by a four-year engineering course. The Joint Committee of the All India Council for Technical Education and the Inter-University Board considered this proposal and recommended that it would be a more effective arrangement to organise a five-year integrated course in the technological institutions themselves. The Inter-University Board has at its last meeting held at Chandigarh accepted this recommendation. I am glad to announce that the Central Government has decided to assist Universities and technological institutions by contributing 50 per cent of the cost involved in introducing the integrated five-year course. I may add that the Council has also taken note of the fact that there must be some interim arrangement for the transitional period. There need therefore be no apprehension of any difficulty in introducing the integrated courses immediately.

Only seven universities have so far intimated their acceptance of the new scheme. One of them, the Rajasthan University, has already introduced the integrated course. Three Universities, namely, Agra, Allahabad and Bombay, have reported that they are not in a position to accept the recommendation. I hope that now that the Inter-University Board has accepted the scheme and the Central Government has offered the necessary assistance, all universities will fall in line and adopt the pattern suggested by the Council.

Of the Council's various recommendations for meeting the shortage of technical teachers in the country, perhaps the most important was for the improvement of their scales of pay in both diploma and degree institutions. The Council will be glad to know that the Central Government has accepted the recommendations *in toto* for the diploma institutions and also for Lecturers and Assistant Professors in the degree institutions. The Lecturers will now be offered a scale of Rs. 350-850, and Assistant

Professors a scale of Rs. 600—1,150. The scale of pay of a Professor should be equated to that of a Superintending Engineer in the Public Works Department of the State, and that of the Principal of the Chief Engineer. Professors in the senior scale may be fixed in an intermediate scale or given an allowance with the pay scale of the Professor in the ordinary scale. If these proposals lead to any anomaly in any particular case, it will be settled by consultation between the Central and the State Government concerned.

The Central Government has decided to bear for a period of five years the entire cost of these improvements so that they can be brought into effect immediately without any strain on the finances of the State Governments. The Third Finance Commission will naturally, in making allocations to the States, take note of the additional financial liability that will devolve on them. I have every hope that the State Governments will avail themselves of this offer made by the Government of India. There is little doubt that adoption of these improved scales of pay will largely determine the future progress and efficiency of Technical education in the country.

I am glad to report that the five institutions selected for providing training facilities for technical teachers in degree colleges will start their training programmes in August this year. The Central Government have decided to award 75 senior fellowships in the scale of Rs. 350—25—400 to the selected trainees. I realise that this number is small considering the needs of the country, but you will agree that for a new programme, which is in the nature of an experiment, it is wiser to start in a small way, gradually build up experience, and then expand the activities according to needs. I am sure that the result of such training will be to raise standards, at first in selected institutions and gradually throughout the country.

There have been conflicting views about the method of selection of these trainees. Some favour selection by a Central Board as they feel that Central selection will alone ensure that the best talent is secured for the teaching profession. Others think that selection should rest with the authorities of the institutions in which they will be subsequently employed. Some compromise between these two standpoints will, I think, be necessary, at least in the initial stages. We have also to ensure that the selected trainees are absorbed in the teaching profession and do not migrate to other avocations because of lack of employment facilities. I am confident that with goodwill and cooperation, which have been so much in evidence in the field of Technical education, this thorny problem will also be solved.

We have had so much agreement in matters of Technical education that it is with some regret that I have to report on the lack of agreement on the question of a common regional admission test for entry into engineering colleges in the country. Not a single State Government has so far indicated its acceptance of the recommendation of the Council in this behalf. On the contrary, six State Governments have already rejected it. I find it difficult to understand why State Governments are reluctant to select students through tests based on a common standard. The position today is that a candidate for admission to an engineering course generally takes many tests and many interviews. He can avoid such multiple tests and interviews only if he decides to take his chance in one institution alone. Such a decision requires not only great self-confidence but also knowledge of the possibilities regarding admission into various institutions which a young student cannot generally be expected to have. I know that the State Governments also have their own problems which arise out of their responsibility to provide opportunities for Technical education to students of backward communities or areas. I am satisfied that there is no conflict between legitimate measures necessary for the discharge of such obligations and the acceptance of a common admission test on a regional basis.

I propose to deal with this question further, as there has recently been a good deal of discussion about the standard of admission to technical institutions in the country. There has been a great expansion of facilities and even this phenomenal increase has not kept pace with the demand. There are perhaps ten good candidates for each vacancy in an engineering college, and yet in terms of provisions of the Constitution, some special facilities have to be offered to students of Scheduled Castes, Scheduled Tribes and other backward classes even if they are somewhat poorer in quality. One of our most distinguished educationists has recently raised a note of warning that students are sometimes admitted to engineering colleges under "political pressure, undue personal influence, or an exaggerated desire to give everyone a chance". I am sure that no one would for a moment support admissions under political pressure or personal influence, but I do think that the question of enlarging opportunities for the less fortunate sections of the community has to be looked at from a somewhat different point of view.

I would not regard the special concessions to students of backward groups as due to "an exaggerated desire to give everyone a chance" but on the contrary look upon them partly as atonement for past injustice and neglect and partly as a measure to secure uniform development of all sections of the Indian community. It is obvious that the strength of the nation will depend on the strength of its weakest members. If some

sections of the Indian people are educationally and therefore economically and socially backward, they would bring down the standard of national achievement in spite of the presence of brilliant individuals in other sections of the community. Besides, it has to be recognised that ability is distributed on an individual and not on a communal basis. If suitable conditions are created, brilliant men and women can emerge out of communities which till now have had a low level of attainment and knowledge because of lack of opportunity.

The argument for special treatment of weaker sections of the nation is based on the same principle which justifies protection to infant industries. To be effective, such protection must be adequate but not so great as to foster a sense of complacency. Further it must not be permanent, for permanent concessions permanently weaken a community. If even a healthy and well-built child is forced always to use crutches will perhaps never be able to stand on his own feet. On the other hand, to deny crutches to a child who is weak but not organically defective would be to condemn him to a life of permanent weakness and disability.

I think there is an irrefutable case for offering to the weaker sections of the Indian people a share in opportunities of education, and more particularly, scientific and technical education. The modern age is essentially an age of science and technology. If some areas or sections are denied the opportunity of sharing in this development, it is bound to retard the progress of the country as a whole. Some special consideration for members of weaker communities is therefore not only justified but necessary in the national interest. At the same time, we must lay down that such concessions are to be withdrawn in a phased manner to encourage and allow the growth of initiative and self-reliance among them. Because of their economic and educational backwardness, young men and women of such communities are often unable to compete on equal terms with young men and women of other communities in securing admission to engineering and technical institutions. Failure to do so further depresses their economic potential and thus sets up a vicious spiral that is detrimental to the national interest.

Measures should therefore be taken for ensuring that young men and women of communities may secure entry into engineering and technical colleges in adequate numbers. This may mean a temporary reduction in the minimum entrance qualifications for members of communities that are backward. The position is likely to vary from State to State. To take one example, Christians may be a backward community in Madhya Pradesh but are certainly not so in Kerala. Wherever a community is backward in this sense, it deserves special treatment for a

period. Such protection may be in the form of lower admission standards for pupils belonging to prescribed communities. There may be a concession in marks, say 10 per cent for an initial period of five to ten years. Since a general student cannot expect to enter an engineering college unless he secures 60 per cent or more, this would mean that for the first five to ten years, a student of a backward area or group would be accepted if he secured 50 per cent or more. Thereafter the concession in marks should be reduced in a phased manner, perhaps one per cent per year, so that after 15 to 20 years, pupils of these communities will have to compete on equal terms with pupils of any other community.

III

I see that there are many important matters in the agenda which await your consideration. I would like to refer mainly to one, namely the measures to be taken for the formulation of the Third Five-Year Plan of Technical Education. A Working Group on Technical Education under the chairmanship of Prof. M.S. Thacker has been set up to assist in the preparation of the Third Five-Year Plan. The Group met on the 13th and the 14th March, 1959 and divided itself into sub-committees to make studies of the various problems in this field. The results of these studies and the deliberations of the Group will be placed before the Council. The Secretariat of the Council has deliberately refrained from making any concrete suggestions in this behalf so that there might be free and frank exchange of views among us. I welcome your advice and suggestions and would like to share with you some thoughts on this topic.

In past years, large sums of money have been spent on providing buildings and equipment for our technical institutions. Attempts have also been made to ensure that there is no deterioration in the standard of teaching but we have not paid the needed attention to the problem of finding and retaining good teachers. Barring a few institutions, the amenities and conditions of service of teachers were such that they did not often attract the right type of persons to the teaching profession. We are now embarking on certain measures which I have mentioned earlier and which I believe will lead to a definite improvement in the situation. I feel that for the next few years we should pay greater attention to the question of recruitment and retention of a sufficient number of teachers of the right calibre than to that of improvement of physical amenities in our institutions. In fact, some foreign visitors have remarked that our institutions are lavishly planned regarding buildings and sometimes also in the matter of equipment while teaching posts remain unfilled or inadequately filled for long periods. Let the improvement of the quality of teachers be one of the highest priorities for our Third Five-Year Plan.

I am sure you will agree with me that in the present economic condition of the country we must increase efficiency and reduce costs. I would suggest that the Council may in the Third Five-Year Plan consider measures to train a large number of engineers and technologists with our existing buildings, library and equipment. I am not suggesting double shifts for the work of educational institutions, but I have a feeling that if a detailed scrutiny of the time-tables is made, it may be found possible to adjust them so as to increase the number of entrants to our colleges and polytechnics. This will of course mean an increase in the number of teachers to maintain the appropriate student-teacher ratio.

In addition, we should expand facilities for part-time training in all such institutions by providing morning or evening courses in different branches of engineering and technology. We may make a beginning with the metropolitan cities where the need is the greatest and the facilities can be most easily organised, but in course of time it should be possible to provide part-time courses even in institutions located in some of the other towns.

I might also point out that the provision of sandwich courses and part-time courses would reduce the cost of training per capita and provide additional opportunities to men engaged in different professions and trades. Existing institutions in industrial centres have a special obligation in this regard. I would appeal to the authorities of such institutions and to industrialists and businessmen in general to devise measures which will enable us to train technicians and foremen as quickly as possible and with the minimum possible cost.

In this connection, I would like to draw the attention of the Council to the provision of technical training through correspondence courses. The U.S.S.R., the U.S.A. and countries of Western Europe provide us with interesting experience in this field. The U.S.S.R. has greatly increased the number of its engineers and technicians through correspondence courses. In India, unfortunately, there has been some allergy to such training. One of the reasons for this is that many institutions which offer correspondence courses have neither the proper staff nor the necessary facilities. In addition, they open their courses to persons who have no experience of actual working in the trade or the profession. In the U.S.S.R., it is only regular institutions which offer such courses. In addition, the courses are usually restricted to persons already working in the particular trade.

There is no need to argue that training can be best imparted in regular educational institutions. Since we cannot provide the facilities in such institutions for all those who wish, the only alternative seems to

be the introduction of correspondence courses more or less on the lines in vogue in the U.S.S.R. The Council may examine the question in greater detail and select some regular institutions for organising correspondence courses for the benefit of workers who have the necessary educational and technical back-ground.

I would also like the Council to consider the question of the ratio between degree colleges and polytechnics. In many advanced countries of the West, there are four or more technicians or foremen for every engineer with a degree. Before independence, the number of degree holders and diplomates was almost equal in India. At the end of the Second Plan period, we shall have attained a ratio of one degree holder for every two diplomates. There is thus clear need for more institutions at the diploma level and with the provision of part-time courses wherever feasible. I would like to see at least one Polytechnic in each district of India within the next few years and in any case before the end of the Third Plan period.

I must not however take any more of your time. It is now over a decade that I had my first association with the work of the All India Council for Technical Education. Except for a brief period, I have had the privilege of participating in its activities and throughout I have watched with interest and real contentment its contribution to the development of Technical Education in India. Of all fields of education, this is perhaps the one in which our progress has been most limited, and for this, the major effort must go to the Council. I am happy that I have retained my membership of the Council at a time when it is planning a still greater expansion and diversification of Technical education for the service of India and her people.

ANNEXURE I

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

12th Meeting

Date : 12th April, 1959

Time : 11 A.M.

Chairman
V. V. Giri
King George's
New Delhi.

AGENDA

- Item No. 1 :* To confirm the minutes of the 11th meeting of the Council.
- Item No. 2 :* To report the membership of the Council.
- Item No. 3 :* To report the action taken on the recommendations/decisions of the Council made at the 11th meeting.
- Item No. 4 :*
- (a) To consider the proposal of the Education Minister, Madras for the change in the system of election of members of States in the respective regions on the Coordinating Committee
 - (b) To elect representatives of the Council on the Coordinating Committee.
- Item No. 5 :* To report the decisions of 27th meeting of the Coordinating Committee held on 18th October, 1958 (other than those covered by item Nos. 6, 7 and 8).
- Item No. 6 :* All India Boards of Technical Studies.
- (a) Matters for report.
 - (b) Recommendations for consideration.
- Item No. 7 :* Regional Committees :
- (a) Matters for report.
 - (b) Recommendations for consideration.
- Item No. 8 :* Post-Graduate Development Committee.
- (a) Matters for report.
 - (b) Recommendations for consideration.
- Item No. 9 :* To report the setting up of Special Committees for (a) Commerce Education (b) Mining Education.
- Item No. 10 :* To consider the report of the Special Committee of the University Grants Commission regarding incorporation of engineering schools as departments of Universities.

- Item No. 11 :* To consider the proposals received from the Ministries of the Government of India and the State Governments regarding various aspects of Technical Education :
- (i) From the Central Ministry of Transport and Communications.
 - (ii) From the Central Ministry of Education.
 - (iii) From the Government of Andhra Pradesh.
 - (iv) From the Government of Bombay.
 - (v) From the Government of Uttar Pradesh.
 - (vi) From the Central Ministry of Food & Agriculture.
 - (vii) From the Government of Rajasthan.
 - (viii) From the Government of Bihar.
- Item No. 12 :* To consider the recommendations of the Expert Committee regarding condensed overseer courses.
- Item No. 13 :* To report the progress of Technical Education Schemes under the Second Five Year-Plan.
- Item No. 14 :* To consider the measures to be taken for the formulation of the Third Five Year-Plan of Technical Education.
- Item No. 15 :* To consider a proposal for the establishment of a Foundry & Forging Training Centre at Ranchi.
- Item No. 16 :* To elect representatives from amongst the non-official members of the All India Council for Technical Education on the Regional Committees of the Council.
- Item No. 17 :* To nominate a representative of the All India Council for Technical Education on the Merchant Navy Training Board under the Ministry of Transport and Communications (Department of Transport).
- Item No. 18 :* Proposal to establish a training centre in Foremanship and Supervision at Jamshedpur by the Tata Iron & Steel Co.
- Item No. 19 :* Establishment of Centrally Sponsored Engineering Colleges under the special expansion of scheme Technical Education in the Second Five-Year Plan.
- Item No. 1 :* To confirm the minutes of the 11th meeting of the Council.**

The minutes of the 11th meeting of the All India Council for Technical Education held at New Delhi on the 24th March, 1958 were circulated to the members. No comments have been received from any member. The proceedings, may therefore be deemed to have been confirmed by circulation,

Item No. 2 : To report the membership of the reconstituted Council

The Central Government have revised the Constitution of the All India Council for Technical Education with effect from the 30th April, 1958. The revised Constitution provides for the representation of all Ministries or Departments of the Central Government which are concerned with technical personnel. Previously, only 6 representatives of Ministries and Departments had been included. With a large-scale expansion in the activities of various Ministries/Departments under the Five-year Plans and their consequential concern with technical manpower required, it has been considered necessary to associate all those Ministries and Departments with the work of the Council. Further, the reconstituted Council also includes a representative of the National Institute of Sciences of India and a representative of National Council for Rural Higher Education. The representation of the Association of Principals of Technical Institutions on the Council has been increased to two seats. The present Constitution and Composition of the Council are given at Annexures I and II respectively.

- (a) Chairman—Minister-in-charge, (Ex-officio) Central Government (on occasions when he is unable to preside over a meeting of the Council, the Educational Adviser (Technical) to the Government of India will deputise for him).
- (b) i) Educational Adviser (Technical) to the Government of India (Ex-officio).
ii) Educational Adviser to the Government of India (Ex-officio).
- (c) Chairmen of the Regional Committees of the Council (Ex-officio).
- (d) Chairmen of the All India Boards of Technical Studies (Ex-officio).
- (e) Representatives of the Ministries/Departments of the Central Government. (The number of such representatives and the Ministries/Departments concerned to be decided by the Chairman from time to time).
- (f) Two members of the Lok Sabha elected by it.
- (g) One member of the Rajya Sabha elected by it.
- (h) i) One representative of each of the States.
ii) Four representatives of the Union Territories to be nominated by the Central Government.

- (i) Eight representatives of Industry and Commerce to be nominated by organisations approved by the Government of India.
- (j) Four representatives of Labour to be nominated by organisations approved by the Government of India.
- (k) One member of the Central Advisory Board of Education.
- (l) One member of the Inter-University Board of India.
- (m) One representative of the National Institute of Sciences of India.
- (n) One representative of the National Council for Rural Higher Education.
- (o) Two representatives of the Association of Principals of Technical Institutions in India.
- (p) Two representatives of Professional Bodies.
- (q) Chairman, University Grants Commission.
- (r) Not more than two members nominated by the Government of India to represent other interests.
- (a) Chairman (Ex-officio) 1. Prof. Humayun Kabir, Minister for Scientific Research & Cultural Affairs, Government of India, New Delhi
- (b) (i) Educational Adviser (Tech.) to the Government of India, (Ex-officio) 2. Prof. M.S. Thacker, Educational Adviser (Technical), Ministry of Scientific Research & Cultural Affairs, New Delhi.
- (ii) Educational Adviser to the Government of India, (Ex-officio) 3. Shri K.G. Saiyidain, Secretary, Ministry of Education, New Delhi.
- (c) Chairmen of the Regional Committees of the Council. (Ex-officio)
- Eastern Regional Committee 4. Shri J. J. Ghandy, Director, Tata Iron & Steel Co., Jamshedpur.
- Western Regional Committee 5. Shri Kasturbhai Lalbhai, Pankora Naka, Ahmedabad.
- Northern Regional Committee 6. Lala Shri Ram, 22, Curzon Road, New Delhi.

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| Southern Regional Committee | 7. Dr. A. L. Mudaliar, Vice-Chancellor, Madras University, Madras. |
|
(c) Chairmen of the All India Boards of Technical Studies (Ex-officio) | |
| Commerce | 8. Dr. V. K. R. V. Rao, Vice-Chancellor, Delhi University, Delhi. |
| Textile Technology | 9. Lala Shri Ram, 22-Curzon Road, New Delhi. |
| Engineering & Metallurgy | 10. Shri N.K. Mitra, 16, Hindustan Road, Rashbehari Avenue, Calcutta. |
| Architecture & Regional Planning | 11. Shri S.H. Parelkar, Medows House, Medows' Street, Fort, Bombay. |
| Chemical Engineering & Chemical Technology | 12. Vacant |
| Applied Art | 13. Prof. V.N. Adarkar, Principal, J. J. Institute of Commercial Art, Bombay. |
| Management | 14. Shri J. J. Ghandy, Director, Tata Iron & Steel Co., Jamshedpur. |
|
(d) Representatives of Ministries/ Departments of Government of India. | |
| Commerce & Industry | 15. Dr. A. Nagaraja Rao, Chief Industrial Adviser, Development Wing, Ministry of Commerce & Industry, New Delhi. |
| Defence | 16. Secretary, Ministry of Defence (or his nominee) |
| Finance | 17. Financial Adviser, Scientific Research & Cultural Affairs. |
| Labour & Employment | 18. Director-General of Resettlement & Employment, New Delhi. |
| Steel, Mines & Fuel | 19. Secretary, Department of Mines & Fuel (or his nominee). |

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| Ministry of Works, Housing & Supply | 20. Shri K.S. Krishnaswamy, Joint Secretary, Ministry of Works, Housing & Supply, New Delhi. |
| Ministry of Irrigation & Power | 21. Shri M. Hayath, Chairman, Central Water & Power Commission, New Delhi. |
| Ministry of Railways | 22. Director, Mechanical Engineering, Railway Board, New Delhi. |
| Ministry of Home Affairs (Directorate of Manpower) | 23. Shri R. Prasad, Joint Secretary, Ministry of Home Affairs, (Directorate of Manpower, New Delhi. |
| Ministry of Food & Agriculture | 24. Shri S. Mullick, I.C.S., Joint Secretary, Department of Agriculture, Ministry of Food and Agriculture, New Delhi. |
| Ministry of Information & Broadcasting | 25. Shri A.C. Ramachandani, Chief Engineer, All India Radio, New Delhi. |
| Ministry of Transport & Communications | 26. Vacant. |
| Department of Atomic Energy | 27. Shri H.N. Sethna, Chief Scientific Officer (Chem. Engg.) Atomic Energy Department, Trombay, Apollo Pier Road, Bombay. |
| Planning Commission | 28. Shri T.N. Singh, Member, Planning Commission, Udyog Bhavan, New Delhi. |
| Central Board of Irrigation & Power | 29. Shri Baleshwar Nath, Secretary, Central Board of Irrigation & Power, Curzon Road, New Delhi. |
| (f) Lok Sabha | 30. Shri P. R. Ramakrishnan, M.P., "Jyothi", A/36, Race Course Road, Coimbatore (South India) |
| | 31. Shri Ganapati Ram, M. P., Village Nimaich, P.O., Kaur, District Banaras. |
| (g) Rajya Sabha | 32. Shri Jaspat Roy Kapoor, M.P., Sheela Gali, Agra. |

(h) (i) State Governments

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| Government of Andhra Pradesh | 33. Shri C.V.D. Murthy, Director of Technical Education, Andhra Pradesh, Hyderabad. |
| Government of Assam | 34. Minister for Education, Assam, Shillong. |
| Government of Bihar | 35. Deputy Minister, Industries, Bihar, Patna. (Shri L.P. Shahi). |
| Government of Bombay | 36. Shri T.N. Tolani, Director of Technical Education, Bombay. |
| Government of Madhya Pradesh | 37. Secretary, Education Department, Government of Madhya Pradesh, Bhopal. |
| Government of Madras | 38. Minister for Education, Madras, or in his absence, Secretary, Department of Health, Education & Local Administration, or Director of Technical Education, Madras. |
| Government of Orissa | 39. Dr. H.B. Mohanty, Additional Secretary, Government of Orissa, Political & Services (Planning) Department, Bhubaneswar. |
| Government of Punjab | 40. Shri Surajmal, Minister for Public Works, Punjab, Chandigarh. |
| Government of Uttar Pradesh | 41. Deputy Minister for Heavy Industries, Uttar Pradesh, Lucknow. |
| Government of West Bengal | 42. Minister for Education, West Bengal, Calcutta. |
| Government of Jammu & Kashmir | 43. Shri G.A. Mukhtar, Director of Education, Jammu & Kashmir, Srinagar. |
| Government of Mysore | 44. Minister for Education, Mysore, Bangalore. |
| Government of Rajasthan | 45. Shri V.G. Garde, Principal, Engineering College, Jodhpur. |

- Government of Kerala
46. Shri V.V. Gopalakrishna Iyer,
Director of Technical Education,
Kerala State, Trivandrum.
- (ii) Union Territories
- Delhi
47. Director of Education, Delhi
Administration, Delhi.
- Himachal Pradesh
48. Shri P. C. Saxena, I. A. S.,
Secretary (Education), Hima-
chal Pradesh, Simla-4.
- Tripura
49. Shri K. P. Bhargava, I. C. S.,
Chief Commissioner. Tripura.
Agartala.
- Manipur
50. Shri S.D. Bahuguna, Director
of Education & Ex-officio Sec-
retary, Education, Manipur
Administration, Imphal.
- (i) Industry & Commerce
- Associated Chambers of 51. Shri B.F. Goodchild, c/o M/s.
Commerce of India. Saxby & Farmer (India) Ltd.,
17, Convent Road, Entally.
Calcutta.
52. Shri Bharat Ram, C/o Delhi
Cloth & General Mills Co.,
Delhi.
- All India Organisation of 53. Shri T. R. Gupta, Director,
Industrial Employers. Jay Engineering Works Ltd.,
183-A, Prince Anwarshah
Road, Calcutta-31.
54. Shri Nandkishore Sakarlal,
Silver Cotton Mills Co. Ltd.,
Kankaria Road, P. B. No. 27,
Ahmedabad.
- Employers Federation of India. 55. Prof. G. M. Nabar, Director,
Department of Chemical
Technology, University of
Bombay, Bombay.
56. Shri G. Y. Mangrulkar, Staff
Training Officer, Tata Iron &
Steel Co., Jamshedpur.

- Federation of Indian Chambers of Commerce & Industry 57. Shri A. M. M. Murugappa Chettiar, Swastik House, Armenian Street, Madras.
58. Prof. M. P. Gandhi, Jan Mansion, Sir Pherozshah Mehta Road, Fort, Bombay.
- (i) Labour
- Indian National Trade Union Congress 59. Shri Michael John, M. P., 17, K. Road, Jamshédpur.
60. Shri B. K. Nair, President, Indian National Trade Union Congress, Kerala Branch, 70, Feet Road, Ernakulam (Kerala).
- National Federation of Indian Railwaymen 61. Shri P. Subbaramaniam, General Secretary, National Federation of Indian Railwaymen, Railway Loco Quarters, Vijayawada-2.
- Hind Mazdoor Sabha 62. Shri Shanta Ram S. Tawde, Secretary, Engineering Mazdoor Sabha, Kamgar Sadan, Nawab Tank Road, Mazgaon, Bombay-10.
- (k) Central Advisory Board of Education 63. Col. B.H. Zaidi, Vice-Chancellor, Muslim University, Aligarh.
- () Inter-University Board of India 64. Dr. A. L. Mudaliar, Vice-Chancellor, Madras University, Madras.
- (m) National Institute of Sciences of India, Mathura Road, New Delhi 65. Prof. S. K. Mitra, D.Sc. F.R.S., Emeritus Professor of Physics, Calcutta University, Institute of Radio Physics & Electronics 92, Upper Circular Road, Calcutta-9.
- (n) National Council for Rural Higher Education 66. Shri T. S. Avinashilingam, M. P., Director, Shri Ramakrishna Mission Vidyalaya Rural Institute, Coimbatore.

- (o) Association of Principals of Technical Institutions (India)
67. Dr. T. Sen, Rector, Jadavpur University and Principal, College of Engineering & Technology, Jadavpur.
68. Shri V. Lakshminarayanan, Principal, Birla College of Engineering, Pilani (Rajasthan).
- (p) Professional Bodies
- Institution of Engineers
69. Shri D. P. R. Cassad, M.I.E., Shirin Lodge, Byramji Town, Nagpur-1.
- Institute of Chartered Accountants
70. Vacant.
- (q) University Grants Commission (Ex-officio)
71. Chairman, University Grants Commission, New Delhi.
- (r) Nominees of Government of India
72. Dr. S.R. Sen Gupta, Director, Indian Institute of Technology, Kharagpur.
73. Shri Fazal I. Rahimtoola, Ismail Building, Dr. Dadabhoy Naoroji Road, Bombay-1.

Item No. 3: To report the action taken on the recommendations/decisions of the Council made at the 11th meeting

<i>Recommendations/Decisions</i>	<i>Action taken</i>														
<p>1. (i) The Council recommended that a certain number of seats should be reserved in the various institutions providing facilities in Chemical Engineering for students from States which do not have such facilities of their own. Further in order that the seats so reserved may be utilized, provision should be made for hostel accommodation for such students. The State Governments concerned should make scholarships available to their students when deputed for training outside.</p>	<p>Seats in the following institutions have been reserved for students belonging to areas which do not have such facilities :</p> <table border="0" style="margin-left: auto; margin-right: 0;"> <thead> <tr> <th></th> <th style="text-align: right;">Seats</th> </tr> </thead> <tbody> <tr> <td>1. Jadavpur University.</td> <td style="text-align: right;">10</td> </tr> <tr> <td>2. A.C. College, Madras.</td> <td style="text-align: right;">3</td> </tr> <tr> <td>3. Bombay University.</td> <td style="text-align: right;">6</td> </tr> <tr> <td>4. Andhra University.</td> <td style="text-align: right;">2</td> </tr> <tr> <td>5. Nagpur University.</td> <td style="text-align: right;">2</td> </tr> <tr> <td>6. Calcutta University.</td> <td style="text-align: right;">4</td> </tr> </tbody> </table> <p>The State Governments concerned have already been informed about the number of seats available for students from their areas.</p>		Seats	1. Jadavpur University.	10	2. A.C. College, Madras.	3	3. Bombay University.	6	4. Andhra University.	2	5. Nagpur University.	2	6. Calcutta University.	4
	Seats														
1. Jadavpur University.	10														
2. A.C. College, Madras.	3														
3. Bombay University.	6														
4. Andhra University.	2														
5. Nagpur University.	2														
6. Calcutta University.	4														

(ii) The Council recommended that teaching fellowships be instituted for the training of teachers in Chemical Engineering at the Indian Institute of Technology, Kharagpur and A. C. College of Technology, Madras.

(iii) The Council approved in principle the proposal to start Summer Schools for teachers in Chemical Engineering and decided that a scheme be formulated for the purpose.

(iv) The Council accepted in principle the scheme for the establishment of Practice Schools and suggested that Lala Shri Ram be included as a Member of the Expert Committee appointed by the Board for this purpose.

2. The Council recommended that consequent on the reorganisation of Secondary Education, five-year integrated course should be adopted for the first-degree in Engineering and Technology after the Higher Secondary stage.

3. The Council recommended the method of competitive tests for adoption by all the institutions in the country for admission to engineering courses. In order to avoid hardship to candidates who have at present to appear for tests and/or interviews held independently by the various institutions, the Council recommended that

The Indian Institute of Technology, Kharagpur has been selected as a centre for the training of teachers *inter alia* in Chemical Engineering. The A. C. College of Technology, Madras has also agreed to train some teachers in this subject.

A detailed scheme is being prepared.

The details of the scheme are being formulated by the Expert Committee in consultation with Chemical Industry. Lala Shri Ram is a member of the Committee.

The recommendation has been forwarded to all Universities. The Boards of Technical Studies are formulating details of five-year integrated courses in their respective fields.

The State Governments, Universities and Technical Institutions have been addressed in the matter. A summary of replies received so far is given at Annexure-I

arrangements be made so that candidates would be required to appear for a single admission test. For this purpose, the Council suggested the setting up of Regional Boards to conduct the admission tests according to the standards laid by a Central Coordinating Board, which should periodically carry out a sample check of the standards maintained by the Regional Boards.

The Council further recommended that a beginning be made with a common test for admissions to the first degree courses in Higher Technological Institutions, other Central Institutions and State Institutions (both Government and non-Government) which are at present holding independent examinations.

4. The Council recommended that until text-books for scientific and technological subjects are available in Hindi and Regional languages, English should continue to be the medium of instruction in the technical institutions.

5. The Council recommended that entry into the Architectural profession should be regulated by the provision of an Act of Parliament and that for this purpose, the draft bill prepared by the Ministry of Works, Housing & Supply as modified by the Architecture Board be accepted subject to the following further modifications :

That any building, the value of which is less than Rs. 40,000/- should

The decision of the Council has been conveyed to the Madhya Pradesh Government, who had raised the issue.

The suggestions made by the Council were referred to the Ministry of Works, Housing & Supply for comments. That Ministry has agreed to the modifications made in the bill. Further action is being taken.

be exempted from the operation of the provisions of the proposed Act.

(ii) That the period of practice as an architect specified for an Engineer to be eligible for registration under the provisions of the proposed Act be reduced from 10 years to seven years.

6. The Council recommended that the Central Government may take necessary steps for ensuring expeditious grant of licences for the import of equipment for technical institutions. The institutions on the other hand should make every effort to find indigenous substitutes for imported equipment. A list of scientific and technical equipment manufactured in the country should be supplied to the institutions for this purpose.

7. The Council emphasised the necessity of providing adequate hostel accommodation to make the scheme of Special Expansion a success and recommended that the Government should sanction without delay interest-free loans to the institutions concerned for constructing hostels to accommodate up to cent-per-cent of the additional student population for residential

All technical institutions have been asked to send their applications direct to the Ministry of Scientific Research & Cultural Affairs and not to the Regional licensing authorities as was done by them previously. Foreign exchange involved in the import of equipment etc. by Government institutions is now met solely from the quota allotted to the Ministry of Scientific Research & Cultural Affairs from time to time. To streamline the procedures for securing import licences inter-departmental meeting of different departments of the Government was also held some time back. Some specific measures were introduced as a result of this discussion. Another meeting is proposed to be held shortly to improve the position further.

Government of India have accepted in principle that hostels for 50% of the students in non-residential and for 100% students in residential institutions be provided. On this basis loans have been sanctioned to Government and non-Government institutions.

institutions and up to 50% for non-residential institutions.

8. The Council considered the proposal of the Government of Assam that the All India Council for Technical Education may depute experts for periodic inspection of technical institutions. The Council recommended that the Regional Committees should set up a Standing Committee to watch the progress of the schemes in their respective regions. If the Standing Committee finds that in any particular case the progress is not satisfactory, the matter should be brought to the notice of the Regional Committee and the Regional Committee should send a small Committee of 2 or 3 members to make an on the spot study with a view to suggesting measures for expediting implementation of the scheme.

9. The Council did not favour the upgrading of the existing diploma course in Textile Design of the M.S. University, Baroda to that of a Degree course. The Council however stressed the importance of the subject in the context of training of good craftsmen in the Fine. The Council requested Shri Kasturbhai Lalbhai to suggest a scheme for the purpose in consultation with the Textile Industry.

Standing Committees have been set up by the Northern, Southern and Western Regional Committees. The Eastern Regional Committee has authorised its Chairman to set up such a Committee if and when considered necessary.

A Committee has been set up by the All India Board of Technical Studies in Textile Technology to consider this question. The composition and the terms of reference of the Committee are as follows :—

Composition :

1. Shri Kasturbhai Lalbhai
(Chairman)
Pankore Naka, Ahmedabad.
2. Shri E. R. Subram, Superintendent, Ambika Mills Ltd., Ahmedabad.
3. Shri C.H. Desai, Manager, The Arvind Mills Ltd., Ahmedabad.
4. Shri V.M. Deshpande, Superintendent/Weaving Master, The Aruna Mills Ltd., Ahmedabad.

5. Shri J. C. Thacker, Divisional Manager, The Calico Mills Ltd., Ahmedabad.

Terms of reference :

To recommend to the All India Council for Technical Education a complete scheme :

- (a) to train craftsmen in the art of weaving cloth on various types of looms ;
- (b) to prescribe the scope of elements of minimum training ;
- (c) to prescribe the period of training and to examine the trainees and to issue certificates to deserving trainees ;
- (d) to suggest the type of organisation and equipment necessary to implement the above ;
- (e) to make further recommendations to attain the above objectives.

Draft scheme is awaited.

10. (i) The Council recommended that the technical institutions in the country should appoint training and placement officers to arrange for the training of students and their placement.

So far as University institutions are concerned, the University Grants Commission has expressed the view that such an appointment is not necessary at this stage.

(ii) The Council approved schemes prepared by its Regional Committees for the development of ten existing institutions, providing courses for degrees and diplomas in Engineering and Technology, and for the establishment of two degree colleges and four diploma institutions under the Normal Develop-

mental programme. The estimated cost of all the above development is Rs. 2,20,98,107 non-recurring, Rs. 1,14,29,410 for buildings, Rs. 1,06,68,697 for equipment and Rs. 31,39,120, additional recurring (ultimate).

The Council recommended that grants in accordance with the approved pattern of assistance may be given for the above development.

(iii) The Council recommended that interest-free loans amounting to Rs. 82,88,800 may be given to institutions for the construction of students' hostels.

(iv) The Council approved in principle the proposals made by the Regional Committees at the instance of the State Governments and private agencies, for the establishment of five new Engineering Colleges and three new diploma institutions.

(v) The Council was of the view that admission to the Guru Nanak Engineering College, Ludhiana should be made on the basis of merit and the present practice of reserving 70% seats for candidates belonging to rural areas should be discontinued; the only reservations should be for those for which the Constitution of India lays down a special responsibility.

The recommendations have been accepted by the Central Government/University Grants Commission and the institutions are being given assistance as proposed.

In consultation with the Ministry of Law, it has been decided that the College may reserve up to 70% of the seats for candidates belonging to rural areas for a period of five years. After the period of five years the number of reserved seats shall be reduced by 5% every year, so that from twentieth year from now, admissions will be purely on the basis of merit. For the reserved seats, only those rural candidates who satisfy the necessary academic requirements as prescribed by the Panjab University should be admitted.

11. The Council recommended that the Central Government should sponsor a scheme of establishment of eight new Engineering Colleges and 27 new diploma institutions in the various parts of the country. In addition, the degree courses at present provided in the Delhi Polytechnic may be shifted to a separate college to be established in Delhi for the purpose. The distribution of the eight new colleges and 27 diploma institutions should be as under :

Colleges : Two in each Region

Diploma

Institutions : 7 in the Eastern Region.

7 in the Southern Region.

5 in the Western Region.

8 in the Northern Region.

The above colleges should be established during the Second Five-Year Plan period.

12. The Council recommended improved scales of pay for teachers in technical institutions to be introduced uniformly in all the institutions in the country.

13. The Council endorsed the recommendations of the Conference of principals of Technical Institutions to meet the shortage of technical teachers and suggested the following :

(i) Institutions of teaching fellowships by the Central Government.

The Central Government have accepted the recommendations. The State Governments have been requested to formulate detailed proposals for the new institutions together with estimates of cost and initiate necessary preliminary work for their establishment. It has been decided that the location of the colleges should be as shown below :—

Southern Region : Warangal
Mangalore

Western Region : Nagpur
Bhopal

Eastern Region : Jamshedpur
Durgapur

Northern Region : Allahabad
Srinagar

The recommendations are under the consideration of the Government.

The recommendation of the Council regarding teacher-training fellow-

ernment—five-hundred senior of the value of Rs. 350-25-400 for degree holders and 200 junior of the value of Rs. 200-20-240 for diploma holders.

ships at selected centres have been accepted by the Government. As regards the phasing of fellowships, it has been decided to make a beginning with 75 senior and 50 junior fellowships. The teacher-training programme will start in the next academic year.

(ii) Appointment of probationary lecturers/teachers by the various institutions in the country in advance to the extent of 50% of the number of teachers required to be appointed by them on the regular cadre three years later. The scales of pay admissible to such probationary lecturers/teachers should be Rs. 300-25-350 for degree holders and Rs. 170-15-200 for diploma holders.

(iii) Simplification of recruitment procedures.

(iv) Raising the age of superannuation to 60.

(v) Securing services on deputation from Government Departments and industry of persons with aptitude for teaching.

(vi) Provision of amenities and incentives for teachers such as housing, travel concessions, personal pay for higher qualifications and a limited amount of private consultative practice.

The recommendations are under the consideration of the Central Government.

Comments received on the proposal to hold a common admission test

Six State Governments viz. Madras, Bombay, Andhra Pradesh, Mysore, Punjab and Assam who have sent final replies so far have not agreed to the proposal of holding a common admission examination. The Government of Madras have gone a step further and indicated that

instead of a common admission examination by the Regional Bodies the method of admissions to an institution should be regulated by each State on the lines now organised in Madras State.

The replies received so far from Universities may broadly be placed in two categories. The first category covering a large majority of the Universities from whom replies have been received desire to follow the line taken by the State Governments concerned. The second category consists of a few universities viz. Jadavpur, Patna, Bihar and Delhi which have stated that they have no objection to join the scheme proposed by the Council provided that (a) performance at the common examination is not the sole criterion in determining the admission of a candidate and (b) details and other particulars concerning the examination should be decided in consultation with the universities.

The replies received from private institutions also indicate that a majority of them would go by the decisions of the State Governments. The Indian Institute of Technology, Kharagpur has also not favoured the proposal regarding Central Regional Selection Board for admission of candidates to the Institute. They have expressed the view that the final selection should be made after interview by the respective institutions.

Item No. 4 (a) :— To consider the proposal of the Education Minister, Madras for the change in the system of election of members of States in the respective regions on the Coordinating Committee

1. The Constitution of the Coordinating Committee includes *inter alia* four members representing States, one from each region, to be elected by the States' representatives of the region on the Council. The relevant resolution of the Council is reproduced below :—

“There shall be four members on the Coordinating Committee of the Council representing the States. The States' representatives on the Council from each region as demarcated by the Council for purposes of the constitution of Regional Committees shall elect one member.”

In connection with the filling up of a vacancy on the Coordinating Committee from the Southern Region for the last term of the Coordinating Committee which expired on the 8th February, 1959, the Minister for Education, Madras pointed out that the present system of election is not a sound system. He has suggested that a system of rotational representation of the Zonal States on the Coordinating Committee may

be thought of; or alternatively, the Minister of Scientific Research & Cultural Affairs, may himself nominate anyone at his discretion.

The suggestions of the State Minister are placed before the Council for consideration.

Item No. 4 (b) :—To elect representatives of the Council on the Co-ordinating Committee

The Constitution of Coordinating Committee *inter alia* provides :

- (a) One member elected by the representatives of the Parliament on the Council.
- (b) Four members representing States, one from each region, as demarcated by the Council to be elected by the States' representatives of the region on the council.
- (c) One member to be elected by the rest of the members of the Council i.e. excluding the representatives of the Ministries of the Central Government, the Parliament and the State Governments.

2. The term of the office of the members of the Coordinating Committee expired on the 8th February, 1959. The members of the Council representing constituencies mentioned at (a) & (b) above have been addressed to elect members from among themselves in accordance with the provision of the Constitution of the Committee. As, however, election by correspondence involves delay, the members concerned are requested to hold election for the above constituencies at the time of the meeting of the Council.

3. The list of members of the Council representing the above three constituencies is given at Annexure-I. The following members of the Council are serving on the present Coordinating Committee from the constituencies as indicated below :—

- | | |
|---|--|
| (i) Representative of the members of Parliament. | (i) Shri P.R. Ramakrishnan. |
| (ii) Representative of the State Governments in the Southern Region. | (ii) Vacant. |
| (iii) Representative of the State Governments in the Northern Region. | (iii) Minister for Public Works, Punjab. |
| (iv) Representative of the State Governments in the Eastern Region. | (iv) Minister for Industries, Bihar. |

- (v) Representative of the State Governments in the Western Region. (v) Secretary, Education Department, Madhya Pradesh.
- (vi) Representative of the rest of the members of the Council. (vi) Shri B.F. Goodchild.

Members of the All India Council for Technical Education representing Parliament, State Governments and the rest of the members of Council.

Parliament

1. Shri Jaspat Roy Kapoor, M.P.
2. Shri P.R. Ramakrishnan, M.P.
3. Shri Ganapati Ram, M.P.

States in Northern Region

1. Minister for Public Works, Punjab.
2. Deputy Minister for Heavy Industries, Uttar Pradesh.
3. Shri G.A. Mukhtar, Jammu & Kashmir.
4. Shri V.G. Garde, Rajasthan.
5. Director of Education, Delhi Administration.
6. Shri P.C. Saxena, Himachal Pradesh.

States in Southern Region

1. Shri C.V.D. Murthy, Andhra Pradesh.
2. Minister for Education, Madras.
3. Minister for Education, Mysore.
4. Shri V.V. Gopalakrishna Iyer, Kerala.

States in Eastern Region

1. Minister for Education, Assam.
2. Deputy Minister for Industries, Bihar.
3. Dr. H.B. Mohanty, Orissa.
4. Minister for Education, West Bengal.
5. Shri K.P. Bhargava, Tripura.
6. Shri S.D. Bahuguna, Manipur.

States in Western Region

1. Shri T.N. Tolani, Bombay.
2. Education Secretary, Madhya Pradesh.

Rest of the Members of the Council

1. Shri B.F. Goodchild, Calcutta.
2. Shri Bharat Ram, Delhi.

3. Shri T.R. Gupta, Calcutta.
4. Shri Nandkishore Sakarlal, Ahmedabad.
5. Prof. G.M. Nabar, Bombay.
6. Shri G.Y. Mangrulkar, Jamshedpur.
7. Shri A.M.M. Murugappa Chettiar, Madras.
8. Prof. M.P. Gandhi, Bombay.
9. Shri Michael John, M.P., Jamshedpur.
10. Shri B.K. Nair, Kerala.
11. Shri P. Subbaramaniam, Vijayawada.
12. Shri Shanta Ram S. Tawde, Bombay.
13. Col. B.H. Zaidi, Aligarh.
14. Dr. A.L. Mudaliar, Madras.
15. Prof. S.K. Mitra, Calcutta.
16. Shri T.S. Avinashilingam, M.P., Coimbatore.
17. Dr. T. Sen, Jadavpur.
18. Shri V. Lakshminarayanan, Pilani, Rajasthan.
19. Chairman, University Grants Commission, New Delhi.
20. Shri D.P.R. Cassad, Nagpur.
21. Shri Fazal I. Rahimtoola, Bombay.
22. Dr. S.R. Sen Gupta, Kharagpur.
23. Representative of the Institute of Chartered Accountants.

Item No. 5 :—To report the decisions of 27th meeting of the Co-ordinating Committee held on 18th October, 1958 (other than those covered by items 6, 7 and 8).

(a) Scheme of Training in Advertising

The Coordinating Committee considered a scheme put forward by Shri Basu to the Ministry of Commerce & Industry for organising degree courses in Advertising. The Scheme was designed to provide an all-round education in Advertising for those who wish to enter the profession and also who are already in the business of advertising. The duration of the course was not specified although the intention was to award University degrees in the subject.

The Coordinating Committee decided that the scheme may be referred to the Special Committee appointed by the All India Council for Technical Education for the reorganisation of Commerce Education.

(b) Buildings & Equipment for Technical Institutes

Lala Shri Ram, Chairman, Northern Regional Committee, had made certain suggestions regarding reduction in the cost of buildings for technical institutions. He had also suggested that equipment required by the institutions should be manufactured in Indian factories as far as

possible and to some extent in the workshops of the institutions concerned. That would reduce the need to import equipment from abroad.

The Coordinating Committee agreed with the suggestion of Lala Shri Ram that every effort should be made to reduce the cost of buildings by adopting economic designs and efficient methods of construction. The Committee at the same time was of the view that it may not be possible to lay down uniform rates of construction or to suggest a uniform design for buildings which can be adopted on an all-India basis. Nevertheless, the Committee recommended that all authorities in charge of constructional work should be requested to effect maximum economy possible in the construction of the buildings. As regards equipment, the Committee agreed that the whole matter should be examined in detail in the light of the suggestions of Lala Shri Ram.

The Chairman, All India Council for Technical Education has appointed an Expert Committee with the following personnel and terms of reference :

Personnel

1. Lala Shri Ram, 22, Curzon Road, New Delhi. (Chairman)
2. Dr. P.K. Kelkar, Deputy Director, Indian Institute of Technology, Bombay.
3. Mr. V. Lakshminarayanan, Principal, Birla Engineering College, Pilani.
4. Mr. B. Sen Gupto, Principal, Victoria Jubilee Technical Institute, Bombay.
5. Mr. V.G. Garde, Principal, M.B.M. Engineering College, Jodhpur.
6. Dr. V.V.L. Rao, Principal, Government Engineering College, Kakinada.
7. Col. V.P.S. Menon, Industrial Adviser, Ministry of Commerce & Industry.
8. Shri R.N. Dogra, Principal, Punjab Engineering College, Chandigarh.
9. Shri S.K. Joglekar, Chief Architect, C.P.W.D., New Delhi.
10. Shri T.J. Manickam, Director, School of Town & Country Planning, Delhi.
11. Shri T.R. Mahendru, Engineer & Architect, New Delhi.
12. Shri J.N. Moudgil, Delhi Polytechnic, Delhi.

(Member-Secretary)

Terms of Reference

(a) To examine the lists of equipment required by Engineering Colleges and Polytechnics and suggest which particular items can and should be produced within the country either in the Workshops of the institutions concerned or by Indian manufactures and various arrangements to be made for this purpose.

(b) To revise the current lists of equipment in respect of estimates of costs, alternative items which can be purchased more easily or at less cost and their sources of supply.

(c) To examine the question of setting up of a Central Organisation to facilitate procurement of equipment both within and outside India.

(d) To evolve economic designs, specifications and methods of construction appropriate for the different areas in the country.

The first meeting of the Committee was held on 26th December, 1958.

(c) Inclusion of representatives of State Boards of Technical Education in the Regional Committees

The constitution of the Regional Committees of the All India Council for Technical Education includes *inter alia* one representative of each State Government on the respective Regional Committees. The Punjab Government suggested that representation may also be given to State Boards of Technical Education on the respective Regional Committees.

The Coordinating Committee considered the above suggestion of the Punjab Government and recommended that the Chairmen of the State Boards of Technical Education or alternatively their nominees be included as members of the concerned Regional Committees. In order to facilitate coordination between the All India Council and State Boards, the State Boards may include a representative of the Central Government and the concerned Regional Committees, as members.

(d) Short-term course in the economic and exact design of structures

The Coordinating Committee considered a scheme prepared by the National Buildings Organisation in consultation with the University of Roorkee for short-term training (at post-graduate level) of Civil Engineers in rationalised structural designs for multi-storeyed constructions aiming at the maximum economy possible in the use of cement and steel. The scheme envisaged a 8-12 week course covering lectures by

eminent architects and engineers. The estimated cost was Rs. 10,000 for one batch of 20 trainees.

The Coordinating Committee decided that the Chairman should first discuss the scheme with the National Buildings Organisation and if the need for the refresher course was clearly established, it may be sanctioned. The National Buildings Organisation has been addressed in the matter.

(e) Fitness of candidates to pursue technical courses

The Coordinating Committee considered a suggestion that the fitness of a candidate to pursue engineering degree or diploma course should be determined on the basis of his performance in the first year of the course itself, so that if he was not found suitable he may be advised, in his own interest, to take up some other course. That will also ensure better utilisation of the facilities available. Some Universities have laid down rules for the elimination of unsuitable candidates, others have not done so.

The Coordinating Committee recommended that Universities, State Boards and Institutions may be requested to formulate suitable rules for the purpose. The Committee also recommended that no candidate may be allowed to take more than three examinations including supplementary examinations, for the first year and no candidates should be allowed to remain in the first year class for more than two years.

The above recommendations have been referred to the University Grants Committee for consideration.

(f) Training in Gas Turbines Work

The Coordinating Committee considered the following resolution passed by the Board of the Council of Scientific and Industrial Research and approved by the Governing Body of the Council at its meeting held on the 22nd March, 1958 :

“Developmental research on gas turbines should be concentrated at the proposed Aero-Engine Factory at Bangalore ; but it should not be ignored that training and teaching were necessary for the creation of the requisite personnel, and for this purpose, teaching and training facilities should be provided at such centres as might be found suitable. With regard to teaching and post-graduate work, the Board desired the Director-General to pursue the matter further and to place his recommendations before the All India Council for Technical Education. However, any schemes for *ad hoc* research at such places of training as

might be suitable and where facilities existed for such schemes, should be considered and encouraged by the Council.”

The Committee was of the view that the existing facilities at the Indian Institute of Science, Bangalore were adequate for the training of personnel required for gas turbine technology work and no further facilities were necessary at this stage.

Item No. 6 :—All India Board of Technical Studies :

- (a) **Matters for Report**
- (b) **Recommendations for Consideration**

(A) Engineering Board

(a) Matters for Report

(i) Meetings

During the period under review the All India Board of Technical Studies in Engineering & Metallurgy held two meetings as indicated below :

11th meeting	17th July, 1958
12th meeting	13th March, 1959.

The decision taken and the recommendations made by the Board at its 11th meeting were placed before the Coordinating Committee at the last meeting held on the 18th October, 1958. They are now reported to the Council for information. The recommendations and decisions in respect of the other meeting will be placed before the Council as soon as the proceedings of the meeting of the Board are available.

(ii) Admission of candidates who have passed Technical Higher Secondary School Examination

The Board at its meeting held on the 17th July, 1958 recommended that candidates who had passed Higher Secondary Examination in the Technical Stream be admitted direct to the second year of the National Certificate Courses under certain conditions. The Board did not agree that candidates who had passed Intermediate in Science examination should be admitted to the second year of the National Certificate Course. The recommendations of the Board were endorsed by the Coordinating Committee.

(iii) Part-time Course for National Diploma

The Council had approved long ago that the National Diploma Course in Engineering may be offered on a part-time basis to those who had passed National Certificate Examination. Although the duration of

the part-time course had been prescribed as three years at that time, on specific syllabus or hours of instructional work required had been worked out in detail.

The Board examined the matter in detail and suggested that a total of 2000 hours institutional work would be necessary for a National Certificate holder to complete the course for the National Diploma as shown at Annexure-I. It also suggested that the course may be covered in 3, 4 or 5 years (part-time) depending upon the number of hours of work per week which an institution would be able to do according to the convenience of the candidates. The detailed syllabii of each subject and examination scheme should be prepared by each institution conducting the courses and approved by the Board.

The Coordinating Committee approved the scheme as formulated by the Board. The Committee also recommended that in view of the need for providing opportunities of further education to those who had completed State diploma courses equivalent to National Certificate, State Boards of Technical Education should formulate Advanced Diploma Course on the same lines as the National Diploma Course. The Committee also recommended that Universities be requested to formulate Degree courses for the benefit of those who had completed courses equivalent to National Certificate in Engineering. The Degree courses should be available both on full-time and on part-time basis. The State Boards of Technical Education and Universities are accordingly being addressed in the matter.

(iv) Additional instructional facilities required for 5-year integrated course

The All India Council for Technical Education had recommended at its last meeting held on 24th March, 1958 that as a sequel to the reorganisation of Secondary Education in the country, the first degree course in Engineering should be reorganised into a 5-year integrated course with Higher Secondary Certificate as the minimum admission qualification. For the introduction of the 5-year integrated course the Board at its meeting held on 17th July, 1958 recommended the following additional instructional facilities at each Engineering College conducting degree courses in Civil, Mechanical and Electrical Engineering :

Buildings (plinth area)	15,100 sq. ft.
Equipment & furniture	Rs. 1.44 lakhs.

Staff

Professors—Physics, Chemistry & Mathematics	3
Readers & Lecturers	5
Junior Lecturers	4
Maintenance expenditure	Rs. 20,000 per year.

The above recommendations of the Board were accepted by the Coordinating Committee at its meeting held on 18th October, 1958. The Board is now finalising curriculum and detailed syllabii for the 5-year integrated course.

(v) *Radio Engineering Course*

The Board at its meeting held on 18th July, 1958 considered the report of its expert Committee set up for formulating courses of study in Radio Engineering and scheme of development of facilities in the field. In view of the present apparently unsatisfactory position in respect of employment of Tele-communication Engineering graduates, the Board felt that the most suitable pattern required for the first-degree course in the field should be examined in detail in consultation with the principals of technical institutions who are conducting separate first-degree courses in Tele-communication Engineering at present. As regards expansion of facilities for degree course in Tele-communication Engineering, the Board was of the view that this matter be considered after the fundamental issues regarding the pattern of the course had been settled.

The Coordinating Committee considered the recommendations of the Board and decided that the question of further expansion in the field should be examined in detail in consultation with the principals of technical institutions and employing authorities. To facilitate such an examination the views of the principals should be sought regarding the best pattern of courses to be organised and also a joint discussion among all interests concerned should be held.

The views of technical institutions and employing authorities are being obtained regarding the pattern of degree course in Radio Engineering and the requirements for technical personnel in the field.

(vi) *High Voltage Equipment for Engineering Colleges*

The model list of equipment approved for a College conducting first-degree courses does not include any High Voltage Equipment for Electrical Engineering. The Board which considered the matter recommended that each engineering college should be provided with a minimum amount of equipment and accommodation for giving training to students in High Voltage work. The Board estimated the requirements as :

Equipment : Rs. 57,000 ; Accommodation : 1,000 sq. ft. floor area.

The Board also recommended that a few selected centres may be developed for advanced work in High Voltage Engineering which will provide the necessary facilities to students belonging to other institutions in their respective areas. The requirements for developing the centres

concerned for advanced work in the field were estimated as shown below :

Equipment :	Rs. 2,37,000/-
Buildings :	4,000 sq. ft. (floor area)

The Coordinating Committee accepted the above recommendations of the Engineering Board. The Committee further decided that the question of selection of centres for advanced work should be examined by the Post-Graduate Development Committee and for that purpose a survey should be carried out regarding the facilities already available in the country and the manner in which they were being utilised.

(vii) *Redistribution of Seats*

The model scheme of engineering colleges and polytechnics provides for an admission of 120 students a year—60 for Civil, 30 for Mechanical and 30 for Electrical branches. In view of the fact that in the coming years electrical and mechanical engineers would be required in larger number than civil engineers, the Board examined the practicability of redistribution of the seats to the three branches and made the following recommendations :—

- (i) An institution may be allowed to redistribute the seats according to its convenience but without any additional cost being involved.
- (ii) The changes should be approved by the Regional Committees concerned.
- (iii) The changes should not materially alter the availability of engineers of each category from estimated position in regard to the 2nd Plan requirements.

The Coordinating Committee approved the above recommendations of the Engineering Board and decided that the institutions be allowed to redistribute the sanctioned seats between the various branches provided that such redistribution does not involve any additional expenditure and is approved by the Regional Committees concerned.

(viii) *Standard of instructional facilities required*

The model list of instructional facilities as approved by the Coordinating Committee for a polytechnic had provided *inter alia* an accommodation of 6,000, 9,000, 12,000 sq. ft. floor area for drawing halls for polytechnics of capacity of 120, 180 and 240 students respectively. The Engineering Board at its meeting held on 17th July, 1958 re-examined the question of accommodation for drawing halls in the light of the views received from various sources and recommended that the schedule of

drawing hall accommodation for a polytechnic should be revised as shown below :—

- (a) For a polytechnic with an annual admission of 120 students :
4200 sq. ft. floor area.
- (b) For a polytechnic with an annual admission of 190 students :
6300 sq. ft. floor area.
- (c) For a polytechnic with an annual admission of 240 students :
8400 sq. ft. floor area.

The Coordinating Committee considered the recommendation of the Engineering Board at its meeting held on 18th October, 1958 and decided that the Regional Committees may make a detailed examination of the present position regarding drawing hall accommodation in selected polytechnics, with particular reference to time allotted for drawing work in the various years of diploma courses, time tables of the institutions concerned and duration of occupancy of drawing halls each working day. On the basis of such a detailed examination, the Regional Committee may give their views on the new standards of drawing hall accommodation suggested by the Board and whether any further revisions are necessary. It was also decided that pending a reconsideration of the matter in the light of the views of the Regional Committees, the existing approved standards should continue.

(ix) *Rolling Mill Engineering*

The Engineering Board considered the suggestion received from the Ministry of Commerce & Industry that "Rolling Mill Engineering" should be introduced in technical institutions to ensure the supply of properly trained personnel to the expanding Rolling Mill Industry. The Board was of the view that the subject of Rolling Mill Practice should be included in Manufacturing processes under Workshop Technology for first-degree course in Mechanical Engineering and recommended that Refresher Courses in Rolling Mill Practice be also conducted at selected technical institutions with the assistance of experts drawn from industry.

The Coordinating Committee which considered the recommendations of the Board decided that the Regional Committee should examine the possibility of conducting refresher courses in Rolling Mill Engineering in selected institutions in their respective areas in co-operation with industry and suggest suitable schemes for consideration.

(x) *Soil Mechanics as a Subject for Civil Engineering Degree Course*

The Board considered the suggestion of the Ministry of Irrigation and Power for inclusion of Soil Mechanics as a subject in the curriculum for Civil Engineering Degree course and observed that this subject is

already included in the National Diploma Course and the various University Degree courses in Civil Engineering and that the treatment of this subject in these courses is adequate.

(xi) *Diploma Course in Automobile Engineering*

The Board at its meeting held on 14/15th November, 1957 decided that there is no need to have a specialised course in Automobile Engineering at the diploma level and recommended that the course may be provided as a post-diploma course after a diploma in Mechanical Engineering. The Coordinating Committee at its meeting held on 3rd December, 1957 accepted this recommendation.

The Western Regional Committee at its meeting held on the 25th February, 1958 recorded without any comments, the view expressed by the representative of the Government of Bombay that the present three-year State Diploma course in Automobile Engineering conducted in some of the State Government institutions having the first two years common with diploma course in Mechanical Engineering will serve the purpose of the industry and will also reduce the total period of training by one year.

The Engineering Board considered the suggestion of the Government of Bombay but confirmed its earlier recommendations.

(xii) *Endorsement of State Board Awards*

The Board considered the question of endorsement on the awards of State Boards for National Certificates and National Diplomas and laid down that this should be done only in respect of institutions providing instructional facilities in accordance with the standards of the All India Council for Technical Education. The institutions should be inspected at least once in three years by Expert Committee of the Regional Committee concerned and approved by it for the purpose.

(xiii) *Production of Text Books in Hindi*

The Board considered the request of the Ministry of Education for a list of text books suitable for degree and diploma courses for translation into Hindi and desired that the question may be taken up after the language issue is settled and a definite decision taken by the Government to replace English in the teaching of Engineering and Technological subjects.

(b) **Recommendations for Consideration**

(i) *Facilities for Training in Agricultural Engineering*

The Engineering Board at its meeting held on 14th and 15th November, 1957 accepted in general the suggestions of its Agricultural Engineering Committee and recommended that facilities for first-degree course

in Agricultural Engineering be developed at selected engineering colleges one in each region. The Board also suggested that Farm Power machinery may be included as one of the electives in the first-degree course in Mechanical Engineering and Soil and Water Conservation as one of the electives in the first-degree course in Civil Engineering.

Regarding diploma course in Agricultural Engineering, the Board was of the view that one-year course may be organised for those candidates who have taken diploma in Mechanical Engineering. The Diploma Course in Agricultural Engineering may be started in Engineering Colleges which are located near Agricultural Colleges.

The above recommendations of the Board were considered by the Coordinating Committee at its meeting held on 3rd December, 1957. The Committee expressed the view that subject like Farm Power Machinery and Soil and Water Conservation should not at this stage, be included as electives in the first-degree course in Mechanical Engineering and Civil Engineering respectively, since such a step would accentuate the difficulties felt at present in the employment of students specially trained for a degree in Agricultural Engineering. The Committee also did not consider it necessary that at the present time, one-year Post-Diploma course in Agricultural Engineering for Diploma holders in Mechanical Engineering need be organised. The Committee was of the view that a clear and categorical opinion of the employers in the field of Agricultural Engineering may be obtained in regard to the usefulness of students trained specially as Agricultural engineers.

In the meantime the Agricultural Personnel Committee appointed by the Planning Commission and the Ministry of Food and Agriculture in its report submitted in March 1958, observed that the scope of employment of Agricultural Engineering graduates was limited and the current out-put from the Indian Institute of Technology, Kharagpur, and Agricultural Institute, Allahabad (the present annual intake of these institutions for this course is 50 and 25 respectively) would be adequate to meet the requirements during the remaining years of the Second Five-Year Plan. The Agricultural Personnel Committee estimated the requirements for the Third Five-Year Plan as 270 Post-graduate and 800 graduates. In order to meet their requirements the Committee recommended that Agricultural Engineering Degree courses should be organised regionally at certain selected centres as envisaged in the scheme formulated by the Engineering Board.

The Committee did not make any recommendation regarding Diploma courses in Agricultural Engineering.

The Coordinating Committee re-examined the question of develop-

ment of facilities for training in Agricultural Engineering in the light of recommendations of the Agricultural Personnel Committee at its meeting held on 18th October, 1958. The Committee noted that the employment position in respect of graduates in Agricultural Engineering particularly from the Indian Institute of Technology, Kharagpur, was not satisfactory and various employing organisations both at the Centre and in the States were recruiting Civil and Mechanical Engineering graduates for agricultural engineering work in preference to Agricultural Engineering graduates. As long as such an unsatisfactory position continued it would not be desirable, the Committee felt, to expand facilities for Agricultural Engineering courses in the country according to the scheme formulated by the Engineering Board and subsequently endorsed by the Agricultural Personnel Committee. In view of this, the Coordinating Committee deferred a decision on the scheme for expanding facilities for the training of Agricultural Engineers and suggested that the Chairman, Coordinating Committee should discuss the matter with the Secretary, Ministry of Food and Agriculture in the first instance and bring it up for further consideration at its next meeting.

The Ministry of Food and Agriculture who were informed of the views of the Coordinating Committee regarding expansion of existing facilities for training of Agricultural engineers, have agreed that the scheme prepared by the Engineering Board for creating new facilities for the training of Agricultural Engineering graduates and diploma holders may be deferred for the present.

The matter is placed before the Council for decision.

(ii) *Specialised courses for Surveyors and Computers at the diploma level*

The Board considered the request of the State Government of Uttar Pradesh for the recognition of special courses for surveyors and computers at the diploma level. The State Government emphasised that on account of the ever increasing work load in engineering departments the need had arisen for such special courses to ensure efficient and economical execution of work. The Board observed that at the diploma level, Engineering Courses should be offered only in the basic branches of Civil, Mechanical and Electrical Engineering, and for this purpose the present pattern of a three-year course after Matriculation is the right one. The special diploma courses for computers and surveyors as proposed by the State Government are only of two years' duration. Even for Intermediates in Science, the basic subjects for the National Certificate course in Civil Engineering cannot be adequately covered in a two-year course. If additional subjects for the training of Surveyors or Computers are also introduced within this short duration, the basic Civil Engineering sub-

jects have to be further curtailed. Further, candidates undergoing the proposed special courses would not be suitable for employment on jobs requiring specialised knowledge in the preparation of designs and estimates and collection of data for large works and projects as intended by the State Government. Such works can be entrusted only to candidates trained at the degree level. The Board therefore decided that no need exists for organising courses at the diploma level for the specialised training of surveyors and computers.

(ii) *Accommodation for Staff*

The Board at its last meeting examined the recommendations of the Northern Regional Committee to increase the accommodation for teaching staff in first-degree institutions by 4080 sq. ft. Having regard to the possibility of seating a large part of the teaching staff in the various laboratories, drawing halls etc. the Board expressed the view that no such increase was necessary. The Coordinating Committee at its meeting held on 18th October, 1958 however desired that the Board may re-examine the matter and indicate how accommodation should be provided to all members of staff in separate rooms, or in laboratories, Workshops etc.

After the re-examination of the case, the Board indicated the particulars of the seating accommodation for each teaching staff member in the various laboratories, workshops, drawing halls, etc. as at Annexure II. On the basis indicated accommodation is available for 43 persons while the total sanctioned teaching staff for a first-degree institution with a four-year course is only 33.

Again 23 members of the staff may be regarded as having practically independent accommodation since some of the laboratories are very rarely occupied. For the rest separate cubicles or screens may have to be provided where necessary.

In the case of institutions with five-year integrated course, 35 members out of a total teaching staff of 41 could have practically independent accommodation. However a total number of 58 members could be accommodated as against the total teaching staff of only 41.

The Board, therefore, did not see any justification to increase the accommodation for teaching staff in the first-degree institutions. A more important consideration, however, for the manner of seating teaching staff is that the various laboratories etc. should be in charge of specific members of the teaching staff.

ANNEXURE I

(Item No. 6-A)

Subject-wise break up of Part-time National Diploma Course for National Certificate holders.

Sl. No.	Subjects	Mechanical	Electrical	Civil
1.	Mathematics	248	248	248
2.	Chemistry	180	180	180
3.	Physics	105	105	105
4.	Heat Engines	165	165	165
5.	Surveying	102	102	102
6.	Drawing	136	136	136
7.	Theory of Machines	150	150	..
8.	Strength of Materials	165	165	165
9.	Hydraulics & Hydraulics Machinery.	165	165	165
10.	Engineering Economics & Accounts	68	68	68
11.	Engineering Production	68	68	68
12.	Heat Engines	165	..	..
13.	Machine Design	136	..	..
14.	Metrology	34	..	..
15.	Metallurgy	68	..	..
16.	Electrical Engineering	..	105	..
17.	Installation Design	..	160	..
18.	Elements of Electrical Design (Machine Design)	..	190	..
19.	Elementary Principles of Line Telegraphy, Telephony & Radio Communication	..	150	..
20.	Engineering Geology	..	..	204
21.	Plane and Geodetic Surveying	..	..	68
22.	Theory and Design of Structure	..	..	204
23.	Civil Engineering-I	..	..	68
24.	Civil Engineering-II	..	..	102
25.	Quantity Surveying	..	..	34

Annexure II*(Item No. 6-A)*

Particulars of seating accommodation for staff members in respect of Engineering Degree institutions having (a) four-year course and (b) 5-year integrated course for an annual admission of 120.

(a) Institutions with four year course

S. No.	Particulars of accommodation	Floor Area in sq. ft.	No. of teachers to be seated
1.	Drawing Halls	9,000	3
2.	Principal's room @ 400 sq. ft.	400	1
3.	Professors - 3 rooms @ 200 sq. ft.	600	3
4.	Other Senior Staff - 3 rooms @ 200 sq. ft.	600	6
*5.	Cement aggregate and concrete	900	1
*6.	Road Materials Laboratory	600	1
*7.	Soil Mechanics and Soil Testing Lab.	900	1
*8.	Structures Laboratory	1,600	2
*9.	Sanitary Engineering Laboratory	600	1
10.	Surveying	1,000	1
*11.	Junior Mechanics Laboratory	1,600	2
12.	Strength of Materials Laboratory	2,000	2
13.	Hydraulics Laboratory	3,000	2
*14.	Geology Laboratory	1,200	1
15.	Engineering Chemistry (Fuels, Metallurgy, Water & Lubricants)	2,000	2
16.	Boiler House & Steam Laboratory	4,000	2
17.	Internal Combustion Laboratory including refrigeration	4,000	3
*18.	Models	1,600	1
*19.	Physics Laboratory	3,000	2
*20.	Chemistry Laboratory	2,000	1
21.	Electrical Machines	6,000	2
22.	Measurements and Applied Electronics	4,000	2
23.	Electrical Workshop	3,000	1
(b) Additional accommodation in respect of institutions with five year integrated course			
1.	Drawing Hall for 60	2,100	1
2.	Science Laboratories for Physics and Chemistry	3,000	2
3.	Staff rooms for 12 members including 3 professors	1,500	12

*Items marked with asterisk are rarely occupied for instructional purposes and can be regarded as practically independent accommodation for teachers seated there.

(B) Architecture Board**(a) Matters for Report***(i) Meeting*

A meeting of the All India Board of Technical Studies in Architecture and Regional Planning was held on 4th November, 1958.

(ii) Recognition of Architectural qualifications for purposes of employment

The Board accepted the recommendations of its Syllabus Committee regarding recognition to be given to various architectural qualifications for the purpose of employment to superior and subordinate posts and services as well as for the purpose of admission to the Post-Intermediate stage of the National Diploma Course in Architecture. A list of qualifications recognised is given at Annexure-I.

The recommendations of the Board regarding recognition of architectural qualifications for employment have been approved by the Central Government.

(iii) Private practice by teaching staff in Architectural Institutions

While considering the shortage of teachers in architectural institutions the Board expressed the view that the institutions failed to attract good and well-qualified architects mainly due to (a) comparatively low pay scales and (b) the teaching staff not being allowed to do private practice. The Board considered that private practice by teachers was essential as it kept them constantly in touch with the profession as also with the modern developments in the field of architecture. The Board recommended that the teachers may be allowed to do limited private practice. It also appointed a sub-committee to formulate detailed proposals regarding private practice to be done by teachers. The report of the Committee is awaited.

(b) Recommendations for Consideration*(i) Facilities for training in Landscape Architecture*

In February, 1958, a Seminar on Landscape Architecture was held at New Delhi. The Seminar recommended that in view of the growing importance of Landscape Architecture a separate department for this subject may be established at the School of Town and Country Planning, Delhi and Landscape Architecture should be introduced as a subject of study in Universities and other institutions and encouraged. The Board examined the recommendations and expressed the view that training in Landscape Architecture at the post-graduate level was necessary for Town Planners and Architects.

The Board recommended that to begin with special course in Landscape Architecture should be organised at the School of Town and Country

Planning, Delhi and the Indian Institute of Technology, Kharagpur, where facilities for training in Town Planning were available. Landscape problem was very widespread and needed a large number of landscape architects. The Board, desired that Government should take positive steps to arrest the process of despoilation and also to suitably utilise the services of qualified landscape architects.

(ii) *Sending of staff members of architectural Schools for training abroad*

Dr. Koenigsberger, Director of Architecture Association School of Architecture, London who visited India some time back, had suggested that it would be useful if some Indians were sent to the London School of Architecture for training in Tropical Architecture. The Seminar on Landscape Architecture, held in February 1958, also recommended that scholarships should be instituted for advanced studies in Landscape Architecture both in India and abroad and for study tours.

The Board considered the question of training Indian personnel abroad and made the following recommendations :—

- (a) that one member of the teaching staff from each of the recognised architectural institutions conducting degree or equivalent courses may be sponsored for training in Tropical Architecture at the London School of Architecture, for about 6 months. The training should be of the Refresher course type ;
- (b) that adequate facilities may be secured for training in Architecture, (including Landscape and Tropical Architecture) Town Planning and allied subjects under the foreign aid programmes. After their training abroad the persons concerned should be absorbed in teaching institutions, if not already employed in them.

The Board also expressed the view that as a result of the impact of the Western advances made in the field, some of the Eastern countries had made considerable progress in Architecture and it will be worthwhile for Indians to know what is happening in those countries. Efforts may therefore, be made to send some Indian Architects to Eastern countries like Japan, Philippines where they could be associated with professional architects, for periods stated. Such an association will widen their outlook and knowledge of the latest techniques and practices followed in those countries.

The recommendations of the Board are placed before the Council for consideration.

ANNEXURE I

(Item No. 6-B)

Name of the Organisation/ Institution	Qualifications recommended for the purposes of employment	
	Superior Services	Subordinate Services
1. All India Council for Technical Education	National Diploma	National Intermediate
2. Baroda University	B. Arch.	i) Passing of the third year of the B. Arch. Course and ii) Diploma
3. Bombay University	B. Arch.	Passing of the third year of the B. Arch. Course
4. Calcutta University	B. Arch.	Passing of the third year of the B. Arch. Course
5. Delhi University	B. Arch.	Passing of the third year of the B. Arch. Course
6. Indian Institute of Techno- logy, Kharagpur	B. Arch.	Passing of the third year of the B. Arch. Course
7. J. J. School of Art, Bombay	Five Year Dip./Cer- tificate after 1941	Passing of the third year of the five-year/Diploma Cer- tificate after 1941
8. Kala Bhavan Technical Institute, Baroda	---	Diploma
9. Nagpur University	---	i) Four-year Diploma course ii) Five-year Diploma course.

(C) Chemical Engineering Board**(a) Matters for Report***Meeting*

The Board held a meeting on the 23rd March, 1959. Dr. G. P. Kane was elected as the Chairman in place of the late Dr. J.C. Ghosh.

(i) Five-year Integrated Course:

The Board decided that at least the first two years of the five-year Integrated Course in Chemical Engineering should be common with the other branches of engineering so that all the students following

engineering courses may have thorough training in fundamental sciences and basic engineering subjects. The Board appointed some of its members to work out in association with the Syllabus Committee of the All India Board of Technical Studies in Engineering and Metallurgy the details of the five-year integrated course in Engineering, which will be common to Chemical Engineering course.

(ii) *Silicate Technology Course*

The Board endorsed the following recommendations of its Expert Committee regarding Silicate Technology Course.

(i) In view of the present conditions of the industry and the types of technical personnel required, it is not necessary at this stage to organise a separate degree course in Silicate Technology as distinct and different from degree course in Chemical Engineering. The needs of the industry could best be met by offering Ceramics and Ceramics Engineering as an elective subject in the first-degree courses in Chemical Engineering at certain selected centres. For the study of the elective, additional 4 and 6 hours of work/week may be provided in the 3rd and 4th years respectively of the present four-year Degree Courses in Chemical Engineering. The final degree examination in Chemical Engineering should include one theory paper and one practical examination for the elective subject.

(ii) The provision for a more intensive study of the elective could be made in the proposed five-year integrated course in Chemical Engineering.

(iii) The elective subject in which a candidate qualifies may be mentioned in the final degree Certificate in Chemical Engineering.

(iv) For the training of specialists in Ceramics and Ceramics Engineering, post-graduate courses of one year may be conducted after the first degree in Chemical Engineering. The post-graduate courses may lead to the award of Master's degree and the candidates allowed to specialise in one of the following branches :

- (i) Glass & Enamels
- (ii) Refractories
- (iii) Porcelain and other ceramicware

(b) Matters for Decision

Training of Operators for Chemical Industry

The Board approved a scheme of Training of Operators for Chemical industry, subject to the proviso that the detailed syllabus suggested in the scheme for Chemical Engineering and related subjects should be revised by a Sub-Committee. A copy of the scheme is given at Appendix 'A'. The Board was of the view that while the above scheme trained fresh

operators for chemical industry, there was, at the same time, a need for training persons who are already working in industry so as to facilitate their advancement in the profession and also to enable them to function better. For that purpose, a part-time course for persons working in industry was necessary which should also be organised in institutions set up in accordance with the above scheme. The details of the part-time course, the centres where they should be organised and other aspects may be examined by the above Sub-Committee and a suitable scheme prepared. The Board also decided that in preparing the scheme, the Development Council for Chemical Industry set up by the Ministry of Commerce & Industry may be consulted and also the views of chemical industry should be obtained in the matter.

(D) Textile Technology Board

(a) Matters for Report

(i) Meeting

The Board met on the 24th September, 1958.

(ii) Training in Woollen & Worsted Technology

On the recommendations of the Board, the Coordinating Committee at its meeting held on the 14th July, 1956 had agreed that the establishment of a separate and full-fledged institute for Woollen & Worsted Technology was not necessary but facilities for conducting post-graduate course in the subject for those who had completed the first-degree in textile technology (cotton) may be organised in an existing institution in woollen industry area, having a well-developed department of textile technology. Some members of the Board, however, expressed the view that it would be desirable to establish a separate institute for woollen and worsted technology.

The Board examined the matter again in detail and also obtained the views of woollen industry. It reiterated its previous view that it was hardly necessary to establish a separate institute for the purpose. The Board also expressed the view that graduates in textile technology (cotton) who had undergone practical training in Woollen & Worsted industry would meet the requirements for technical personnel for the industry, at present, and therefore there was no need to organise even a post-graduate course in the subject as recommended earlier.

The Coordinating Committee at its 27th meeting held on the 18th October, 1958 endorsed this decision of the Board.

(iii) Training of supervisory personnel for Textile Industry

On the recommendations of the Board, the Coordinating Committee at its meeting held on the 14th July, 1956 agreed that the Board may

go ahead with the reorganisation of courses for supervisory training to suit the needs of jobbers.

The Board examined the entire question of training of personnel for supervisory positions and also obtained the views of textile industry in the matter.

The Board expressed the view that while every incentive and encouragement should be given to jobbers to rise to supervisory positions it would not be in the best interests of the industry that such positions should only be filled by promotions from the ranks. The industry should also recruit as supervisors persons who had undergone a formal course of training in textile technology at diploma or certificate level in a technical institute. For this purpose the Board recommended that a full-time course of about three years' duration with Matriculation as admission qualification should be designed. The same course should also be available on part-time basis for the benefit of those who were already in industry and wish to equip themselves with necessary training for advancement in their field.

The views of the Board were placed before the Coordinating Committee at its 27th meeting held on the 18th October, 1958. The Committee endorsed the recommendations of the Board and recommended that a three-year course with Matriculation or equivalent as admission qualification be formulated. This recommendation of the Committee will be placed before the Board at its next meeting for necessary action.

Regarding training of jobbers, the Board was of the view that even if a Diploma or National Certificate course was organised on a part-time basis many skilled workers in the industry and particularly jobbers will not be able to take advantage of it in view of their inadequate general educational equipment. Nevertheless jobbers should have some kind of part-time training for self improvement and to become better jobbers. Such training would also help them to discharge their responsibilities satisfactorily when they rose to supervisory positions, on the basis of their experience in the industry. The Board prepared a scheme of part-time course for jobbers.

The Coordinating Committee while approving the scheme formulated by the Board expressed the view that training at this level falls under the purview of the Ministry of Labour. The Committee, therefore, recommended that the scheme be referred to the National Council for Training in Vocational Trades for consideration.

The scheme has accordingly been referred to the National Council for Training in Vocational Trades.

(E) Applied Art Board**(a) Matters for Report***(i) Meeting*

Since the last meeting of the Council, the All India Board of Technical Studies in Applied Art met once, namely, on the 8th August, 1958.

(ii) Representation of the Board on the Lalit Kala Akademi

The Board considered the question of its representation on the Lalit Kala Akademi and was of the view that since the scope of work of the Akademi included *inter alia* promotion of education and training in Applied Art, the Board should be represented on the Akademi for mutual benefit, coordination of work and elimination of duplication of efforts. The Board decided that the matter be referred to the Government for consideration. The matter has accordingly been taken up with the appropriate authorities.

(iii) Re-organisation of courses in Applied Art

The Board considered a suggestion received from Shri B.C. Sanyal, Head of Applied Art Department, Delhi Polytechnic, regarding reorganisation of courses in Applied Arts & Crafts and decided that detailed information should be collected from all art institutions regarding courses offered by them and their views sought regarding revision of the structure and duration of the courses in the light of the new pattern of Secondary Education introduced in the country.

(iv) Change in duration of courses at the Regional School of Printing

Some members of the Board expressed the view that the two-year National certificate Course in Printing Technology could only train skilled workers or craftsmen for the industry and not technicians as generally understood. Since the primary object of the printing school should be to train technicians of the supervisory type for the industry, the present two-year National Certificate and one-year Advanced Certificate Courses should be combined together and one National Certificate Course of three years' duration should be adopted.

The Board decided that the entire matter should be examined by the Expert Committee for Printing Technology which should also advise regarding the standard and contents of the courses and changes, if any, considered necessary in the existing structure of the courses. The Committee should also consider the question of practical training and suggest how that should be organised. The Board also noted that some Printing Schools had suggested certain revisions in the list of equipment. The Board decided that the Committee for Printing Technology should also examine

the matter particularly from the point of view of changes which might be suggested by it in respect of the courses and give a final list of equipment required for a Printing School and its estimated cost. In pursuance of the decision of the Board, the Committee for Printing Technology met on the 12th September, 1958 and compiled a list of equipment required for a Regional School of Printing. The Committee is preparing at present estimates of cost of the equipment and their specifications.

Regarding the structure of the courses, the Committee decided that the present two-year National Certificate Course and one-year Advanced Certificate Course should be combined and an integrated 3-year National Certificate Course in Printing Technology should be formulated. The Committee is preparing details of the revised course.

(v) *Traditional Artists and Art Institutions*

The Board was of the view that Indian Art was on the verge of extinction and it was imperative that something should be done to revive Indian techniques in applied art. For that purpose it is necessary *inter alia* to encourage traditional institutions to run side by side modern art institutions. The Board decided that information regarding traditional artists and art institutions should be obtained and the matter considered in full at the next meeting. In pursuance of the decision of the Board, necessary information regarding traditional artists and art institutions is being collected.

(vi) *Nomination of Council's representative on the Board*

The constitution of the various Boards of Technical Studies *inter alia* provides for one representative of All India Council for Technical Education on each Board. The Council at its meeting held on the 25th February, 1957 had nominated Shri D.P. Roy Chowdhury as its representative on the All India Board of Technical Studies in Applied Art for the period ending 31st December, 1959. As Shri D. P. Roy Chowdhury regretted his inability to accept the membership of the Board, the Coordinating Committee at its meeting held on the 3rd December, 1957 nominated Lala Sri Ram as the representative. Lala Sri Ram attended the first meeting and later on, regretted his inability to continue on the Board. The Coordinating Committee at its meeting held on the 16th October, 1958 nominated Shri S.H. Parekar as the representative of the Council on the Board in place of Lala Sri Ram. Shri Parekar has accepted the membership of the Board.

Item No. 7 :--Regional Committees :

- (a) **Matters for Report**
- (b) **Recommendations for Consideration**

WESTERN REGIONAL COMMITTEE**A. Matters for Report***(a) Meetings*

The Western Regional Committee was reconstituted for a period of three years with effect from 13-10-1958. Seth Kasturbhai Lalbhai was re-elected as Chairman.

(b) Accommodation for Drawing Halls in Polytechnics

In pursuance of the decision of the Coordinating Committee at its meeting held on 18th October, 1958 the Regional Committee reviewed the question of accommodation for Drawing Halls for Polytechnics and carried out a detailed study of the requirements in this regard with reference to selected institutions in the region. A similar study has also been carried out by the Northern Regional Committee. The Southern and Eastern Regional Committee have not yet done so. Since the intention of the Coordinating Committee is to consider the recommendations of all the Regional Committees together, the matter will be brought up before the Council after the other Regional Committees have examined it and made their recommendations.

(c) Location of Diploma Courses in Metallurgy

The Regional Committee has suggested that the following institutions may be selected for organizing diploma courses in Metallurgy.

- (i) College of Engineering, Poona.
- (ii) University Polytechnic, Baroda.
- (iii) Centrally sponsored Polytechnic, Bombay.
- (iv) Government College of Engineering & Technology, Raipur.
- (v) S.V. Polytechnic Institute, Bhopal.

The recommendations of the Regional Committee will be considered by the Expert Committee on Metallurgy of the All India Council for Technical Education and the matter brought up before the Council together with the recommendations of the Expert Committee regarding the Centres to be organised in all parts of the country.

B. Matters for Decision*(a) Architecture and Town Planning Course at Birla Viswakarma Mahavidyalaya, Anand*

Birla Viswakarma Mahavidyalaya Anand had submitted a scheme for the establishment of degree course in Architecture and Regional

Planning. The Regional Committee examined the scheme with the help of an expert Committee but was unable to recommend it for the following reasons :

- (i) As the building activities in the University Town and nearby cities such as Ahmedabad and Baroda were of a restricted nature, there was no scope in the near future for buildings of various types.
 - (ii) It was well-nigh impossible in the opinion of the visiting Committee to secure services of a duly qualified and experienced architect to shoulder the responsibility of the Head of the Department, even on a salary much higher than that prescribed (viz. Rs. 1050). The committee further felt that the idea of securing services of experienced architects from Ahmedabad and Baroda appeared impracticable and would introduce the factor of irregularity and sluggishness in the absence of regular staff.
 - (iii) As the training in Regional Planning postulates completion of a five-year course either in Architecture or Engineering a combined course of Regional Planning and Architecture was not advisable. Besides, the duration of four years for the combined course would be too inadequate for candidates with admission qualifications as higher secondary school examination in Science or technological stream or first-year Science.
 - (iv) In view of the recommendation of the All India Council for Technical Education, not to start new schools particularly in the Region, where facilities for training in Architecture already exist and on account of the near vicinity of the Kalabhavan at Baroda, it was not advisable to introduce the course at Anand.
- (b) *Establishment of a Training Centre for Foremanship & Supervision by the Federation of Gujrat Mills and Industries, Baroda*

The Regional Committee has approved the proposal of the Federation of Gujrat Mills and Industries, Baroda to establish a Centre at Baroda for training in Foremanship and Supervision on the lines of the scheme formulated by All India Council for Technical Education. The Committee has recommended an annual grant of Rs. 4,000/- for the purpose and has further suggested that the Federation may be allowed to conduct the course in the regional language instead of in English.

(c) *Procurement of equipment for Technical Institutions*

While considering the report of the Standing Sub-Committee on the progress of approved development schemes in the region, the Western Regional Committee has observed that the poor progress made by some of the institutions is due to delay in the procurement of equipment. The Committee has also noted that the delay is chiefly due to difficulties experienced by the institutions in getting import licences and long delivery periods stipulated by suppliers abroad. The Committee has, therefore, recommended that the essential items of equipment required to be imported by technical institutions should be imported in bulk by the Central Government and distributed to them instead of sanctioning grants for the purpose.

(d) *Co-ordination of Practical Training Schemes—Suggestion of Indian Engineering Association, Bombay*

The Regional Committee considered the proposal of the Indian Engineering Association, Bombay for the co-ordination of different practical training schemes viz. Practical Training Scheme for graduates and diploma holders, scheme of training Technicians for Government Steel Plants, training scheme for Craftsmen and National Apprenticeship Scheme and desired that the following recommendations made by its Sub-Committee be placed before the All India Council.

(i) Practical training should form an integral part of Technical Education and the award of various degrees and diplomas should be subject to compulsory training for at least one year.

(ii) Two Central Co-ordinating authorities should be formed—one for dealing with the training of graduate and diploma holders in Engineering and Technology and the other for the training of trade apprentices. The former should be administered by the Western Regional Office and the latter by the Director of Technical Education, Bombay.

(iii) Field Officers should be appointed to help in co-ordinating the practical training programmes.

(iv) For attracting meritorious students for practical training, the value of stipends should be increased to Rs. 250/- p.m. for degree holders and Rs. 150/- p.m. for diploma holders.

(v) Hostel accommodation for students under practical training should be provided.

(vi) At each of the technical institutions, one Training and Placement officer of the rank of a professor should be appointed.

In this connection it may be mentioned that the Council at its last meeting held in March, 1958 endorsed the recommendations of the Northern Regional Committee that all technical institutions in the country should have Training and Placement officers to look after the practical training and placement of students. This recommendation has not been accepted by the University Grants Commission in so far as University Institutions are concerned.

(e) *Puranmal Lahoti Smarak Technical College, Latur—Organization of diploma course in Civil Engineering*

The institution was established in July, 1956 in the Marathawada area of the former Hyderabad state on the initiative of and with donations raised by the people of Latur. Hyderabad Government also gave some grant. It started two-year Certificate Course for overseers. After the States reorganisation, Latur was integrated with Bombay and the institution sought affiliation to the State Board of Technical Education for conducting three-year diploma course in Civil Engineering. The institution also approached the Central Government through the State Government in June, 1958 for assistance in the organisation and development of three-year diploma course of the State Board.

The request has been considered by the Regional Committee which has recommended the proposal for starting three-year diploma course in Civil Engineering with an annual admission of 60 students. The Committee has estimated the cost of the project as shown below.

Non-recurring

Additional buildings (18,000 sq. ft. plinth) plus roofing, flooring to existing buildings plus electrical and sanitary services	Rs. 3,23,000
Equipment, furniture and Library	Rs. 4,31,700
Total	Rs. 7,54,700
<i>Recurring</i>	Rs. 1,26,000
<i>Hostels</i> —for 70 students	Rs. 2,82,000

In making the above estimates the Regional Committee has taken into consideration the facilities—buildings and equipment already available at the institution and has determined the additional facilities required for organising the course. It has included in the latter some expenditure incurred by the institution on buildings and equipment between the date of applying to the Central Government for assistance and the date of visit of the Visiting Committee to the institution.

The Regional Committee has prescribed the following conditions for grants to the institution :

- (i) A three-year State Diploma Course in Civil Engineering will be conducted for the present in the Polytechnic with an admission capacity of 60 students. Under no circumstances, the figure of admission will be increased in any year by the authorities without prior approval in writing both from the All India Council for Technical Education and from the State Government of Bombay.
- (ii) The Polytechnic authorities will not introduce any new course in Engineering or Technology other than the one which is being conducted at present without obtaining prior approval in writing from the All India Council for Technical Education.
- (iii) Admissions to the above course will be made purely on merit except to the seats which may be required to be reserved for Scheduled Caste/Tribe students in accordance with the State Government rules in force. An effort should be made that students to be admitted to the course obtain a minimum of 50% marks in the qualifying examination.
- (iv) For the management of the Polytechnic, a Managing Committee or Governing Council will be set up consisting of 20 members excluding the Principal, who will be ex-officio member. Ten out of these will be nominated or elected by the Polytechnic authorities from amongst different categories of donors. The remaining ten seats will be filled by nominees of the State Government of Bombay, Government of India, All India Council for Technical Education, State Council of Technical Education and eminent persons from Industry, Education and Commerce in that area to be nominated by the Western Regional Committee.
- (v) Construction of buildings, purchase of equipment, furniture etc., will be the responsibility of a sub-committee to be set up for the purpose by the Governing Council or Managing Committee. All expenditure on buildings and equipment etc. will be sanctioned by the Managing Committee.
- (vi) The Principal will ensure that floor areas recommended in this report will be provided. In case of any difficulty, he will obtain prior approval of the Central Government, to any revision. He will also obtain prior approval of the Central Government for purchase of any item of equipment for a price

higher than the estimated one in this report or for any change in the specification of an item.

- (vii) Teachers will be recruited through Standing Selection Committee to be constituted for the purpose. At every meeting of a Selection Committee, two experts from the approved panels of experts will be associated with it. Panels of experts will be drawn by the Governing Council or Managing Committee and approved by the chairman of the Western Regional Committee.
- (viii) The Managing Committee or Governing Council will draw minimum qualifications for each category of teaching post and only those persons who possess prescribed qualifications will be considered for recruitment to the same.
- (ix) The scales of salaries of different categories of teaching and other posts will conform for the time being to those sanctioned by the State Government of Bombay for teachers in State-owned institutions conducting similar courses.
- (x) The total number of teachers for lectures, laboratory and workshop work will conform to that recommended in Para XIV of this report.

It may be stated that the State Government have agreed to provide as grant only 1/6th of non-recurring and recurring cost according to the State grant-in-aid code. As the institution has no resources of its own and Marathwada is a backward area, it has recommended that the rest of the developmental expenditure should be borne by the Central Government.

(f) Development of Central Technical Institute, Gwalior

This is a Government institution. It was approved by All India Council for Technical Education some years back for diploma courses in Civil, Mechanical and Electrical Engineering with an annual admission of 20 students to each branch. The State government have proposed a scheme of development of the institution into a full-fledged Polytechnic of the normal All India Council for Technical Education pattern capable of admitting 120 students per year for diploma courses in Civil, Mechanical and Electrical Engineering. The State plan includes provision for the purpose. The Regional Committee has examined the matter and has estimated the cost of the scheme as shown below :

Non-recurring

Buildings (10044 sq. ft. plinth)	Rs. 1,15,000
Equipment, Furniture and Library :	Rs. 4,65,500
	Total : Rs. 5,80,500

Recurring

Rs. 3,46,642

Hostel Loans for 100 students

Rs. 3,00,000

The Regional Committee has prescribed the following conditions for grants :

- (i) Admissions to the State Diploma courses in Civil, Mechanical and Electrical Engineering will be 60, 30 and 30 respectively. Under no circumstances these figures of admissions will be increased in any year by the authorities without prior approval in writing from the All India Council for Technical Education.
- (ii) The Polytechnic authorities will not introduce any new courses in Engineering or Technology other than the ones conducted at present without obtaining prior approval in writing from the All India Council for Technical Education.
- (iii) Admissions should be made to any of the 3 courses strictly in order of merit and those students who obtain less than 50% marks in the qualifying examination should not normally be admitted unless there are vacancies. In the total seats sanctioned for this Polytechnic, reservations should be made only for students of the scheduled caste and scheduled tribe communities in accordance with the State Government Resolutions on the subject in force.
- (iv) The courses shall be of three years' duration. Students passing the final year examination will be awarded diplomas after they have undergone practical training for a period not less than 6 months and not more than one year.
- (v) The principal will ensure that the floor areas recommended in this report will be provided. In case of any difficulty, he will obtain prior approval of the Central Government for purchase of any item of equipment for a price higher than the estimated one in this report of the Visiting Committee or for any change in the specification of an item.
- (vi) The total number of teachers for lectures, laboratory and workshop work will conform to that recommended in para XVI of the Visiting Committee's report.

It may be stated that with the above estimates total plinth area of buildings for the institution would be 64,410 sq. ft. as against approved standards of 53,300 sq. ft. plinth.

(g) *Development of Laxminarayan Institute of Technology, Nagpur*

This is one of the 14 technological institutions originally approved for development by the All India Council for Technical Education in 1947. Nagpur University has now made proposals for the further development and expansion of the Institute. The Regional Committee has examined the scheme and recommended that the Institute should be developed on satisfactory lines for degree course in Chemical Engineering in accordance with the standards prescribed by the All India Council for Technical Education. The annual admission to the course should be restricted to 36 students and the course should provide for two electives viz., Fuel Technology and Oil Technology. The Committee has made the following estimates of cost for the developmet scheme.

Non-recurring

Buildings (2133 sq. ft. plinth)	Rs. 38,400
Equipment	Rs. 1,14,000
	Total: Rs. 1,52,400/-

Recurring

Staff and Contingencies	Rs. 61,500/-
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In may be stated that including the present accommodation, the institution would have building of 50,451 sq. ft. floor area. The total floor area approved in case of a similar institution in the southern region is 40,900 sq. ft. which does not include provision for electives. It is for consideration whether the excess of 9551 sq. ft. floor area should be allowed for the two electives recommended for the institution. Further, in the estimates of the Regional Committee for recurring expenditure on account of staff, 2 posts of professors and 5 posts of readers are included whereas generally only one post of professor and 4 posts of readers are provided for the degree course in Chemical Engineering.

The Regional Committee has prescribed the following conditions for grants :

- (i) A permanent Director with sufficient discretionary powers to deal with matters concerning the normal working of the Institute and its various Departments, should be appointed immediately.
- (ii) The University of Nagpur may consider establishment of a separate Faculty of Technology to take care of the subjects of

Chemical Engineering and Chemical Technology, if such a Faculty does not already exist.

- (iii) The University of Nagpur may consider conducting a University Examination at the end of the first year of the course, in addition to examinations already conducted at the end of second, third and fourth years of the course. A student should be given only 2 additional chances to appear for the first year examination at the end of which he should be automatically debarred from continuing his studies further.
- (iv) The salary grades of teachers should be brought in line with those prevailing in the institutions of comparable status in order that right type of persons are attracted to the teaching profession.
- (v) Admissions to the course should not exceed 36 students in the first year annually. The recommendation made by the Advisory Board of the Department stipulating a minimum of 50% marks to be obtained by a candidate in the Inter-Science Examination of any recognised University should be implemented.
- (vi) The question of reserve seats now agreed to by the University should be examined by the University Grants Commission in consultation with the Nagpur University and reservations may be reduced to the minimum necessary.
- (vii) The University authorities may consider introduction of two electives in the fourth year of the course—one in Oil Technology and the other in Fuel Technology.
- (viii) Teaching staff should be recruited strictly in accordance with the recommendations of the Visiting Committee made on pages 11 and 12 of its report.

Persons who have engineering qualifications of the degree standard should only be considered for recruitment as teachers.

- (ix) The Director-in-charge will ensure that floor areas recommended in this report will be provided. In case of any difficulty he will obtain prior approval of the University Grants Commission to any revision.
- (x) The list showing items of equipment considered necessary for the four-year degree in Chemical Engineering has been drawn up in consultation with the Director-in-charge, and any change, either in the specification of an item of equipment or

the price thereof will be made after obtaining prior approval of the Western Regional Committee.

(h) *Development of J. J. College of Architecture, Bombay*

This is a State Government institution which conducts five-year Degree Course in Architecture with an annual intake of 80 students. In 1954, on the recommendations of the Council, a non-recurring grant of Rs. 6 lakhs was sanctioned to the College for increasing the intake by 25 students and for reserving those seats for the benefit of students coming from outside Bombay State. The present intake of 80 includes the 25 additional seats. The Regional Committee on a proposal received from the State Government has now recommended that the intake to the College be increased from 80 to 100 and has estimated the additional cost for the purpose as shown below :—

Non-recurring

Buildings, 3,000 sq. ft. (Plinth)	Rs. 42,000/-
Equipment	Rs. 93,000/-
	Total : Rs. 1,35,000/-

Recurring

Staff	
7 Studio Assistants in the scale Rs. 300-350	
Hostels for 250 students	Rs. 9,98,000/-

The Committee laid down the following conditions for the sanction of grants by the Central Government for the above purpose :—

- (i) Additional buildings to be constructed and items of equipment to be purchased should be in accordance with the recommendations made in the report of the Visiting Committee dated 17th February, 1959.
- (ii) Seven additional Studio Assistants should be recruited for supervising work of the students.
- (iii) The permanent teaching staff of the college should be given those scales of pay as have been recommended by the All India Board of Technical Studies in Architecture and Regional Planning, so as to ensure properly qualified and experienced teaching staff.
- (iv) Honorarium to Visiting lecturers should be raised to Rs. 25/- per hour of visit.

(i) *Introduction of 3-Year Diploma Course at the Government Training Institute, Khar*

In 1955 the Council approved the development of the institution for 2-year Diploma Course in Leather Technology with an annual ad-

mission of 15 students. The Council also approved an estimate of Rs. 1,04,625/- for the purpose. The State Government subsequently revised the course to the normal pattern of 3-year's duration and the Regional Committee has estimated the additional expenditure on that account as shown below :

Non-recurring

Buildings—2850 sq. ft. (Plinth)	Rs. 46,000/-
Equipment, furniture and Library	Rs. 51,200/-
Total	Rs. 97,200/-

(j) *Courses for Advanced State Diplomas*

The Coordinating Committee at its meeting held on 18th October, 1958 recommended that the State Boards of Technical Education may formulate schemes for Advanced Diploma Courses equal in standard to National Diploma for the benefit of those who had completed State Diploma Courses. The Advanced Diploma Courses may be offered both on part-time and on full-time basis. The Regional Committee has examined the matter and made the following observations :—

The proposed Advanced Diploma may not have a recognition different from the present Diploma awarded by the State Board in the matter of employment since they can never have the same status as a University Degree. It may further lead to complications in the matter of placement of existing State diploma holders. The intention of the Coordinating Committee, may be served by organising at established engineering colleges facilities for preparing State diploma holders for the Associate Membership Examination of the Institution of Engineers (India). Suitable assistance may be provided to the Colleges for the purpose. Some universities in Bombay are admitting diploma holders in engineering to the second year of the Degree course and other universities in the State may follow suit. These arrangements are more satisfactory than providing Advanced State Diploma Course.

(k) *Increase in Admission to Shri Govind Ram Seksaria Technological Institute, Indore*

The Council approved in 1957 the development of the Institute for degree courses in Civil, Mechanical and Electrical Engineering with an annual admission of 105 students. The instructional facilities provided under the development scheme are, however, in accordance with the normal pattern for an engineering college with an annual admission of 120 students. In order to make the best use of the facilities available and to be in conformity with the normal pattern, the Regional Committee has recommended that the Institution may admit 120 students per year—60 for Civil, 30 for Mechanical and 30 for Electrical.

(l) *Refresher Course in Rolling Mill Engineering*

In pursuance of the decision of the Coordinating Committee at its meeting held on 18th October, 1958 that the Regional Committees may recommend, suitable institutions for conducting refresher course in rolling mill engineering in cooperation with industry, the Western Regional Committee has recommended that the Indian Institute of Technology, Bombay would be a suitable place for the purpose. The Institute may, the Committee has recommended, organise the Course not only for persons working in rolling mills, but also fresh mechanical engineering graduates. The Committee has further suggested that the services of an expert in the subject may be secured from the U.S.S.R. for conducting the Course at the Institute. The annual admission to the course may be 10 candidates including the nominees of industry.

EASTERN REGIONAL COMMITTEE

A. Matters for Report

(a) *Meetings*

The Regional Committee was reconstituted for a further period of 3 years with effect from 10-4-1958. The reconstituted Committee held its first meeting on the 10th December, 1958 when Shri J. J. Ghandy was re-elected as Chairman.

(b) *Appointment of Standing Committees*

At its 11th meeting held on the 24th March, 1958, the Council recommended the setting up of Standing Committees by the Regional Committees to watch the progress of schemes of Technical Education in their respective areas. If the Standing Committee found in any particular case that the progress was not satisfactory, the matter should be brought to the notice of the Regional Committee concerned and the Regional Committee should send a small Committee of two or three members including the Secretary of the Committee to make an on-the-spot study with a view to suggesting measures for expediting the implementation of the scheme.

After careful consideration of this recommendation the Eastern Regional Committee expressed the view that no necessity existed for the setting up of such a Standing Committees at present. The Chairman was however, authorised to appoint "Special Committees" as and when necessary.

(c) *Centres for National Certificate Course in Metallurgy*

The Expert Committee on Metallurgy appointed by All India Council for Technical Education had recommended that the Regional

Committee should select suitable institutes in their respective areas for organising diploma courses in Metallurgy. In pursuance of this recommendation the Regional Committee has recommended that National Certificate Course in Metallurgy be introduced at the following institutions in the Eastern region :—

1. Asansol Polytechnic, Asansol.
2. Ramakrishna Shilpa Mandir, Belur.
3. Jamshedpur Technical Institute, Jamshedpur.
4. Dhanbad Polytechnic, Dhanbad.
5. Ranchi School of Engineering, Ranchi.

The above suggestions will be considered by the Expert Committee on Metallurgy, which will make final recommendations regarding the institutions to be selected in all regions.

(d) *Priority to Matriculates for admission to diploma institutions*

The Regional Committee observed that at present a disproportionately large numbers of Intermediate Science students were being admitted to diploma institutions and suggested that the institutions should give due representation to matriculates for whom the training facilities created were intended primarily.

B. Matters for Consideration

(a) *Metallurgy Degree Course at Bihar Institute of Technology*

At its 27th meeting held on 18-10-1958 the Co-ordinating Committee considered the recommendation of the Eastern Regional Committee that the Metallurgical Engineering degree course started at the Bihar Institute of Technology, Sindri in 1955-1956 should be approved and financial assistance given by the Central Government for the development of the course. The Co-ordinating Committee also had before it the recommendation of the Expert Committee on Metallurgy appointed by All India Council for Technical Education that the degree course in the subject should be organised at the new College proposed to be established at Jamshedpur rather than at the Bihar Institute of Technology. The Co-ordinating Committee agreed with the views of the Expert Committee and decided that as the Bihar Institute had started the course without the prior approval of All India Council for Technical Education, no financial assistance be given for the development of the course there.

The Eastern Regional Committee has requested the above decision to be reviewed in view of the following position as explained by the State Government.

- (a) The Government of Bihar submitted their proposals for organising a degree course in Metallurgy in 1956.

- (b) The scheme was included in the Second Plan of the State and was accepted by the Planning Commission.
- (c) The report of the Metallurgy Committee was available only in July, 1958 and no action was taken on the request of the State Government for nearly 2½ years.
- (d) When the scheme was formulated the State Government did not anticipate the establishment of a College at Jamshedpur.
- (e) The requirements of the several steel plants situated in and around Bihar would justify the continuance of the course at Sindri in addition to organising the course at the Jamshedpur College.

It may be stated that although the degree course in Metallurgy was included in the second five-year plan of the State that was clearly on the understanding that the prior approval of All India Council for Technical Education would be obtained before the course was actually started. The All India Council appointed an Expert Committee to survey the whole field of Metallurgical Education and training and formulate proposals on an all-India basis for the development of necessary training facilities in relation to actual requirements for Metallurgical Engineers. In view of the comprehensive task assigned to it, the Committee took some time to examine the matter in detail and formulate proposals for the consideration of All India Council for Technical Education. The Committee has suggested that as a first step towards an expansion of the required training facilities the existing centres should be developed, and next as additional centres, degree course in Metallurgy should be organised at the new colleges proposed at Jamshedpur and Durgapur, which are also centres of new metallurgical activity. In making these proposals, the Committee has taken into account the requirements for metallurgical graduates for the new steel plants and other projects in the field of metallurgy.

(b) *Belghuria Polytechnic, Belghuria*

The Government of West Bengal started in 1958 a polytechnic at Belghuria for diploma courses in Civil, Mechanical and Electrical Engineering with an annual intake of 180 students. The State Government have also made the necessary plan provision for the institution. The Central Government approved in September, 1958 the establishment of the polytechnic in principle.

The Regional Committee has now made the following estimates of cost for the polytechnic:

Non-recurring expenditure

Building (65,260 sq. ft. plinth)	Rs. 9,80,000
Equipment	Rs. 11,00,000
Total	Rs. 20,80,000

Recurring expenditure

Staff	Rs. 2,10,236
Maintenance	Rs. 43,500
Total	Rs. 2,53,736

It may be mentioned that the above estimates of the Regional Committee in respect of buildings and equipment are at variance with the standards approved by the All India Council for a model polytechnic. The plinth area of buildings as estimated by the Committee is about 1600 sq. ft. less than the standard. The floor area recommended for certain items are however, very much higher and for others very much lower than the standards. Further, the Regional Committee has altogether omitted certain items of instructional facilities required but has provided for accommodation for non-instructional purposes. The estimates of the Committee for equipment is also in excess of the approved standards by about Rs. 1,35,000/-.

(c) Bhadrak Polytechnic, Bhadrak

The Government of Orissa started in 1958 a Polytechnic at Bhadrak for diploma courses in Civil, Mechanical and Electrical Engineering. The State Government had, however, not made any plan provision for the institutions in its Second Five-Year Plan. Subsequently, it represented that the institution should be accepted as one of the Centrally sponsored institutions under the scheme formulated by Ghosh-Chandrakant Committee for the implementation of the recommendations of the Engineering Personnel Committee and that the entire cost of buildings and equipment should be borne by the Central Government. The new institutions recommended by the Ghosh-Chandrakant Committee were, however, not approved by the Central Government which desired that the entire question of further expansion of technical education should be re-examined from various points of view, particularly of the requirements for technical personnel in the third and subsequent five-year plan periods. The State Government was accordingly informed of the actual position regarding the establishment of Centrally sponsored institutions under the Engineering Personnel Committee scheme.

The All India Council for Technical Education at its meeting held in March, 1958 approved the scheme of establishment of eight Regional Engineering colleges and 27 Polytechnics under a Centrally sponsored scheme for the further expansion of technical education in the second

plan period. One of the 27 Polytechnics was also allotted to Orissa State. The Council recommended that the polytechnic started by the State Government at Bhadrak may be accepted as a Centrally sponsored institution under this scheme against the one polytechnic allotted to Orissa State. It was also recommended that for this institution the Central Government may provide assistance on the same scale as proposed under the scheme viz. 50% of the cost of buildings and equipment and 50% of the recurring expenditure for a period of five years.

When the State plan for 1959-60 was discussed in January, 1959 at a meeting of the Working Group set up by the Planning Commission, the State Government represented that the Bhadrak Polytechnic had been started in the expectation that the Central Government will provide the entire expenditure on buildings and equipment as grant-in-aid and that it would also bear a major part of the recurring expenditure during the plan period. Now, however, the pattern of Central assistance to new institutions recommended under the special scheme was substantially the same as for institutions established by State Governments under the normal plans. The only difference was that the Central Government's commitment in respect of recurring expenditure in the former case extended over a period of five years and in the latter case, up to the end of the current plan period. The State Government, therefore, suggested that it would include Bhadrak Polytechnic under their normal plan and make the necessary plan provision for it by readjustment. The Polytechnic, recommended under the special scheme, should be regarded as in addition to the Bhadrak Polytechnic. The suggestion of the State Government was accepted by the Working Group and necessary plan provision for the institution was made by readjustment. The Central Government also informed the State Government that, in pursuance of the general policy laid down by the All India Council for Technical Education, if the State Government could make the necessary plan provision for the Bhadrak Polytechnic, Central assistance will be provided to the institution as per normal schemes under the State five-year plans. In that event, the polytechnic recommended under the special scheme could be regarded as in addition to the Bhadrak Polytechnic.

The Regional Committee has now made the following estimates for the Bhadrak Polytechnic :—

Non-recurring expenditure

Buildings (65,260 sq. ft. plinth)	Rs. 9,80,000
Equipment	Rs. 11,00,000
Total	<u>Rs. 20,80,000</u>

Recurring expenditure

Staff	Rs. 1,91,768
Maintenance	Rs. 43,500

Total	Rs. 2,35,268
Loan for hostel for 270 students	Rs. 6,34,500

It may be mentioned that the above estimates of the Regional Committee in respect of buildings and equipment are at variance with the standards approved by the All India Council for a model polytechnic. The plinth area of buildings as estimated by the Committee is about 1600 sq. ft. less than the standards. The floor area recommended for certain items are, however, very much higher and for others very much lower than the standards. Further, the Regional Committee has omitted certain items of instructional facilities required but it has provided accommodation for non-instructional purposes. The estimates of the Committee for equipment is also in excess of the approved standards by about Rs. 1,35,000/-.

(d) Engineering and Technology, Jadavpur University

The College of Engineering and Technology, Jadavpur which was established in the nineteen twenties had equipment of the value of Rs. 14 lakhs approximately when the All India Council for Technical Education considered the scheme of development of the institution in 1948. The Council recommended *inter alia* an equipment grant of Rs. 24 lakhs for degree courses in Mechanical, Electrical and Chemical Engineering. Later on, the actual estimates of cost of the various items of equipment were revised from time to time and ultimately the total grant for equipment for the development of the courses was fixed at Rs. 19.78 lakhs. Subsequently, in 1957 the college was also approved for starting degree courses in Civil Engineering and Tele-communication Engineering and for increasing the admissions to Mechanical and Electrical degree courses. For this purpose, an equipment grant of Rs. 7.24 lakhs was approved.

A number of items of equipment at the institution which had been purchased long ago have since worn out and are un-serviceable. The University therefore requested for a rehabilitation grant for replacing the old and un-serviceable equipments. The matter was considered by the Regional Committee. After an examination of the present state of equipment at the College by an expert committee, the Regional Committee has now recommended a rehabilitation grant of Rs. 6,14,740 to the University.

The recommendations of the Regional Committee fall under three categories : viz.

1. Replacement of existing equipment	Rs. 5,67,140
2. New additional equipment	Rs. 33,400
3. Uncategorised	Rs. 14,200

The first category *inter alia* includes replacement of a very old and unserviceable boiler installed in 1924 by a modern Babcock and Wilcox Boiler costing Rs. 2,30,000 to provide sufficient steam for the different laboratories. With the change in the boiler the existing steam engine (which is also old) has to be replaced by a new experimental type double-stroke steam engine costing Rs. 35,000/-. In this connection it may be pointed out that the Council at its 11th meeting held in March, 1958 considered the recommendations of the Southern Regional Committee that a Babcock and Wilcox Boiler may be sanctioned to the Government College of Technology, Coimbatore and decided that in view of the present foreign exchange position such a boiler was not necessary and an ordinary fire tube boiler costing about Rs. 40,000/- would serve the purpose of an Engineering College. It is for consideration whether that decision should not apply to Jadavpur University also. The question whether the existing steam engine should be replaced or not depends upon a decision regarding the type of boiler to be installed.

The second category includes *inter alia* two lecture room demonstration apparatus costing Rs. 8,000 each which are not in the All India Council for Technical Education standard list. These have been specially recommended by the Visiting Committee since they are, in the opinion of the Committee essential to modern methods of teaching. The other items of equipment are in the All India Council for Technical Education standard list and have been recommended to make good the existing deficiencies at the institution.

The Regional Committee has not classified whether the equipment falling in the third category are in replacement of the existing items or are entirely new additional equipment. The question whether this equipment should be included in the first category or second category has to be settled after obtaining necessary clarification from the Regional Committee.

(e) *Assam Engineering Institute, Gauhati*

In 1957 under the Expansion Scheme this Institution was approved for adding Electrical and Mechanical Engineering Diploma courses with an annual intake of 30 students each in addition to the then existing Civil Engineering diploma course with an intake of 120 students per year. In

the estimates for the expansion recommended no additional building was provided as it was believed that shifting of the Engineering College temporarily located in some of the buildings in this institute would release additional space sufficient to meet the requirements of the expansion recommended. However, when the Engineering College was actually shifted it was realised that the buildings vacated were of temporary construction and were not suitable for the additional courses under the Expansion Scheme. The Regional Committee after examining the matter through a Visiting Committee recommended an additional building with a plinth area of 27,400 sq. ft. at a cost of Rs. 4.93 lacs.

With the additional buildings originally recommended in 1954 covering the plinth area of 12,644 sq. ft., the existing plinth area of pucca buildings is 37,913 sq. ft. After implementing the present recommendation the institution would possess the total plinth area of 65,313 sq. ft. which is within the approved standards of the Council.

(f) *Tripura Polytechnic, Agartala*

This institution was approved for establishment in 1957 and started functioning from August, 1958 with an annual intake of 60 students (Civil-30, Mechanical-15 and Electrical-15). The Regional Committee, in view of the progress made by the institution and the good response from the local population, recommended that it may be raised to a full-fledged polytechnic with an annual intake of 120 students (60-Civil, 30-Mechanical and 30-Electrical) and assessed the following total cost for the polytechnic :—

Non-recurring expenditure

Buildings (44,500 sq. ft. gross)	Rs. 6.675 lacs.
Equipment	Rs. 7.315 lacs.
Total :	Rs. 13.990 lacs.

Recurring Expenditure

From 1957-58 till 1964-65	Rs. 6.00 lacs.
Ultimate Recurring	Rs. 2,31,614/-
Hostels for 360 students	Rs. 7.20 lacs.
Staff Quarters (for all staff)	Rs. 3.00 lacs.

An expenditure of Rs. 9.40 lacs has already been incurred out of the Tripura Administration's Second Five-Year Plan provision of Rs. 14.50 lacs for this purpose. The Regional Committee recommended that the further necessary expenditure may be so phased that the balance of the Second Plan provision viz. Rs. 5.10 lacs be spent during the remaining

period of the current Plan and that Rs. 15.69 lacs be carried over to the Third Five-Year Plan period.

NORTHERN REGIONAL COMMITTEE

A. Matters for Report

(a) Meetings.

Since the last meeting of the Coordinating Committee, the Regional Committee held one meeting on the 11th December, 1958.

B. Matters for Decision

(a) Establishment of Polytechnics at Handia, Chandauli and Almora

The revised Second Five-Year Plan of Uttar Pradesh includes *inter alia* establishment of three Overseer Schools, one each at Handia, Chandauli and Nainital for Diploma courses in Civil Engineering. The State Government started these institutions in 1957 without consulting the All India Council for Technical Education or its Regional Committee. In 1958 when the State Government approached the Central Government for financial assistance for these institutions, the matter was referred to the Northern Regional Committee. The Regional Committee appointed a Visiting Committee, which visited the institutions and submitted detailed reports. The reports were considered by the Regional Committee at its meeting held on 11-12-1958. The Committee has made the following observations:—

- (i) The polytechnics at Handia and Chandauli are not located at suitable places. The instructional facilities provided and other arrangements made at the institutions before admitting the students were most unsatisfactory. However, since these institutions have already started functioning there is no other alternative than to develop them along right lines, as far as possible.
- (ii) Due to weather conditions, Nainital is not a suitable place for the establishment of a polytechnic. The Institution should be shifted to Almora.

The Committee has made the following estimates of cost for each of the three institutions:—

Non-recurring :

Buildings (33,066 sq. ft. plinth)	Rs.	3,96,800
Equipment, Library and furniture	Rs.	6,28,600

Total :	Rs.	10,25,400
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Recurring

Staff	Rs. 1,34,190/-
Maintenance	Rs. 15,500/-
Total	Rs. 1,49,690/-

The Committee has also recommended an additional amount of Rs. 2,500/- for the Overseer School, Almora for the shifting of the existing equipment etc., from Nainital to Almora. The School at Nainital is functioning in hired buildings.

The Committee has recommended that each school should not admit more than 60 students per year for the diploma course in Civil Engineering. In addition, it has also prescribed the following conditions :—

- (i) The Board of Management of the School should be registered as a Registered Society under the Registration of Societies Act.
- (ii) The Board of Management should be re-constituted according to the constitution suggested by the Visiting Committee.
- (iii) The Institute should provide three-year post-Matric diploma course in Civil Engineering of the standard of the National Certificate course.
- (iv) The intake should be limited to 60 students per year. This limit should not be exceeded.
- (v) Admission of students should be made strictly on the basis of merit. There should be no nomination of any kind and no reservation of seats except as provided in the Constitution.
- (vi) The work of construction of buildings should be entrusted to the State Public Works Department. The buildings should be provided according to the scales for Laboratories, Library, Class-rooms, Drawing Halls etc. prescribed by the Northern Regional Committee.
- (vii) Equipment should be purchased according to the lists prescribed by the Northern Regional Committee.
- (viii) The strength of the staff, their qualifications and salary scales should be in accordance with the standards prescribed by the Northern Regional Committee.

It may be stated that in regard to the shifting of the Nainital Institute to Almora as recommended by the Regional Committee, the Government of Uttar Pradesh have expressed the following views :—

“Apart from practical difficulties in shifting of the school at

this stage, it would not be a feasible proposition. Almora is right in the interior and comparatively less accessible. Almora also does not have the building and marketing facilities which Nainital has and a Technical School there would not be able to flourish."

The above views of the State Government are placed before the Council for consideration.

(b) *Establishment of Murlidhar Gajanand Technical Institute, Hathras*

With a donation of a building (plinth area 44,800 sq. ft.), furniture worth Rs. 5,610/- and some building materials worth Rs. 25,700/-, received from Seth Gajanand Chowdhry, the Government of Uttar Pradesh started in 1957 a technical institute at Hathras for providing two-year courses for Surveyors, Computers and Draftsmen (Civil). In 1958, the State Government asked for Central assistance in the establishment of the institution. The Second Five-Year Plan of Uttar Pradesh includes provision for the institution.

After a detailed examination of the proposal, the Regional Committee has expressed the view that the courses for Surveyors and Computers do not serve any useful purpose and the institution should therefore be developed as a full-fledged polytechnic for 3-year diploma courses in Civil, Mechanical and Electrical Engineering with an intake of 60, 30 and 30 students per year respectively. It has also recommended that the institute may offer Draughtsmanship Certificate courses in Civil, Mechanical and Electrical branches with an intake of 30 students for Civil and 30 for Mechanical and Electrical branches, if at least 10 students join for each of the two groups.

The Committee made the following estimates of cost for the institute :—

Non-Recurring

Buildings (1,70,67 sq. ft. plinth less cost of material donated by Seth Gajanand).	Rs. 1,79,100/-
Equipment, Library and Furniture	Rs. 10,79,590/-

Total : Rs. 12,58,690/-

Recurring

Staff	Rs. 2,71,350/-
Maintenance	Rs. 30,000/-

Total : Rs. 3,01,350/-

The Committee has prescribed the following conditions for the approval of the scheme for assistance from the Central Government.

- (i) The Board of Management of the Institute should be registered as a Registered Society under the Registration of Societies Act.
- (ii) The Board of Management should be re-constituted according to the constitution suggested by the Visiting Committee.
- (iii) The Institute should provide three-year post-Matric diploma courses in Engineering of the standard of the National Certificate course. A two-year post-Matric Draftsmanship Certificate course may also be provided, if not less than 10 students offer to join the course separately for Civil, Mechanical and Electrical.
- (iv) The intake to the diploma courses should be limited to 120 students per year (Civil 60, Electrical 30 and Mechanical 30). The intake to the Draftsmanship Certificate course should be limited to 60 students per year (Civil 30, Electrical and Mechanical combined 30). This limit should not be exceeded.
- (v) Admission of students should be made strictly on the basis of merit. There should be no nomination of any kind and no reservation of seats except as provided in the Constitution.
- (vi) The work of construction of buildings should be entrusted to the State Public Works Department. The buildings should be provided according to the scales for Laboratories, Library, Class-rooms, Drawing Halls etc. etc. prescribed by the Northern Regional Committee.
- (vii) Equipment should be purchased according to the lists prescribed by the Northern Regional Committee.
- (viii) The strength of the staff, their qualifications and salary scales should be in accordance with the standards prescribed by the Northern Regional Committee.

(c) Establishment of Seth Ganga Sagar Jatia Technical Institute, Khurja

Shrimati In'ermot' Jatia has donated a sum of Rs. 10 lakhs to the Government of Uttar Pradesh for the establishment of a Technical Institute at Khurja. The State Second Five-Year Plan also includes provision for the establishment of the institute. The State Government has asked for Central assistance in the establishment of the institution.

The Regional Committee has recommended that the institution should offer three-year diploma courses in Civil, Mechanical and Electrical Engineering with an annual intake of 120 students (Civil 60, Mechanical 30 and Electrical 30). It has estimated the cost of the scheme as under:—

Non-recurring

Buildings (56,467 sq. ft. plinth)	Rs. 6,77,604/-
Equipment, Library and furniture	Rs. 10,85,200/-

Total :	Rs. 17,62,804/-
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Recurring

Staff	Rs. 2,58,390/-
Maintenance	Rs. 30,000/-

Total :	Rs. 2,88,390/-
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The Regional Committee has prescribed the following conditions for sanction of Central assistance to the institution :

- (i) The Board of Management of the Institute should be registered as a Registered Society under the Registration of Societies Act.
- (ii) The Board of Management should be constituted according to the constitution suggested by the Visiting Committee.
- (iii) The Institute should provide three-year post-Matric diploma courses in Engineering of the standard of the National Certificate course.
- (iv) The intake should be limited to 120 students per year (Civil 60, Electrical 30 and Mechanical 30). This limit should not be exceeded.
- (v) Admission of students should be made strictly on the basis of merit. There should be no nominations of any kind and no reservations of seats except as provided in the Constitution.
- (vi) The work of construction of buildings should be entrusted to the State Public Works Department. The buildings should be provided according to the scales for Laboratories, Library, Class-rooms, Drawing Halls etc. etc. prescribed by the Northern Regional Committee.
- (vii) Equipment should be purchased according to the lists prescribed by the Northern Regional Committee.
- (viii) The strength of the staff, their qualifications and salary scales should be in accordance with the standards prescribed by the Northern Regional Committee.

(d) Development of P.A.V. Technical Institute, Mathura

The All India Council at its meeting held in October, 1954 approved the development of this institution for diploma course in Mechanical Engineering. In February 1957 the Council also approved the organisa-

tion of Diploma course in Electrical Engineering at the institute under the scheme of special expansion of technical institutions. Later on, the proposed course in Electrical Engineering was, however, deferred till the first phase of development of the institute relating to mechanical engineering course had been fully implemented. This development is now nearly complete and the institution has asked for permission to start diploma course in electrical engineering.

The Regional Committee has recommended that instead of piecemeal development of the institute, it should be developed straightway into a full-fledged polytechnic for conducting Diploma courses in all branches viz., Civil, Mechanical and Electrical Engineering with an annual intake of 120 students (Mechanical 45, Electrical 45 and Civil 30). The Committee has estimated the additional cost of development as shown below :

Non-recurring

Buildings (13,893 sq. ft. plinth) plus expenditure on roofing and flooring for existing laboratory of floor	Rs. 1,82,716
Equipment, Library and Furniture	Rs. 4,54,200
Total :	Rs. 6,36,916

Recurring

Staff	Rs. 2,58,390
Maintenance	Rs. 30,000
Total :	Rs. 2,88,390

Since the above development of the institution is covered partly under the special expansion scheme and partly under the normal development scheme and different patterns of Central assistance apply to the two schemes, the Regional Committee has recommended that the additional cost may be apportioned between the two schemes in the following manner :—

	Total estimated cost	Share of expansion scheme	Share of normal development scheme
Non-recurring	6,36,916	4,82,716	1,54,200
Recurring	2,88,390	90,720	1,97,670

In determining the above apportionment, the Regional Committee has adopted the principle that for the electrical engineering section the maximum admissible assessment under the expansion scheme should be allowed and the remaining cost should be charged against the Civil Engineering section as a normal development scheme.

It may be stated that as per the conditions laid down by All India

Council for Technical Education in respect of establishment/development of non-government institutions the agreement of the State Government to bear, in collaboration with the private agency, the entire non-Central portion of the developmental expenditure has yet to be obtained. The Regional Committee has also prescribed the following conditions for grants :—

- (i) The Institute should provide three-year post-Matric diploma courses in Mechanical, Electrical and Civil Engineering according to the courses prescribed by the State Board of Technical Education.
- (ii) The intake should be limited to 120 students per year (Mechanical 45, Electrical 45 and Civil 30). The limit of the intake should not be exceeded.
- (iii) No other course should be started by the Institute without prior approval of the Northern Regional Committee.
- (iv) The total non-recurring expenditure on the Institute buildings, equipment etc. should be met in agreed proportions by the Central Government and the Government of Uttar Pradesh.
- (v) The nett deficit in the recurring expenditure of the Institute should be borne by the Central Government and the Government of Uttar Pradesh in agreed proportions after taking into account the income realised from tuition fees and landed property of the Institute. The State Government should assume full responsibility for the non-Central Government part of the deficit in the recurring expenditure. In this way the financial resources of the Institute should be ensured before further development of the Institute, now recommended, is taken up.
- (vi) The admissions of the students should be made strictly on the basis of merit. There should be no nomination of any kind and no reservation of seats except as provided in the Constitution of the country.
- (vii) Buildings should be provided according to the scales for Laboratories, Library, Class-rooms, Drawing Halls etc. prescribed by the Northern Regional Committee.
- (viii) Equipment should be purchased according to the lists prescribed by the Northern Regional Committee.
- (ix) The strength of the staff, their qualifications and salary scales should be in accordance with the standards prescribed by the Northern Regional Committee.

(e) *Development of Civil Engineering School, Lucknow*

The institution has submitted a scheme through the Government of

Uttar Pradesh for the introduction of diploma courses in Mechanical and Electrical Engineering in addition to the existing Civil Engineering course. The Second Five-Year Plan of Uttar Pradesh provides for assistance to be given for the development of the institution.

The Regional Committee has examined the scheme in detail and has recommended that in view of the fact that since a number of institutions have been set up by the State Government and private agencies in Uttar Pradesh for the training of Civil overseers and the employment potential for Civil overseers is not so large, the existing intake for Civil Engineering course at the School should be reduced from 120 to 60, and diploma courses in Mechanical and Electrical Engineering should be started there. The total intake to the school should remain 120 students (Civil 60, Mechanical 30, Electrical 30).

Regarding the additional requirements of the institution, the Committee has made the following estimates after taking into account grants already sanctioned :

Non-recurring

Equipment	Rs. 3,91,050 (gross)
	Rs. 2,37,130 (nett)

Recurring

Staff	Rs. 2,58,390
Maintenance	Rs. 30,000

Total : Rs. 2,88,390

As regards equipment the estimates of the Committee are Rs. 3,91,050. A grant of Rs. 5,38,400/- for buildings had been approved in 1954 and 1956 for the School. At that time, however, a building area of 24,427 sq. ft. plinth constructed by the School out of a donation received from the Hindu Educational Society was not taken into account. There is, therefore, an excess of Rs. 1,53,920 in the buildings grant approved for the School. The Regional Committee has recommended that excess amount should be set off against the total estimates for equipment for the present development.

It may be stated that according to the report of the Visiting Committee the School has no resources of its own to meet any part of the development expenditure and therefore the guarantee of the State Government is required to meet the entire non-Central share of the expenditure. The Regional Committee has also prescribed the following conditions for grants :

- (i) The Institute should provide three-year post-Matric diploma courses in Mechanical, Electrical and Civil Engineering accord-

ing to the courses prescribed by the State Board of Technical Education.

- (ii) The intake should be limited to 120 students per year (Mechanical 30, Electrical 30 and Civil 60). This limit of the intake should not be exceeded.
- (iii) No other course should be started by the Institute without prior approval of the Northern Regional Committee.
- (iv) The entire additional non-recurring expenditure on buildings, equipment etc. should be met in agreed proportions by the Central Government and the Government of Uttar Pradesh.
- (v) The nett deficit in the recurring expenditure of the Institute should be borne by the Central Government and the Government of Uttar Pradesh in agreed proportions after taking into account the income from tuition fees realised from the students. The State Government should assume full responsibility for the non-Central Government part of the deficit in the recurring expenditure. In this way adequate finances should be ensured before further development of the Institute, now recommended, is taken up.
- (vi) The admission of the students should be made strictly on the basis of merit. There should be no nomination of any kind and no reservation of seats except as provided in the Constitution of the country.
- (vii) Buildings should be provided according to the scales for Laboratories, Library, Class-rooms, Drawing Halls etc. prescribed by the Northern Regional Committee.
- (viii) Equipment should be purchased according to the lists prescribed by the Northern Regional Committee.
- (ix) The strength of the staff, their qualifications and salary scales should be in accordance with the standards prescribed by the Northern Regional Committee.
- (x) The Institute should observe strict economy in the construction of buildings and purchase of equipment, furniture, library books etc.

The assurance and guarantee from the State Government, in regard to the resources of the private agency for bearing their share of the additional cost has yet to be obtained.

(f) Development of Hewett Engineering School, Lucknow

The institution has submitted a proposal, through the Government of Uttar Pradesh for the introduction of diploma courses in Mechanical

and Electrical engineering in addition to the existing Civil engineering course. The Second Five-Year Plan of Uttar Pradesh provides for assistance to be given in the development of the institution.

The Regional Committee has examined the scheme in detail and has recommended that in view of the fact that since a number of institutions have been set up by the State Government and private agencies in Uttar Pradesh for the training of Civil overseers, and the employment potential for Civil Overseers is not so large at present, the existing intake for Civil Engineering diploma course at the school should be reduced from 120 to 60, and diploma courses in Mechanical and Electrical Engineering with an annual intake of 30 students each should be introduced there. The total intake to the School should remain 120 students.

The Committee has estimated the additional requirements of the School for the above development as under :

Non-recurring

Buildings (12,127 sq. ft. plinth)	Rs. 1,45,524
Equipment	Rs. 3,83,550
Total :	Rs. 5,29,074

Recurring

Staff	Rs. 2,58,390
Maintenance	Rs. 30,000
Total :	Rs. 2,88,390

It may be stated that according to the report of the Visiting Committee, the school does not have suitable resources of its own to meet any part of the development expenditure and therefore the guarantee of the State Government is required to meet the entire non-Central share of the expenditure. The Regional Committee has also prescribed the following conditions for grants :

- (i) The Institute should provide three-year post-Matric diploma courses in Mechanical, Electrical and Civil Engineering according to the courses prescribed by the State Board of Technical Education.
- (ii) The intake should be limited to 120 students per year (Mechanical 30, Electrical 30 and Civil 60). This limit of intake should not be exceeded.
- (iii) No other course should be started by the Institute without prior approval of the Northern Regional Committee.

- (iv) The total non-recurring expenditure on buildings, equipment, etc. should be met in agreed proportions by the Central Government and the Government of Uttar Pradesh.
- (v) The nett deficit in the recurring expenditure of the Institute should be borne by the Central Government and the Government of Uttar Pradesh in agreed proportions after taking into account the income from tuition fees realised from the students. The State Government should assume full responsibility for the non-Central Government part of the deficit in the recurring expenditure. In this way adequate finances should be ensured before further development of the Institute, now recommended, is taken up.
- (vi) The admission of the students should be made strictly on the basis of merit. There should be no nomination of any kind and no reservation of seats except as provided in the Constitution of the country.
- (vii) Buildings should be provided according to the scales for Laboratories, Library, Class-rooms, Drawing Halls etc. prescribed by the Northern Regional Committee.
- (viii) Equipment should be purchased according to the lists prescribed by the Northern Regional Committee.
- (ix) The strength of the staff, their qualifications and salary scales should be in accordance with the standards prescribed by the Northern Regional Committee.
- (x) The Institute should observe strict economy in the construction of buildings, purchase of equipment, furniture, library books etc.

(g) *Loans for Hostels*

The Committee has recommended loans for the construction of hostels as shown below :—

Name of the Institution	Total student strength	No. of students for hostels	Amount of loan
			Rs.
1. Seth Ganga Sagar Jatia Technical Institute, Khurja	360	180	4,50,000
2. Overseer School, Nainital (to be shifted to Almora)	180	150	3,75,000
3. P.M.V. Technical Institute Mathura	360	120	3,00,000

In the case of Almora School the Regional Committee has recommended hostel accommodation for more than 50% of the total student enrolment possibly in view of special local conditions. As regards the rest, the hostel accommodation recommended is up to 50% of the students.

(h) Appointment of full-time Supervisors in Training Establishments

The Regional Committee has recommended that whereas on the one hand Training and Placement Officers should be appointed at all technical institutions, on the other hand, full-time Supervisors should be appointed by the training establishment to ensure that the training of the students is carried out on proper lines according to the programme drawn up by the establishment in consultation with the Regional Committee.

It may be stated in this connection that the recommendation of the Coordinating Committee that every Technical Institution should appoint a training and placement officer to look after the arrangements for the practical training of students was forwarded to the University Grants Commission for consideration in respect of university institutions. The Commission has expressed the view that the appointment of training and placement officers is unnecessary at this stage.

(i) Additional accommodation for the College of Engineering & Technology, Muslim University, Aligarh

The Aligarh Muslim University represented to the Northern Regional Committee that in making an estimate of requirements of the university for additional accommodation for the development of various courses in 1946, the Committee had taken into account some information regarding the then available accommodation which was subsequently found incorrect. The university requested the Committee to reassess the estimates on the basis of correct information made available. After an examination of the matter with the help of an Expert Committee, the Regional Committee has now recommended that an additional accommodation of 1,681 sq. ft. floor area estimated at Rs. 27,000/- may be sanctioned to the University for degree courses in Civil, Mechanical and Electrical Engineering. The Committee has taken into account the standards prescribed by the All India Council for Technical Education. The Regional Committee has also prescribed the following conditions for grants :

- (i) The plan of construction of the new building of the College should be revised so as to provide the necessary accommodation for Drawing Halls, Class-rooms, Laboratories, etc. according to the allotment made in the standard prescribed by the All India Council for Technical Education.

- (ii) The accommodation proposed to be provided in the new block for Class-rooms, Staff rooms, staff common rooms, Office, Stores, Students' common room etc. should be reduced so as to bring it to the standard prescribed by the Council.
- (iii) The proposed floor area of 50,550 sq. ft. in the new building to be constructed, should be reduced by 4,269 sq. ft.
- (j) *Introduction of full-time National Certificate course in Textile Technology at Government Central Textile Institute, Kanpur*

The Northern Regional Committee had advised that the Government Central Textile Institute, Kanpur, should provide full-time National Diploma courses in Textile Manufacture and Textile Chemistry and part-time National Certificate course in Textile Technology. The Institute has started Degree courses in Textile Manufacture and Textile Chemistry in place of the full-time National Diploma courses. The Institute is, however, finding it difficult to start part-time National Certificate course as the local industry does not seem to be willing to release its employees for part-time training. The Government of Uttar Pradesh has, therefore, approached the Regional Committee for permission to start full-time National Certificate course instead of part-time course. The Regional Committee has recommended that the Institute may provide full-time National Certificate course.

(k) *Development of M.B.M. Engineering College, Jodhpur*

The Coordinating Committee at its last meeting held in October, 1958 considered the revised scheme of expansion of the M.B.M. Engineering College, Jodhpur and approved certain non-recurring and recurring grants for the purpose on the basis of the recommendations of its Northern Regional Committee. At that time Shri V.G. Garde, who was present in the above meeting as a representative of the State Government of Rajasthan, raised the question of inadequacy of those grants. Professor Thacker who was presiding over the meeting observed that assessment made by the Regional Committee may be re-examined.

Accordingly the matter was re-examined by the Northern Regional Committee who have recommended that the College should be provided the following additional accommodation and equipment :

Buildings	
(19,584 sq. ft. plinth)	Rs. 2,39,760
Equipment	Rs. 4,65,421
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Total	Rs. 7,05,181

SOUTHERN REGIONAL COMMITTEE

A. Matters for Report

Meetings

The Regional Committee was reconstituted for a further term of three years with effect from 30th October, 1958. The reconstituted Committee held its first meeting on 18th March, 1959, when it re-elected Dr. A.L. Mudaliar as Chairman.

B. Recommendations for Consideration

(a) Establishment of a Polytechnic at Kancheepuram by the Bhaktavatsalam Educational Trust

The 1959-60 annual plan of the Government of Madras includes provision for assistance to be given in the establishment of a polytechnic at Kancheepuram by Bhaktavatsalam Educational Trust. The Regional Committee has examined the Scheme and estimated its cost as shown below. The Polytechnic will conduct Diploma Courses in Civil, Mechanical and Electrical Engineering with an annual admission of 120 students :—

Non-recurring

Buildings (54,200 sq. ft. plinth)	Rs. 7,59,000/-
Equipment, Library and Furniture	Rs. 9,03,880/-
	Total : Rs. 16,62,880/-

Recurring

Staff	Rs 1.20 lakhs
Maintenance	Rs. 0.40 lakhs
	Total : Rs. 1.60 lakhs.

The Committee has prescribed the following conditions for sanction of grants to the institution :—

1. No new Course should be introduced at Diploma level.
2. Admissions should be restricted to 120 student per year (60 Civil, 30 Mechanical, 30 Electrical).
3. The Courses and their pattern should be in line with the approved standards of the A.I.C.T.E.

4. Equipment should be purchased in accordance with list supplied. Funds sanctioned for one Department should not be transferred to another.
5. Staff to be appointed should possess the minimum qualifications and experience as prescribed by the All India Council for Technical Education.
6. Staff should be selected by a staff selection committee which will include at least two experts from the panel of experts to be recommended by the Southern Regional Committee.

It may be stated that information has not yet been received from the State Government regarding the resources of the Trust and its share of the cost of the Scheme and whether the State Government have underwritten the Trust.

(b) Introduction of Diploma Courses in Civil and Electrical Engineering at the S.I. Technical Institute Bhadravati

This is a State Government institution and is conducting diploma course in Mechanical Engineering. The State Government have proposed to develop it into a full-fledged polytechnic for diploma courses in civil electrical and mechanical engineering, under the Second 5-Year Plan with an annual intake of 120 students. Necessary plan provision for the purpose has also been made. The Regional Committee has approved the scheme. Detailed estimates of cost are being worked out.

(c) Development of the Mahabubnagar Polytechnic, Andhra Pradesh

The Coordinating Committee at its meeting held on 18th October, 1958 approved the development of the Polytechnic for diploma courses in civil, mechanical and electrical engineering, provided that the State Government made the necessary provision for the purpose. The State Government have since made the necessary provision in the annual plan of 1959-60. The Regional Committee has estimated the cost of development of the institution as shown below :—

Non-recurring

Buildings (38,200 sq. ft. plinth)	Rs. 5.5 lakhs
Equipment	Rs. 8.61 lakhs
	Total :
	Rs. 14.11 lakhs

Recurring

Rs. 1.4 lakhs.

(d) Government Polytechnic, Cannanore

This is one of the Polytechnics included in the State plan of Kerala and has been approved in principle by the Council. The Regional Com-

mittee have now estimated the cost of establishment of the polytechnic as shown below :-

Non-recurring

Buildings (54, sq. ft. plinth)	Rs. 7,59,000
Equipment, Furniture and Library.	Rs. 9,03,880
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Total :	Rs. 16,62,880
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Recurring

Staff and maintenance	Rs. 1.6 lakhs.
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The Regional Committee has also recommended that the Textile Technology diploma course conducted at present at the Government Textile Institute, Trivandrum, be shifted to the Cannanore Polytechnic but that should not involve any additional financial commitment for the Central Government.

(e) Government Polytechnics at Tumkur and Chennapatna, Mysore State

The Mysore State Plan provides for the establishment of two polytechnics at Tumkur and another at Chennapatna in lieu of the School of Engineering, Bangalore. The School of Engineering, Bangalore is functioning with facilities provided by the Government Engineering College there. It is considered that that arrangement is not satisfactory particularly in view of the fact that the College has increased recently admissions to the degree courses. (The polytechnics have been approved in principle and started functioning with effect from 1958-59).

The Regional Committee has estimated the cost of the Polytechnics as shown below. In arriving at the estimates the Committee has taken into account the equipment that will be available from the Engineering School, Bangalore for one of the new Polytechnics.

Government Polytechnic, Tumkur

Non-recurring

Buildings (54,200 sq. ft. plinth)	Rs. 7,59,000
Equipment, furniture and Library	Rs. 7,21,635*
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Total :	Rs. 14,80,635
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* after deducting the cost of equipment (viz. Rs. 1,82,245) available from the School of Engineering, Bangalore.

Recurring

Staff and Maintenance	Rs. 1.6 lakhs.
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*Government Polytechnic, Chennapatna**Non-recurring*

Buildings (54,200 sq. ft.)	Rs. 7,59,000
Equipment, furniture and Library	Rs. 9,03,880
Total :	<u>Rs. 16,62,880</u>

Recurring

Staff and Maintenance	Rs. 1.6 lakhs.
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(f) Loans for Construction of Hostels

The Regional Committee has recommended loans for construction of hostels for various institutions in the region as shown below :—

Name of institution	Sanctioned annual intake capacity	No. of students for whom hostel accommodation is recommended	Loan recommended
1. Gulbarga Engineering College, Gulbarga	120	240	Rs. 6.00 lakhs
2. Sree Narayana Polytechnic, Quilon	120	180	Rs. 4.5 lakhs
3. Carmel Polytechnic, Alleppey	120	100	Rs. 2.0 lakhs
4. Sankar Polytechnic, Sankarnagar	120	180	Rs. 4.50 lakhs

The Regional Committee suggested that loans should be granted subject to the condition that the institution have their own unnumbered land for the construction of hostels.

Item No. 8—Post-Graduate Development Committee**(A) Matters for Report****(B) Recommendations for Consideration***(A) Matters for report**(a) New Post-graduate courses sanctioned*

On the recommendation of the Post-graduate Development Committee the Council had selected the following institutions for organising post-graduate courses in the subjects shown against them. Detailed schemes were subsequently obtained from the institutions and the requirements assessed by the experts appointed for the purpose. The Chair-

man of the Council on the recommendation of the Chairman, Post-graduate Development Committee approved the requirements for starting the courses as indicated against the institutions :—

S. No.	Name of Institution	Subject	Requirements	
			Non-recurring	Recurring
			Rs.	Rs.
1.	Roorkee University, Roorkee	Highway Engineering	89,250	27,100
2.	-do-	Photogrammetric Engineering	4,88,000	75,500
3.	P. S. G. & Sons' Charities College of Technology, Coim- batore	Electrical Machine Design	1,40,000	5,000 (Exclusive of staff)
4.	Engineering College, Trivandrum	-do-	1,40,000	5,000 (Exclusive of staff)

The Coordinating Committee at its meeting held on the 3rd December, 1957 accepted the views of the Post-graduate Development Committee that permission previously granted for starting a post-graduate course in Hydraulics, Irrigation Engineering and Flood Control at the College of Engineering, Trivandrum be withdrawn having regard to the difficulty experienced by the College in recruiting the necessary staff for the purpose. Later on, the State Government represented that recent development in Kerala State and in Public Works Department had emphasised the importance of studies in Irrigation and Flood Control. Dr. K. L. Rao who is the approved expert for this subject also recommended that in view of the great number of hydraulic problems relating to river valley projects which were under construction and are likely to be taken up during the Third Five-Year Plan a good Hydraulics Laboratory in Kerala State was an immediate necessity and that should be established in the College of Engineering, Trivandrum as a part of the post-graduate course in Hydraulics, etc. The State Government also assured that close collaboration would be arranged between the College and the State Public Works Department and the Chief Engineer would assume full responsibility for the development of the course in the college and that necessary staff would be made available for the purpose. The Chairman, Post-graduate Development Committee, therefore, recommended that the original decision of the Committee to select the College for a

post-graduate course in Hydraulics, etc. might be revived and the institution asked to proceed with the scheme. The Chairman of the Council has approved the recommendation.

(b) Meetings

Since the last meeting of the Council the Post-Graduate Development Committee met once viz. on the 7th December, 1958.

(c) Scheme of Post-graduate Studies at Sardar Vallabhbhai Vidyapeeth, Anand

The Committee considered the request of Sardar Vallabhbhai Vidyapeeth for organising six post-graduate courses in Engineering/Technology at the Birla Vishvakarma Mahavidyalaya and noted that the scheme had envisaged the establishment of a separate college for post-graduate studies in Engineering at a total cost of Rs. 46.0 lakhs non-recurring and Rs. 4.35 lakhs recurring. The Committee was of the view that the scheme in its present form cannot be accepted since it is both undesirable and impracticable to establish separate institutions for post-graduate studies. It was decided that the Mahavidyalaya may be asked to furnish full information regarding the present state of development of the various departments for under-graduate courses, the staff available, their qualifications and experience, proposals, if any, for the re-organisation of the under-graduate courses in accordance with the recommendation of the All India Council for Technical Education, the particular fields of post-graduate study which can be developed in the existing departments by the present staff and the details of co-operative relationship that will be established between the institution and industry. On receipt of the necessary information, the Committee will examine the question of the particular fields in which the institution is best suited for post-graduate development.

(d) Recommendations of Panel of Scientists

The Committee endorsed the recommendations of the Panel of Scientists of the Planning Commission—Committee for Railways, Roads, Building and Construction—on post-graduate studies and research in Engineering that only students of merit should be admitted to post-graduate courses. Government departments, industry etc. should depute promising young officer for post-graduate studies in the various approved institutions and bear the necessary expenditure. It was decided that the Central and State Governments and industry should be addressed in the matter. The Committee also endorsed the recommendations that there should be *frequent interchange of technical personnel* between technical institutions and government departments and industry. It was also agreed that each technical institution should have training and deputation reserve of the order of 10% of the sanctioned strength of staff. Part

of the reserve may consist of Teaching Assistantships to which bright young graduates and diploma holders may be appointed and trained for regular teaching position, later on.

The Committee agreed that facilities for *Refresher/Specialised courses* for teachers of technical institutions, engineers on service and other suitable persons should be organised at selected institutions, particularly at those centres where post-graduate courses had been organised. The Refresher/Specialised courses should be conducted as far as possible as a co-operative programme by the institution in association with government departments, industry and other organisations. It was decided that the Regional Committee be requested to formulate detailed proposals in this respect in consultation with institutions in their respective areas. The question of assisting the institutions concerned under the Post-graduate development programme should be considered by the Central Government.

(e) *Post-Graduate course in Mining at Karnatak University*

The Committee considered the request of the *Karnatak University, Dharwar* for starting a post-graduate course in Mining Engineering and noted that the University did not have an under-graduate department in Mining Engineering nor did it have under-graduate departments in any other branch of engineering and particularly in Civil, Mechanical and Electrical. In the circumstances, the committee was of the considered view that the University will not be in a position to successfully organise and conduct the post-graduate course in Mining Engineering. The Committee, therefore, decided that the scheme of Karnatak University for starting a post-graduate course in Mining Engineering should not be recommended.

(f) *Co-operative Relationships*

The Committee considered the question of establishing *Co-operative arrangements between technical institutions and industry and Government departments* for conducting post-graduate courses in Engineering/Technology and expressed the view that this co-operation was possible only in certain fields in which industry and government departments have set up Design and Development Units whose facilities are useful to the course. It was decided that each institution should be requested to examine the position in relation to industry and government departments in its own area and formulate proposals for establishing the necessary co-operative relationships with them. Prof. D.L. Dashgupta informed that the Bihar Institute of Technology which had been selected earlier by the Committee for a post-graduate course in Foundry Engineering was reconsidering the scheme in the light of the Foundry and Forge Plant proposed to be set up by the Central Government at Ranchi and the possibility of establishing co-operative arrangement between the Institute and the Plant in the conduct

of the course. The Committee agreed to his suggestion that the implementation of the original scheme be deferred and the revised scheme of the Institute be awaited.

(g) *Progress of Post-graduate courses*

On a review of the *progress of post-graduate courses* the Committee noted that at certain centres post-graduate courses sanctioned had made good progress and at others the position was not quite satisfactory, due to difficulty in respect of qualified staff, lack of students and other factors. The Committee was of the view that in the further expansion of post-graduate studies careful consideration should be given to the availability of staff for new courses or at new centres before the schemes were sanctioned. It was necessary to consolidate the existing centres before further expansion was undertaken. It was decided that fresh request for starting post-graduate courses should not be considered unless the availability of staff for conducting the courses at the institutions concerned was ensured. The Committee also requested the institutions already selected for post-graduate courses in different fields to adopt a uniform pattern in respect of duration, *standard and content* for the course as recommended by the Committee.

The Committee was of the view that every post-graduate course in Engineering should include *provision for the study of Advanced Mathematics* with particular reference to engineering studies, but the facilities now available at the institutions for Advanced Mathematics are generally unsatisfactory. It was decided to appoint a Sub-Committee consisting of the following persons to examine the question of improving the position and suggesting suitable measures for adoption. The Sub-Committee should also indicate the standard and content of Advanced Mathematics that should be covered in Post-graduate courses. The provision for the establishment of full-fledged departments of Mathematics, Physics and Chemistry in each engineering college as recommended by the All India Council for Technical Education in the context of a five-year integrated course for the first-degree should be borne in mind.

Members

1. Dr. B. R. Seth, Indian Institute of Technology, Kharagpur.
2. Dr. P. L. Bhatnagar, Indian Institute of Science, Bangalore.
5. Prof. D. L. Deshpande, Bihar Institute of Technology, Sindri.
4. Dr. A. N. Khosla, University of Roorkee.
5. Prof. B. Sen Gupto, Victoria Jubilee Technical Institute, Bombay.

(h) *Post-graduate course in Power Engineering at Roorkee University*

The Committee considered the *request of the University of Roorkee for starting a post-graduate course in Power System and stability* and decided that a Sub-

Committee consisting of Prof. M. S. Thacker, Dr. A. N. Khosla and Dr. S. Bhagavantam should examine whether any additional centres other than the Indian Institute of Science, Bangalore where comprehensive facilities for Power Engineering had been developed for post-graduate studies in different aspects of Power Engineering, were necessary at this stage. The scheme of Roorkee University would be considered again on receipt of the report of the Sub-Committee.

(i) Post-graduate course in Internal Combustion Engineering at Guindy Engineering College

The Committee considered the scheme for starting a *post-graduate course in Internal Combustion Engineering at the College of Engineering, Guindy* and noted that comprehensive facilities in Internal Combustion Engineering had been developed at the Indian Institute of Science, Bangalore and the need for starting additional centres should be examined on the basis of the actual needs felt and the extent to which the facilities at Bangalore had been utilised. It was decided that Dr. Bhagavantam should be requested to give his views in the matter. He may also indicate the lines on which the Indian Institute of Science, and Guindy College could collaborate in developing studies in certain aspects of I.C.E. at the latter institution.

(j) Specialisation in Soil Mechanics

The Committee considered the *suggestion of the Ministry of Irrigation and Power regarding specialisation in particular aspects of Soil Mechanics* and noted that six institutions had been selected for organising Post-graduate courses in Foundation Engineering and Soil Mechanics. The Committee was of the view that the question of selecting two Universities, one from the Northern Region and the other from the Southern Region for research in Soil Mechanics as suggested by the Irrigation and Power Ministry should be considered only after the centres already approved had been fully developed. The Committee agreed that close liaison should be maintained between the institutions and field construction and design organisations in conducting the post-graduate course, and decided that the institutions be requested to examine the possibilities in this respect and formulate proposals for establishing the necessary collaborative arrangements in their respective areas.

(k) Post-graduate courses at Jadavpur University

The Committee considered the *proposals of the Jadavpur University for post-graduate courses in Engineering* and noted that the University had submitted a scheme for starting Post-graduate courses in Electrical, Mechanical, Civil and Chemical Engineering at a total cost of Rs. 19.5 lakhs non-recurring and Rs. 4.7 lakhs recurring. It was also noted that the College of Engineering and Technology, Jadavpur University had already been approved

for conducting Master's Degree Course in Chemical Engineering and for organising a Post-graduate Course in Food Technology. The Committee decided that the University may be asked to furnish full information regarding the present state of development of the various departments for under-graduate courses, the staff available with their qualifications and experience, the particular fields of post-graduate study which can be developed in the existing departments by the present staff and the details of cooperative relationships that will be established between the institution and industry. On receipt of the necessary information, the Committee will examine the question of the other particular fields in which the institution is best suited for post-graduate development.

(B) Matters for Consideration

(a) Additional grants to Indian Institute of Science, Bangalore

On the recommendations of the Post-graduate Development Committee made at its first meeting held on the 19th and 20th October, 1953 the All India Council for Technical Education selected the Indian Institute of Science, Bangalore for organising a post-graduate course in Automobile Engineering and approved the following grants and staff to the Institute for the course.

Non-recurring

(a) Buildings	Nil
(b) Equipment	Rs. 75,000/-

Recurring

(a) Working expenses	Rs. 12,500/-p.a.
(b) Staff	
Assistant Professor	1
Lecturer	1
Mechanic	1
Cleaner	1

Later on, the Institute approached for a revision of Group II staff for this course. This proposal was considered by the Post-graduate Development Committee and on the basis of its recommendation the Co-ordinating Committee at its meeting held on 3-12-1958 revised the requirements of Group II staff as follows :

Mechanic	1
Laboratory Assistants or Helpers	2
Cleaners	2

The Institute has now requested for an additional non-recurring grant of Rs. 1.00 lakh--Rs. 85,000/- for the purchase of equipment and Rs. 15,000/- for the building. The matter has been examined in consul-

tation with the experts appointed for the purpose. The Chairman, Post-graduate Development Committee has recommended that the following additional non-recurring grant may be approved for the Post-graduate course in Automobile Engineering at the Indian Institute of Science, Bangalore.

Building

(1,000 sq. ft. @ Rs. 15 per sq. ft. inclusive of electrical fittings.)	Rs. 15,000
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Equipment

Chassis Dynamometer	Rs. 30,000
Chassis Frame testing	Rs. 10,000
Chassis with power plant for instructional purposes	Rs. 5,000
Radiator, fan and gear box test rigs	Rs. 35,000
Auxiliaries	Rs. 5,000
Total :	Rs. 1,00,000

(b) Measures to avoid delay

The Committee noted that in the case of Government Institutions, there was a considerable time lag between the sanctioning of grants by the Central Government for post-graduate schemes and the actual placement of the funds at the disposal of the institutions concerned by the State Governments. That resulted in delay in the implementation of the scheme. The Committee recommended that the Central Government may consider the question of evolving a more straightforward procedure to ensure that the funds sanctioned from time to time became available to the institutions as expeditiously as possible.

(c) Sanction of Qualification Pay

The Committee recommended that in order to encourage advanced study and research, departments of the Central and State Governments and other technical organisations should give Qualification Pay to those members of their staff who have obtained Master's degree or Doctorate in Engineering and Technology. For the holder of Master's degree the qualification pay should be Rs. 50/- p.m. and for the holder of Doctorate degree Rs. 125/- p.m.

(d) Pattern of Central Assistance

The Committee noted that the Government of India has revised the pattern of Central assistance for the development of facilities for post-graduate studies in Engineering and Technology. The Committee recommended that the expenditure on the appointment of subordinate staff viz. laboratory technicians, helpers, etc. for post-graduate courses should also

be admissible to grant-in-aid from the Central Government under the post-graduate development programme.

(e) Post-graduate Scholarships

The Committee recommended that in view of the present day costs and the urgent need to utilize fully the facilities created for post-graduate studies, the value of post-graduate scholarships should be increased to Rs. 200/- p.m. Further, scholarships, should be awarded to all students admitted to post-graduate courses, subject to the condition, that the number of such scholarships for each course at an institution shall not exceed ten. The Committee also recommended that an adequate number of research scholarships of the value of Rs. 250/- p.m. should be instituted at all appropriate institutions to encourage those candidates who have taken Master's degree in engineering to do research.

(f) Courses of Study and Syllabi and Designation of Awards

The Committee observed that the scheme for Post-graduate studies in various subjects formulated by the Joint Committee of the All India Council for Technical Education and the Inter-University Board had served a very useful purpose in indicating to the institutions concerned the nature and scope of post-graduate studies in each field, the standards to be attained and other related aspects. The scheme, however, had been prepared several years ago. Since then, several changes have taken place in the light of which the scheme has to be further revised. On the recommendations of the Post-graduate Development Committee, the All India Council has sanctioned post-graduate courses in other fields not covered in the original scheme. Individual universities and institutions which have started post-graduate courses have also given a good deal of thought to the syllabi in their respective fields. The Committee, therefore, recommended that the original scheme should be revised in the light of all these new developments and model courses for different subjects should be framed. This work should be entrusted to the experts already approved for each subject. The Committee also recommended that every Post-graduate course should include Advanced Mathematics and Project Work which are essential to equip the students with a high degree of attainment in their respective fields. The Committee further recommended that the Master's Degree awarded at the end of a post-graduate course should be in Engineering or Technology with an appropriate nomenclature like M.E. or M. Tech. or M.Sc. (Eng./Tech.). The Major field in which the degree has been awarded viz. Mechanical Engineering, Civil Engineering, Electrical Engineering, Tele-Communication Engineering, Chemical Engineering, etc. should be specified also, the particular branch of specialisation, as for instance, Highway Engineering, Electrical Machines Design, Heat Power Engineering, etc. should be specified.

(g) Post-graduate Studies and Research in Chemical Engineering

The Committee accepted the recommendation of its panel of experts for Chemical Engineering that post-graduate course in Chemical Engineering for Master's Degree should be of one year's duration after a candidate had taken Bachelor's degree in the subject in accordance with the revised scheme of Chemical Engineering formulated by the All India Council for Technical Education. The academic year should consist of 32 weeks of 36 hours each. Not more than 50% of this time should be devoted to course work and the rest for project work and dissertation. The examination should consist of two parts, namely, written papers and dissertation. The M.Sc. Degree course in Chemical Engineering should be started only in those institutions which had adequate qualified staff, equipment and buildings for a full-fledged four-year Bachelor degree course in Chemical Engineering in accordance with the scheme formulated for the purpose by the All India Council for Technical Education. The admission to the post-graduate courses should not be more than ten candidates per year but should preferably be restricted to six in order to maintain work of a high quality. The Committee approved the recommendations of the panel of experts that the following institutions be selected for conducting Master's Degree course in Chemical Engineering.

- (i) College of Engineering and Technology, Jadavpur.
- (ii) J.V.D. College of Science and Technology, Andhra University.
- (iii) A.C. College of Technology, Madras University.
- (iv) College of Technology, Banaras Hindu University.
- (v) Laxminarayan Institute of Technology, Nagpur University.
- (vi) Department of Chemical Technology, Bombay University.
- (vii) Indian Institute of Science, Bangalore.
- (viii) Indian Institute of Technology, Kharagpur.

The Committee approved the estimates of cost for organising post-graduate courses at the above centres as given at Annexure I.

The Committee also accepted the recommendation of experts that Research Units in Chemical Engineering be established at Jadavpur University, Laxminarayan Institute of Technology, Nagpur University, Department of Applied Chemistry, Calcutta University, J.V.D. College of Science and Technology, Andhra University, Department of Technology, Annamalai University, A.C. College of Technology, Madras University and College of Technology Banaras Hindu University. The estimated cost for the Research units (given at Annexure II) were also recommended.

(h) Estimates of cost for Post-graduate courses at Engineering College, Trivandrum

The Committee considered the estimates of cost for the scheme of post-graduate studies in Hydraulics, Irrigation Engineering and Flood

Control at the College of Engineering, Trivandrum and recommended that the scheme be approved with the following estimates.

Non-recurring

Buildings 8,900 sq. ft. plinth @ Rs. 14/- per sq. ft.	Rs. 1.25 lakhs
Equipment (list at Annexure III)	Rs. 2.90 lakhs
Total :	Rs. 4.15 lakhs

Recurring

Rs. 26,000/- (approved for the 1st year).

Professor—one, Reader—one, Lecturer—one, Skilled Assistant (Lab.)—Two, Attender—Two, (Main- tenance and Stores)	Rs. 2,000/-
Total :	Rs. 28,000/-

The Committee also considered the estimates of staff already approved for Post-Graduate Course in Electrical Machine Design at the College and recommended that a Professor in the usual scale be sanctioned in place of Reader.

(i) *Duration of Post-Graduate Courses*

At its 23rd meeting held on 14th July, 1956, the Coordinating Committee considered the recommendations of the Board of Studies for Engineering and Metallurgy that the duration of Post-graduate courses should be uniformly of two years, and expressed the view that courses of such long duration were not necessary. The Committee also expressed the view that the earlier recommendations of the Post-graduate development Committee viz., courses of one year duration after a four-year first degree course were more realistic. The Committee decided that the recommendations of the Board together with its views be referred to the Post-graduate Committee for detailed examination.

The Post-graduate Development Committee considered the matter at its meeting held on the 7th December, 1958 and expressed the view that the duration and standard of post-graduate courses should be determined in relation to the duration and standard of under-graduate courses. In the context of reorganisation of secondary education that is in progress, the All-India Council for Technical Education and the Inter-University Board have suggested a five-year integrated course after Higher Secondary for first-degree in engineering and technology. The integrated course will have provision for the introduction of intensive electives at the under-graduate level. When the first-degree courses are reorganised in that manner, post-graduate courses, the Committee recommended, should be of one academic year's duration for actual instruction at an institution followed by practical training, wherever necessary. The duration of

practical training cannot be prescribed uniformly for all subjects and should, therefore, be left to individual institutions concerned to decide according to the needs of each course the type of practical training facilities available. The examination may be held either after the institutional studies are over or after the practical training, but the degree should not be conferred unless a candidate has completed practical training, wherever prescribed. For certain subjects like Advanced Electronics etc. project work may take the place of practical training.

ANNEXURE I

(Item No. 8)

Estimates of cost for organising post-graduate courses

- | | |
|--|--|
| (1) Accommodation | 1,200 sq. ft. net area (excluding verandahs, stairs, thickness of walls, etc.) |
| (2) Laboratory fittings, furniture and measuring instruments | Rs. 10,000 |
| (3) Recurring expenditure | Rs. 500 per student per year. |
| (4) Research Assistant | One in the scale of lecturer or in the scale of Rs. 350-850 as recommended by A.I.C.T.E. |

ANNEXURE II

(Item No. 8)

Estimated cost for Research Units**Jadavpur University**

For research in Chemical Engineering Plant Design and Construction, Hydrogenation and related aspects.

Buildings

Shed for Boiler and a small workshop 20' x 30'—cost Rs. 6000

Equipment

Rs. 7605

	Rs.
1. One Vacuum pump and blower	580
2. Air Compressor, 15 cfm. 50 psig.	2,000
3. One D.C. Ammeter 0-10 Amps. and one A.C. Ammeter 0-15.	250
4. One D.C. Voltmeter, 0-10 volt, and one A.C. Voltmeter 0-220	325
5. One "Perspex" electrolytic cell with membrances and electrodes	400
6. One Rheostat, 25 ohms, 10 amps.	200
7. Power Drill	500
8. Variable transformers (two) 7.5 amps.	450
9. One portable Gas welding set	600
10. Two Laboratory Mixers 1/60 H.P.	800
11. Pressure gauges (two)	500
12. Circulating pumps (two) stainless	1,000
Total :	7,605

<i>Recurring</i>	1 Mechanic	Rs. 960/-
<i>Contingencies and Working expenses</i>		Rs. 2,000/- per year.

Research Scholarships—6 (including those already sanctioned by the Government).

Laxminarayan Institute of Technology, Nagpur University

For research in Reaction Kinetics, Electrolysis, Fuels.

Buildings Nil.

Equipment Rs. 5,000/- (as given below)

1. Rotameters (2)	2,000
2. Particle size determination unit	1,000
3. Gas Analyser	1,000
4. Circulating pumps (2)	1,000
Total :	<u>5,000</u>

Recurring

Consumables and contingencies	Rs. 2,500 per year.
Laboratory Attendant	1
Research Scholarships	2

Department of Applied Chemistry, University College of Science and Technology, Calcutta University

For research in Liquid—Liquid Extraction ; Heat Transfer and Catalysis.

Buildings Nil.

Equipment Rs. 9,100/-

1. Variable speed adjustment motor 1/2 H.P.	200
2. Automatic time switch	200
3. Microvoltmeter (2)	1,000
4. Circulating pumps (2)	200
5. Low Range Rotameter Set	1,000
6. Special Liquid—liquid extraction apparatus	5,000
7. Thermal Conductivity gas analyser	1,500
Total :	<u>9,100</u>

Recurring

Consumables and contingencies	Rs. 2,500 per year.
Research Scholarships	2

J.V.D. College of Science & Technology, Andhra University

For research in Liquid—Liquid Extraction : Heat Transfer.

Buildings Nil.

Equipment Rs. 36,000/-

1. Potentiometer
2. Interferometer
3. High Speed Camera
4. Flowmeter & Pumps
5. Three Phase gang variaes

Total : Rs. 36,000

Recurring

Consumables and contingencies Rs. 2,000/- per year.

Research Assistant 1

Research Scholarships 4

Department of Technology, Annamalai University

For research in Heat Transfer

Sulphonation

Buildings Nil.

Equipment Rs. 10,000 for the construction of necessary apparatus, measuring instruments etc.

Recurring Consumables and contingencies Rs. 1000 per year

Research Scholarships 4

Research Assistant 1

A.C. College of Technology, Madras University, Madras

For research in Heat Transfer ; Mass Transfer.

Buildings Nil.

Equipment It was decided that the college should prepare a revised list of equipment required for research in the above fields which should be examined further for making the necessary recommendations.

Recurring Consumables Rs. 2000

Research Assistant 1

Research Scholarships 4

College of Technology, Banaras Hindu University, Banaras

It was decided that the research unit, to be established at the college, should carry out work in Fluidisation, Heat Transfer and related aspects. It was also decided that the college should be requested to formulate its requirements in respect of equipment, recurring expenditure etc. which should be examined further by the experts for making necessary recommendations.

Note : In all the above cases, the Research Scholarships should be of the value of Rs. 200 p.m. and Research Assistantships in the scale of Rs. 250-500).

ANNEXURE III

(Item No. 8)

Detailed list of Equipment recommended together with their Estimated cost

(i) Overhead tank, pumps and pumping main with all fittings delivery pipe line, masonry flumes for studies on standing wave, flume outlets, Syphons, spillways, modules, etc. model for experiments on energy dissipation below spillways, river and sea erosion, silting up of harbour areas, mud banks action of sea water on the West Coast, jettier etc. silting of reservoirs, reclamation of land from back water areas etc. Rs. 1.5 lakhs.

(ii) Precision Instruments for Hydraulics and Irrigation Laboratory

1. Haigh Depth meter		
2. Pitot Static Tube		
3. Rain Gauge		
4. Membrane Analogy Model (for pressure Drop)		
5. Electric Analogy Model (for pressure Drop)		
6. Seismograph		
7. Puri's Siltometer		
8. Kennedy's Silt Classifier		
9. Optical Lever Siltometer		
10. Air Siltometer		
11. Saughey Fall Increaser		
12. Vane Anemometer		
13. Hot Wire Anemometer		
14. Electric heater air flow meter		
15. Viscometer		
16. Tilting Gauge		
17. Krell Manometer		
18. Curved tube manometer		
19. Modules—Gibbs, Foote & Spanish		
20. Kennedy's Gauge Outlet		
21. Pressure & Vacuum Gauges		
22. Pressure Gauge Tester		Rs. 1 lakh
23. Hook gauges with $\frac{3}{4}$ " square brass tube, each 2½ ft.	20 Nos. 20 Nos.	Rs. 5,000
24. Flow indicator 3 ft. long	2 Nos.	500
25. 90 V notches one ft. high	3 Nos.	450

26.	Cippoletti weirs		Rs.
	1 No. 3 ft. long		300
	1 No. 4 ft. long		400
	1 No. 5 ft. long.		500
27.	Gurley current meters	3 Nos.	6,000
28.	Midget Current meters	3 Nos.	2,400
29.	$\frac{1}{4}$ " dia brass measuring rods each rod 4 ft. long	20 Nos.	600
30.	Stop watches	12 Nos.	1,200
31.	Pressure cells with electronic pressure recording equipment	1 Nos.	6,000
32.	Three channel wave recording equipment		15,000
33.	Rchbock weirs.		
	1 No. 3 ft. long.		400
	1 No. 4 ft. long.		500
	1 No. 5 ft. long.		600
			<hr/>
			39,850
		Say Rs.	40,000
	Grand Total :	Rs.	2,90,000

Item No. 9—To report the setting up of a Special Committee for**(a) Commerce Education (b) Mining Education***(a) Commerce Education*

The coordinating Committee of the All India Council for Technical Education at its meeting held on the 3rd December, 1957 recommended that a high-powered Committee be appointed by the Chairman, All India Council for Technical Education to survey the whole field of Commerce Education as well as to assess the present state of employment of Commerce graduates with a view to suggesting an integrated pattern of Commerce Education at all levels. In pursuance of this, the Minister for Scientific Research and Cultural Affairs in his capacity as the Chairman of the Council, constituted a 16-man Committee under the chairmanship of Dr. V. K. R. V. Rao. The composition of the Committee and its terms of reference are given at Annexure I.

The first meeting of the Committee was held on the 14th August, 1958. The Committee held discussions regarding the various aspects of Commerce Education and the method to be followed to investigate its terms of reference. The Committee also finalised a set of questionnaires for issue to State Governments/Boards of Education; Universities/Colleges; Industrial and Business Houses/Chambers of Commerce; and Professional organisations for collecting detailed information regarding the present state of Commerce Education and employment opportunities available as well as views regarding re-organisation of the courses.

The Committee has issued over 2,000 questionnaires in all categories. According to the present programme, the Committee will continue issuing questionnaires to different organisations till the end of March, 1959. The Committee expects to collect full information by the end of May, 1959 and will then proceed to analyse it.

The Committee proposes to visit selected centres where clarification of the written replies received will be obtained, if necessary, and representatives of Commerce and Industry, educationists and other prominent persons will be interviewed.

In view of the comprehensive nature of the enquiry entrusted to it and its wide terms of reference no definite time limit has been prescribed for the completion of the work of the Committee. The present indications, however, are that the report of the Committee may be ready towards the end of the current year.

(b) Mining Education

The All India Council for Technical Education had set-up earlier an Expert Committee under the Chairmanship of Dr. M.S. Krishnan to prepare a scheme for the development of adequate training facilities in

Mining Engineering at Degree and Diploma levels, to meet the requirements for technical personnel for the mineral development programme under the Second Five-Year Plan. The Council approved the scheme formulated by the Expert Committee for the expansion of the training capacity of existing institutions for degree courses ; introduction of mining engineering degree course at seven other selected technical institutions. The Council also approved the establishment of 12 institutions in different parts of the country for diploma courses in mining engineering.

In view of the urgency felt in respect of technical personnel for Coal production programmes, the National Coal Development Corporation set up a few schools for the training of different categories of subordinate mining personnel including Overmen and mines Surveyors. The Courses followed at these Schools, their contents and duration are, however, different from the diploma courses at the institutions, established on the recommendations of the All India Council for Technical Education. It was, therefore, considered desirable that there should be uniformity in all institutions in respect of courses, standards of instruction, examinations, awards etc. The Steering Committee of the Coal Council of India accepted the suggestions and agreed that a Joint Committee of the All India Council for Technical Education and the Steering Committee may be set up to deal with these issues. The Chairman, All India Council for Technical Education also approved the constitution of a Joint Committee. The Committee has been set up with the following personnel and terms of reference :—

A. Personnel

1. Dr. M. S. Krishnan (Chairman)
2. Dr. D. N. Prasad
3. Shri S. S. Grewal
4. Shri A. B. Ghua
5. Shri H. R. Dewan
6. A nominee of the Mining Industry
7. Shri D. V. Narasimham (Secretary)

B. Terms of Reference

1. To evolve a common pattern and standard for Diploma courses in mining for all institutions run by various agencies.
2. To work out the details of integrating academic courses in Mining Engineering at degree level with the necessary practical training.
3. To examine other relevant matters such as reorganisation of Evening Mining classes run by the Government of Bihar and West Bengal.

The Joint Committee held its first meeting on the 2nd of March, 1959.

ANNEXURE I

(*Item No. 9*)

Composition of the Special Committee for Re-organisation of Commerce Education

1. Dr. V.K.R.V. Rao, (Chairman)
Vice-Chancellor,
Delhi University, Delhi.
2. Dr. P.S. Lokanathan,
Director,
National Council for Applied
Economic Research, New Delhi.
3. Prof. B.N. Das Gupta,
13/8 Swinhoe Street,
Calcutta-19.
4. Dr. Saroj Basu,
Head of the Commerce Department,
Calcutta University,
Calcutta.
5. Prof. P.D. Swaminadha Mudaliar,
Head of the Department of Commerce,
University of Madras,
Madras.
6. Shri Jagdish Prasad,
General Manager,
Indian Telephone Industries Ltd.,
Bangalore.
7. Mr. C.S. Tayabjee,
Managing Director,
Azam Zahi Mill Ltd., Hyderabad.
8. Mr. S. Shamsheer Ali,
6, Rainey Park, Ballyganj,
Calcutta-19.
9. Mr. K.T. Merchant,
Principal,
Sydenham College of Commerce,
Bombay.

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| 10. | Dr. P.J. Phillips,
Development Officer,
University Grants Commission,
Old Mill Road, New Delhi. | (Representative of
University Grants Commission) |
| 11. | Prof. A.N. Agarwala,
Head of the Commerce Department,
Allahabad University,
Allahabad. | (Representative of the
Inter-University Board of India). |
| 12. | Vacant. | (Representative of the Institute of
Chartered Accountants of India). |
| 13. | Mr. M.L. Tannan,
The Cliff,
Carmichael Road,
Bombay-26. | (Representative of the
Indian Institute of Bankers). |
| 14. | An Educationist from U.K. | (Will join the committee at |
| 15. | An Educationist from U.S.A. | a later stage). |
| 16. | Prof. A. Das Gupta,
Delhi School of Economics,
Delhi University, Delhi. | (Member-Secretary) |

Terms of reference of the Special Committee for Re-organisation of Commerce Education

- (a) To enquire into and report on the present position of Commerce Education in India in all its aspects and
- (b) suggest measures for its re-organisation and improvement with particular reference to :—
 - (i) the aims, organisation and content of Commerce Education.
 - (ii) its relationship to existing and proposed courses of Education in Business Management.
 - (iii) the inter-relation of Commerce Schools and Colleges with Schools and Colleges of other types, and
 - (iv) other allied problems.

so that a sound and reasonably uniform system of Commerce Education suited to the needs and resources of our developing economy may be provided for the whole country.

Item No. 10 :—To consider the Report of the Special Committee of the University Grants Commission regarding incorporation of Engineering Schools as Departments of Universities.

The University Education Commission appointed by the Government of India in 1948-49 recommended the incorporation of Engineering Schools as Departments of Universities as follows :—

‘It is better that such Engineering Schools should not be isolated but should be Departments of Universities so that teachers of science economics, industrial relations and language shall be available and so that Engineering students may have the advantage of all-round cultural atmosphere.’

The attention of the University Grants Commission was drawn by the Ministry of Education to the above recommendations of the University Education Commission and Special Committee was appointed by it to consider this matter. The Committee agreed with the University Education Commission that for producing ‘skilled Engineers and Technologists’ who should also be sound and well-integrated individuals and citizens, it is desirable that Engineering Schools should not exist in isolation, but should form an integral part of a University. The Committee, however, noted the fact that :—

- (i) there are a large number of Engineering colleges which are located at places far away from the University centres and therefore, cannot be incorporated as Departments of Universities; and
- (ii) many Engineering institutions are purposely established near industrial areas and thus enjoy the benefit of being most suitably placed where the students can earn as they learn and the teachers can have, as the University Education Commission itself desired, the suitable background and experience in the field of production.

The Committee further noted with interest that several Engineering Schools are already Departments of Universities as in the case of Engineering Colleges in the Universities of Annamalai, Aligarh, Mysore, Osmania, Jadavpur, Baroda, Roorkee etc. The Committee recommended that “such affiliated Engineering Colleges which are located at the University centres, as far example, Engineering Colleges in Poona, Madras Chandigarh (Punjab) should preferably be transferred under the control of the University concerned. The other classes of affiliated colleges which are intentionally located near industrial centres like Ludhiana and Patiala in the Punjab, Sangli in Bombay and Javapur in Madhya Pradesh, may

be left as they are, but should be encouraged to introduce General Education in their curriculum. The University to which these Colleges are affiliated should enlarge the sphere of cultural knowledge of these Colleges by arranging extension lectures and providing Visiting Professors to give a series of lectures on special topics pertaining to cultural education, business management, industrial relations and economic and general problems of the day. All Engineering Colleges and the University of Roorkee which is a Technical University should be required to have on their staff one or more members specialising in Humanities and Social Sciences, and study of these subjects should form an essential part of the curriculum of these Engineering Colleges. The Central and State Governments should help the Colleges in this venture by giving suitable recurring and non-recurring grants. Expenditure on this account may not be very large as most of the Colleges already have facilities for General Science which may be suitably improved and enlarged at relatively small cost. They would also need addition to their library facilities in the form of more books on Humanities and Social Sciences and some addition to the strength of their staff. The University Grants Commission could help the Universities in organising Visiting Professorships. It may be advantageous to provide special lectures through Visiting Professors on highly specialised fields in Engineering and allied sciences as well."

With regard to Polytechnics teaching up to Diploma Course Standards, the Committee was in full agreement with the resolution of the All India Council for Technical Education that Polytechnics may be permitted to be attached to Engineering Colleges on certain conditions which should include the provision that :—

- (i) theoretical and practical instructions staff in polytechnics and the teaching and laboratory space and equipment for the purpose are absolutely separate from those for the Engineering Colleges with provision that Professors of College may be permitted to give occasional lectures to tone up instructions in the Polytechnic and interchange of special lectures is permitted on a reciprocal basis.
- (ii) Polytechnics should have their own Superintendents-in-charge who may, however, work under the guidance of the Principal of the College ; and
- (iii) the budget of income and expenditure for the Polytechnics is kept separate from that of the College.

The Report of the Special Committee was considered by the University Grants Commission at its meeting held on 18th February, 1957, when the Commission resolved as follows :—

“It was agreed that the report of the Special Committee be referred to the All India Council for Technical Education for advice and the matter be placed before the Commission at a later date.”

The Coordinating Committee which considered the matter at its meeting held on 3-12-1957 was of the view that such an important question of policy should be considered by a full meeting of the Council. The Committee also desired that the comments of the State Governments may be obtained in the first instance before the matter is referred to the Council. The Report of the Special Committee of the University Grants Commission was accordingly circulated to all the State Governments for their comments and summary of the replies received so far is given at Annexure. From the summary it will be observed that all the eight State Governments who have replied are against the proposal for the incorporation of engineering institutions as Departments of Universities.

The matter is placed before the Council.

ANNEXURE

(Item No. 10)

Summary of the replies received from State Governments on the proposal regarding incorporation of Engineering Schools as Departments of Universities

Madras Not agreeable to the proposal for the incorporation of Engineering Schools as Departments of Universities.

Mysore. The number of Engineering Institutions in the State being very large it would become unwieldy for a University to administer them very effectively. Moreover, with the increasing demand for Technical Education and also the need to safeguard the interest of backward communities, Government will have to exercise direct control over these Institutions instead of leaving them to Universities which are autonomous bodies. This Government is, therefore, not in favour of the recommendations made by the University Education Commission.

Andhra Pradesh The advantage claimed by having Engineering Institutions as Departments of Universities is mainly to have the benefit of lectures on General Education of Humanities or Social Sciences which can be achieved by extension lectures and other methods. Moreover, it is desirable that Engineering Institutions should be within easy reach of Industrial area but this may not be available if they form an integral part of the Universities. Considering all these facts the State Government is of the opinion that it may not be desirable to insist on such institutions forming necessarily integral part of the Universities in all cases as a rule.

Orissa However admirable the objective may be, the fact remains that Engineering Schools are not always situated in close proximity of Universities. Moreover, Engineering Schools, curriculum devised by the All India Council for Technical Education now provides specifically for the teaching of Science, Industrial relations, Cost Accounting and Languages in Engineering Schools for which the necessary staff are appointed by the Schools themselves. So the objective envisaged by the University Education Commission is being fulfilled without the Institutions being incorporated as the Departments of Universities. Again it is desirable to have Engineering Institutions located in Industrial Regions where they can have the suitable background in the field of Engineering practices and Industrial Production which is much more important for them than to be

in the neighbourhood of a University to benefit from the cultural atmosphere which can at best bring them only an indirect benefit rather than any material advantage. In these circumstances, the State Government do not consider it desirable that Engineering Schools should be incorporated as Departments of Universities at present.

Uttar Pradesh Since the Board of Technical Education set up in various States will be incharge of all the Engineering and Technical Education the purpose of proposed affiliation of the Engineering and Technical Institutions to Universities will not only be lost but may be at cross purpose with the idea of the Board of Technical Education.

Rajasthan It is agreed that as a general rule it is desirable that Engineering Colleges and Schools should form an integral part of a University. But this may not be possible in many cases specially for the reasons that such Institutions at times are located in towns and cities which are not the seat of a University. In such cases the Institutions can hardly form a Department of the University with any specific advantage.

Punjab As the State Government, with a view to coordinating the activities of various Departments/Institutions dealing with the subjects of Technical Education and for developing Technical Education in State on the sound lines, have already set up the State Board for Technical Education with a Directorate as its Executive Agency, it would not be necessary to have a Degree/Diploma Institution attached to the University as its Department. The Vice-Chancellor of the Punjab university is already there on the State Board of Technical Education. In order to have an effective liaison between the functioning of these two institutions, the Vice-Chancellor of the Punjab University has been requested to take the Director of Technical Education on the University Senate. In view of the above position it is not considered necessary that the Degree Institutions should be incorporated as Departments attached to the Universities. As regards Diploma Institutions, the Examinations for the recognised Institutions are conducted by the State Board of Technical Education and this arrangement is considered to be satisfactory enough and it is not necessary to attach the Diploma Institutions also to the University for conduct of their examinations or being attached as their Departments. The State Board as a responsible and broad based body should be able to maintain a satisfactory standard of Education and ensure development of such institutions on proper lines.

West Bengal The State Government agree with the recommendation of the Commission as far as Unitary teaching Universities are concerned. In regard to affiliating Universities where collateral facilities of liberal education are not available and so-called 'cultural asmosphere' may also be absent, the authorities of Engineering Colleges should try their best to fill up the necessary gaps by competent Visiting Lecturers drawn from respective spheres and through approved Extension Services.

Item No. 11 To consider the proposals received from the Ministries of the Government of India and the State Governments regarding various aspects of Technical Education :—

- (i) From the Central Ministry of Transport and Communications.
- (ii) From the Central Ministry of Education.
- (iii) From the Government of Andhra Pradesh.
- (iv) From the Government of Bombay.
- (v) From the Government of Uttar Pradesh.
- (vi) From the Central Ministry of Food and Agriculture.
- (vii) From the Government of Rajasthan.
- (viii) From the Government of Bihar.

(i) Proposal received from the Central Ministry of Transport and Communications

India Meteorological Department

Specialised training courses in electronics especially in radar techniques

Electronics has many applications in Meteorology which are increasing day by day, such as upper air measurements by radar and radiosonde, observations of atmospheric electricity, radio-direction finding of thunderstorms, automatic weather stations etc. The application of radar in Meteorology has not only provided a powerful operational tool in Meteorology, it has also an extensive use in the study of hydrometeors and the structure of clouds and is contributing largely to fundamental investigations in the understanding of cloud and precipitation processes—The India Meteorological Department is engaged in work in this field. The Department, therefore, needs personnel trained in the practical side of electronics. An increasing demand for such trained personnel in practical electronics probably exists in other government and non-government departments also. In view of this, the All India Council for Technical Education may consider making suitable arrangements for imparting specialised training courses in the practical side of electronics, particularly radar techniques, in the scheme of technical education in the country.

(ii) Proposal received from the Central Ministry of Education

Integration of pre-professional courses with Professional courses

In the past, the minimum qualification for admission to most of the professional courses has been a Pass in Intermediate Science in the appropriate group of subjects. With the introduction of the three-year degree course and the consequent abolition of the Intermediate examination in a number of universities, the basis for admission to professional courses has been engaging the attention of the Three-Year Degree Course Estimates

Committee, All India Council for Technical Education, Central Advisory Board of Education and the Second Deshmukh Committee.

The Three-Year Degree Course Estimates Committee in their report submitted in May, 1957 had opined that 'admission of students to pre-professional course should be regulated, so that only those students are admitted to those courses who will ultimately be able to find seats in professional colleges. For this purpose, it is necessary that the professional colleges should either select candidates on the basis of the Higher Secondary/Pre-University Examination results or should conduct their own admission tests. The establishment of junior colleges, which might provide centralised pre-professional courses or instruction in some only of the professional colleges, as is done by the Madras University, is another possibility. This would also obviate the necessity of Intermediate Colleges continuing to provide Inter-Science Courses for selection to professional colleges.'

The All India Council for Technical Education in their meeting held in March, 1958, accepted the recommendation of the Secondary Education Commission that the pre-professional course, i.e., pre-medical and pre-engineering courses, should be the concern of the professional colleges themselves in accordance with their special requirements.

The Central Advisory Board of Education at its 25th meeting held in February, 1958 had also considered this question but deferred a recommendation till the views of the Science Sub-Committee of the Second Deshmukh Committee became available. The Science Sub-Committee has examined the issue in detail and is of the view that the arguments in favour of the integration of pre-professional courses with the professional courses far outweigh those cited against it and has recommended that there should not merely be an addition of one year, but it should be integrated with the professional course. A copy each of the relevant extracts from the report of the Second Deshmukh Committee together with relevant extracts from the report of the Science Sub-Committee, is enclosed. (Annexures I & II).

Twenty Universities in the country have adopted the Three-Year Degree Course by 1958-59 and eight more universities are expected to switch-over to this pattern before the end of the Second Five-Year Plan period. A statement giving the up-to-date position is enclosed. (Annexure-III.) In view of the rapid change-over to the new pattern of the first-degree course, it has become increasingly urgent that a concrete solution to the problem should be found. It is, therefore, suggested that the matter may be placed before the All India Council for Technical Education at their next meeting to indicate the ways and means which would enable the

professional colleges to take over the pre-professional classes from the Arts and Science Colleges as early as possible and integrate them with their professional courses.

(iii) Proposal received from the Government of Andhra Pradesh

(a) Training of Technical Teachers

It has become difficult to recruit suitable personnel for teaching technical subjects in the institutions. Although certain top posts can be filled with competent men depending on the salary offered, the junior posts do not attract competent young men who are keen to stick on to the teaching profession. Further, those who join the institution leave in the middle of the year when their attempts to get attractive terms materialise. Considerable time of the senior teaching staff is wasted in trying to guide such young men who ultimately leave the institution not having developed sufficient aptitude for teaching.

The competition with the Industries for technically trained personnel has increased day by day with the result that the technical institutions are not in a position to attract suitable personnel.

The Government of India have already formulated a Scheme of giving Junior and Senior Fellowships for certain selected Engineering graduates to fill vacancies in teaching posts in Polytechnics and Colleges. The scheme as such will not serve all the needs of the institutions. The question of establishing suitable Technical Teacher Training Programme in each State should be considered at an early date. Such a Programme may be established at the local University campus with the cooperation of local Technical College or Institution, for providing laboratory and workshop facilities. The course of Training should be designed in such a manner as to produce teachers who are capable of imparting knowledge in technical subjects efficiently.

(b) Recognition of Architectural Studies, and institution of suitable Grants by the Centre

So far, the All India Council for Technical Education did not take up the question of giving suitable grants for the development of Architectural Studies in the States. The Andhra Pradesh Government established a Five-Year Architecture Diploma Course as far back as 1951. The syllabus is practically on par with the syllabus for National Diploma, prescribed by the All India Council for Technical Education. Recently, the All India Council for Technical Education sent a Visiting Committee to inspect Architectural Institutions in the Southern Region and to make suitable recommendations. It is not known what steps All India Council for Technical Education proposes to take to assist those institutions

which deserve recognition. It will be encouraging to the State Government if suitable grants are given towards non-recurring and recurring expenditure for the development of Architectural Studies.

(c) Enhancement of Grants for Equipment to Technical Institutions—Revision of ceilings

During the last meeting, the A.I.C.T.E. considered the suggestion made by Shri Garde to enhance the grants to institutions to enable them to meet the rise in the cost of equipment, and recommended a limit of 25% increase in the price of the individual items without further reference to the Government. It was also stated that the question of revising the final estimates to implement the scheme, should be considered by the Regional Committees concerned.

There is considerable rise in the cost of equipment in recent years. Although, the limit of 25% rise may hold good for certain minor equipment, the prices of majority of laboratory type of equipment have gone up by leaps and bounds and in some cases the prices have nearly doubled. Every case has to be referred to the Regional Committee for their approval. This results in unnecessary correspondence and in the end, it is the experience of the institutions, that the equipment has to be purchased for instructional purposes exceeding the limits prescribed. It is suggested that the A.I.C.T.E. may revise the existing list of equipment to bring it up-to-date.

(d) Equipping the Regional Engineering Colleges with Foreign assistance

In the expansion of Technical Education in the country as a whole, parity or equity among the regions was aimed at. Keeping this principle in view, eight new colleges sponsored by the Central Government were distributed equally among all the four regions.

The college proposed for Delhi, whose foundation-stone has been recently laid by the Duke of Edinburgh, is to receive equipment and other expert help from the U.K. to the tune of £ 500,000 for its development.

Since the other seven colleges were also recommended to be established under this very scheme, it is worthwhile for the All India Council for Technical Education to recommend to the Government of India to consider the feasibility of getting suitable help from foreign countries to equip these colleges on modern lines.

(iv) Proposals received from the Government of Bombay

(a) Consideration of the request for increase in the ceilings on the cost of furniture required for a Polytechnic of 120 admission as capacity laid down by the Board of Studies in Engineering & Metallurgy

The Visiting Committee appointed by the Western Regional Committee recommended *inter alia* financial assistance of Rs. 67,000 for furniture to the Government Polytechnic, Karad. Financial assistance for the same purpose for the other Polytechnic at Sholapur is also Rs. 67,000. The Government of India have however approved the expenditure of Rs. 35,000 only for furniture as against Rs. 67,000 recommended by the Western Regional Committee in respect of the Government Polytechnic, Karad. In this behalf, they have informed this office that as the ceilings of Rs. 35,000 has been fixed by the All India Council for Technical Education in respect of the Institutions conducting diploma courses, it is not possible for them to enhance the ceilings for furniture in respect of this Polytechnic at Karad.

It may be mentioned here that this is the second polytechnic to be established under the Plan Scheme of the establishment of the District polytechnics at a total cost of Rs. 72.29 lakhs, the first having been established at Sholapur, for which financial assistance of Rs. 67,000/- for furniture has been accepted by the Government.

It is the experience that the furniture of Rs. 67,000/- for the Polytechnic with 120 admissions has been found to be inadequate. Broad details of the furniture which are essential for the polytechnic for its smooth conduct are indicated below :

Furniture for :

(1) Drawing Halls—	Drawing tables, stools, drawing cabinets, Black-boards etc.	Rs. 20,000
(2) Class rooms—	Students' Seats, platform-tables, Black-boards etc.	Rs. 20,000
(3) Library—	Steel book cases, Card index cabinets, Tables, Chairs, Cupboards etc.	Rs. 7,000
(4) Laboratories—	Chemistry and Laboratory Tables, Stools, Side racks, Cupboards, Stands, racks, Work benches, Work tables etc.	Rs. 12,000
(5) Workshops—	Work benches, Steel lockers, Racks etc.	Rs. 14,000
(6) Teaching and administrative staff—	Tables, Chairs, Racks—small and big—Stools, Storewel, Cupboards, glass cupboards, filing cabinets etc.	Rs. 15,000
(7) Common rooms—	Tables, Chairs, etc.	Rs. 2,000
	Total :	Rs. 90,000

These items of furniture are found to be absolutely essential for an educational institution like a Polytechnic to enable the institution to be able to accord instructions—both theoretical and practical smoothly.

It is, therefore, requested that the All India Council for Technical Education may kindly consider the question of raising the Ceilings for furniture in respect of institutions conducting diploma courses to Rs. 90,000/- for the reasons stated above.

(b) Consideration of the request to permit the purchase of equipment required by the Polytechnic at the lowest prices as available in the market and according to specifications laid down by the Regional Committee

The Government of India give financial assistance for development of the Institutions in regard to building and equipment. The institutions receiving such assistance have to purchase equipment at the prices as indicated by the Visiting Committee in its report on the institutions. The institutions have however found it difficult to purchase some of the items of equipment due to increase in the prices as against those indicated in the lists furnished to the institutions along with the development reports. The Government of India, therefore, permitted the purchase of the individual items of equipment in which case increase in price in respect of each item is within 25% of the price as indicated in the standard list prepared by the All India Council for Technical Education or Western Regional Committee in case of institutions conducting diploma courses in Engineering.

Even though permission is granted to purchase equipment with the 25% increase in prices, it is found that it is not possible to purchase the equipment within the increased prices. Due to fluctuations in the market, the prices of the items of equipment have considerably increased. It is therefore not possible for the institutions to obtain the equipment within the prices laid down by the Committee. This eventually retards the progress of the institution. In this connection, some items of equipment are indicated below showing (1) the rates at which the equipment is to be purchased as approved by the W. R. C. and (2) the present market prices at which these items are available.

Items of Equipment	Rate approved by the W.R.C. (in Rs.)	Market prices at which the items are available. (in Rs.)
(1) Bellis & Marcome exper- imental Steam turbine	50,000/-	71,100/-
(2) Disc Recorder	2,000/-	11,000/-
(3) Electric Indicator	4,000/-	13,220/-
(4) Uniflow Steam Engine	10,000/-	48,820/-

(5) Crank Shaft balance	1,000/-	15,072/-
(6) Milling Machine	10,000/-	38,000/-

It will thus be seen that the prices of the equipment are increasing considerably.

It is therefore suggested that the institutions may be permitted to purchase equipment at the available prices, with the stipulation that the equipment is purchased of the specifications laid down in the report. No doubt, the institution will follow the usual procedure of purchase of inviting tenders and accepting the lowest. The equipment may be allowed to be purchased up to the financial ceiling for total equipment approved in respect of each Institution by the Committee. Thereafter the institutions will approach the Committee for the remaining items with their prices for the sanction of the Committee.

(v) Proposals received from the Government of Uttar Pradesh

(a) Increase in the maintenance Recurring Grant for training of Diploma Students in Civil, Electrical and Mechanical Engineering

The All India Council for Technical Education had originally recommended maintenance grant of Rs. 100/- p. a. per student for Diploma Institutions. Accordingly, the recurring contingency expenditure under the expansion scheme at the Government Technical Institute, Lucknow and Gorakhpur and the two New Diploma Institutes at Bareilly and Jhansi in Uttar Pradesh had been phased on the same basis. Now the Government of India have reduced this maintenance grant to Rs. 75/- per annum for a student only. The amount of Rs. 75/- per annum for a student is too meagre to meet the recurring expenses on full training of Engineering students. Moreover, the prices of most of the materials have increased considerably. From the past experience it has been observed that maintenance charges per student for diploma classes in our existing technical institutions is much higher than this amount as is evident from the enclosed statement (Annexure IV). It is therefore suggested that the maintenance grant should be restored to at least Rs. 100/- per student, if it is not increased to Rs. 138/- per student otherwise it will adversely affect the training of students. In fact, the grant per student per annum need to be raised still further beyond Rs. 100/- per annum and the details of expenditure also need to be reviewed.

Moreover, no expenditure towards office administration has been provided by the Government of India. A sum of Rs. 30/- per annum on an average cost per student, is required towards expenditure on this item and it may also be approved by the All India Council for Technical Education.

(b) Development of P.M.V. Technical Institute, Mathura

The Visiting Committee of the Government of India has recommended that instead of piece-meal development of the P.M.V. Technical Institute, Mathura, it would be better to develop it straightaway into a full-fledged Institute. Accordingly the institute should impart training in all the three courses at the diploma level viz., Civil, Electrical and Mechanical Engineering and admit 120 students per year (Mechanical 45, Electrical 45, Civil 30). The introduction of diploma course in Electrical Engineering had been agreed upon long ago by the Government of India and the State Government under the expansion scheme of the institute but the introduction of Civil Engineering course had been recommended by the Government of India recently under normal development scheme of the institute. The grant recommended by the Visiting Committee for the expansion and normal development of the institute is as under :

	Total grant recommended	Share of expansion scheme	Share of Normal Development
1. Buildings	Rs. 1,82,716	Rs. 1,82,716	Rs. Nil
2. Equipment including library books, furniture etc.	Rs. 4,54,200	Rs. 3,00,000	Rs. 1,54,200
3. Recurring (Ultimate)	Rs. 2,26,550	Rs. 73,440	Rs. 1,53,110

The expenditure on building and equipment under expansion scheme will be borne completely by the Government of India. The Government of India's share in recurring expenditure under expansion scheme will be 100 per cent in first year, 80 per cent in second year and 50 per cent in subsequent years.

The second part of the recommendations is to introduce Civil Engineering in addition to the Mechanical and Electrical Engineering, and to increase the admission from 90 to 120 under the Normal Development Scheme of the Institute. The pattern of Central assistance will be 50 per cent recurring and non-recurring each for these additional admission in Civil Engineering. On this basis the State share and the Government of India share will be as follows :

	Recommendations for the normal development	Government of India share	State Government share
1. Building	Nil	Nil	Nil
2. Non-recurring	Rs. 1,54,200	Rs. 77,100	Rs. 77,100
3. Recurring (Ultimate)	Rs. 1,53,100	Rs. 76,555	Rs. 76,555

Thus the State Government will be required to bear Rs. 77,100/- non-recurring and Rs. 76,555/- recurring ultimate. As no provision of additional non-recurring and recurring expenditure for further development of the institute has been made in the State Plan ceiling for the year 1959-60 and 1960-61, the All India Council for Technical Education may kindly include the entire expenditure for the additional normal development also in Expansion Scheme as the new subject of Civil Engineering to be introduced is proposed by the Visiting Committee. In fact the further development of the institute for the introduction of Civil Engineering should be a part and parcel of the Expansion Scheme according to which Electrical Engineering was to be added to the Institute. Under the original normal development of the Institute for the teaching of Mechanical Engineering, the State Government had already contributed their full share. It is, therefore, requested that the further development of the institute should be treated as a complete Expansion Scheme in one integral part instead of changing the basis of assistance in two parts as expansion and normal development.

(vi) Note received from the Ministry of Food and Agriculture

Education in Soil Conservation in Agricultural Schools and Colleges

It is of paramount importance that the students passing out from Agricultural Schools and Colleges are well grounded in the practice of modern conservation farming. In the agricultural sphere soil conservation is the basis of all sustained production of agricultural commodities. Considering the alarming rate at which the agricultural lands throughout the country are being depleted annually of the valuable top soil through erosion, it is imperative that proper land use practices and soil conservation methods are introduced in all farm lands through the cooperation of farmers. The staff of the Agricultural Departments should, therefore, be thoroughly trained in this important aspect of farm management through a phased programme of agricultural education in schools and colleges. The following steps may be necessary for the fulfilment of this objective :—

- (a) Soil Conservation Charts and models may be supplied to all agricultural schools and colleges free by the Agricultural Departments.
- (b) Popular talks may be arranged in the schools and students taken out to show soil conservation projects nearby.
- (c) School teachers may be given a refresher's course in soil conservation in the agricultural colleges in the State.
- (d) 16 mm sound projectors may be supplied to agricultural colleges to show soil conservation and better farming films.
- (e) The degree course in Agricultural Colleges should include a

comprehensive syllabus for compulsory training in soil conservation and

- (f) Publication of text books in Soil Conservation for Schools and Colleges by the department concerned.
- (g) During vacations in colleges, the students may be required to spend a period of fortnight in soil conservation projects for compulsory training in soil conservation.

The above note was considered in the *ad hoc* meeting of State Ministers in charge of Soil Conservation work held in New Delhi on the 25th and 26th April, 1956, and the following report made by a sub-committee to examine the matter was adopted at the meeting :—

“Charts and Models which the State Governments had in their possession would be sent to the Central Soil Conservation Board which would examine their suitability for re-production from the following points of view.”

- (a) General charts and models on Soil Conservation.
- (b) Charts and models suitable only for regional problems.

It was suggested that only selected charts of the above two categories would be printed and distributed by the Soil Conservation Board to different States.

The Central Soil Conservation Board would continue to produce suitable films for soil conservation during the Second Five-Year Plan and arrange for their distribution to the different States for exhibition. It was expected that 16 mm. sound projectors would be available with most of the States.

It was suggested that the syllabus for Soil Conservation should be prepared by the Board for inclusion in the Agricultural Engineering and Forest Colleges, in the States.

It was also thought desirable that the Board should take up writing of text books on Soil Conservation to suit schools and colleges.

The note was brought to the notice of the Inter-University Board of India in their 32nd and 34th meetings held in January and December 1957 who circulated the note to the different Universities for inclusion of the item in those colleges where the facilities exist, and also desired that some additional grants be sanctioned by the Government for such institutions. After consideration, the Secretary of the Inter-University Board of India was informed that there is no provision for financial assistance for such purposes under the Soil Conservation Board and requested that Ministry of Education or the University Grants Commission may be approached in the matter.

(vii) Proposals received from the Government of Rajasthan

Conversion of floor area to plinth area of Buildings required for technical institutions for purpose of working out the cost etc.

At present the plinth area requirements are worked out by increasing the floor area requirements by $33\frac{1}{3}\%$. It has been found that this is too inadequate. It should be increased considerably.

Note :—This question has been raised a number of times in the N.R.C. of the All India Council for Technical Education. An enquiry was made by the Secretary, Northern Regional Committee and by Shri G.K. Chandiramani from the State Governments and private institutions regarding actual ratio between the floor area requirements of the institutions and the corresponding plinth area of the buildings constructed by them. It is expected that the information has been received by now and it is desirable that a final decision is taken in view of the discrepancies between area recommended and area actually built up.

Office accommodation for members of the teaching staff

At present office accommodation has been recommended by the All India Council for Technical Education only for the senior members of the staff, such as Professors. It is necessary that office accommodation be provided to all the teaching staff up to the rank of Lecturers.

Note :—All the staff in technical institutions are expected to attend institution for full working hours irrespective of vacant periods. During the vacant periods the teaching staff is expected to mark the session work, examination answer books etc. and maintain the progress records of the students under their charge. Quite a few items of this routine are of confidential nature. Therefore, the staff cannot be allowed to take them away to their homes. It is, therefore, felt that all teaching staff up to the rank of Lecturers/Assistant Professors should have a room to themselves, where they could attend to the work defined above and keep the record in safe custody. It is suggested that the room should have a minimum area of 120 sq. ft. and such rooms may be located near the Laboratories for administrative convenience.

Increase in the grant for recurring expenditure

At present the recurring expenditure sanctioned for the various schemes is sanctioned for items like salaries etc. of the staff and maintenance grant for the laboratories and workshop raw materials. It is suggested that the recurring grant should also include other items as given vide Annexure-I which are already approved as permissible items of recurring expenditure

by the Government of India (vide D.O. letter dated 12th February, 1959 Annexure-II).

Additional Instructional facilities required for 5-year integrated Degree Course

The requirements approved by the All India Council for Technical Education do not include non-recurring grant for Library books. It is suggested that the grant to the extent of Rs. 25,000 be included for this purpose. Also in place of maintenance grant of Rs. 20,000 lump sum approved by the All India Council for Technical Education, it is suggested that the grant be at the pro-rata basis depending upon the approved number of students in the Institution subject to a certain minimum figure.

Mining Degree Course

The requirements so far approved do not include the furniture grant. It is suggested that the furniture grant at the rate of Rs. 250 per student be approved. Also maintenance grant be approved at the rate of Rs. 200 per student per annum in place of lump sum grant.

(viii) Note received from the Government of Bihar

(a) Introduction of a Five-Year Degree Course in Mining Engineering at the Bihar Institute of Technology, Sindri, Dhanbad (Bihar)

The Department of Mines and Fuel in the Ministry of Steel Mines and Fuel, Government of India, have assessed that there will be a shortage of nearly 1,000 mine managers, an important category of technical personnel up to the end of the third Plan Period. In making this assessment the number of such personnel that can be obtained from the Indian School of Mines & Applied Geology, Dhanbad, Banaras Hindu University and a few other Engineering Colleges, and higher technological institutes where mining has been introduced as an additional subject, was taken into consideration.

Of course, the large units of mines have proposed temporary relaxation of statutory requirements as one of the measures for meeting this shortage. It is doubtful whether the Department of Mines would accede to such relaxation, in view of the large number of mine accidents in recent years. There will certainly be quite a big gap yet to be bridged, for which arrangements have to be made. One of the means is, no doubt, to further increase the intake capacity of the institutions where mining is taught at present, but this will certainly bring the efficiency down immensely.

It has been observed in the past that Mining graduates from Banaras Hindu University could not fare so well at the Mine Managers Examination as the Associates of the Indian School of Mines. The main reason of this is not the quality of teaching at the two institutions but the proximity

of the School of Mines to the important Coal Mines of India, to which the students are weekly taken out on excursion during the course of training. This very important advantage, which makes the institutional training complete and more efficient cannot be made possible for the students of other institutions.

The Bihar Institute of Technology, Sindri, a well established institution, situated in the heart of the Jharia Coalfield, having courses in seven branches of Engineering, can play a very important role in providing well qualified and well experienced mine managers if a Mining Engineering Degree Course of the pattern as detailed below be introduced in the institution.

It is proposed to start a five-year degree course in Mining Engineering in the Bihar Institute of Technology, Sindri, of a sandwich pattern. The distinctive features of the scheme are as follows :—

(i) The first two years will be full-time course in common with the course of the other seven branches of Engineering with the addition of Geology and Mining in the course of first and second years.

(ii) During the remaining three years the course will be a sandwiched one. The students will work in mines in the morning from 8.00 A.M. to 12.00 Noon and will have classes and the laboratory work at the institution from 5 to 9 P.M. every day for five days in the week.

(iii) The summer vacation will be for only one month during the last three years.

(iv) The two long vacations during the first two years should be partly assigned (two months each vacation) for practical training in selected mines.

(v) Thus at the end of the five-year course every student will have more than three years of practical mining training to his credit and can appear at the First Class Mine Managers Examination straight off.

(vi) The importance of practical training running alongside the class work, in making a sound mining man, cannot be over-emphasised. It makes him bold, experienced and dependable at the end of his college career and it makes his mining training integral.

(vii) The difficulty in obtaining qualified teaching staff for mining subjects is felt in all the institutions where mining is taught and if a proper

assessment be made it will be found that all these institutions are either under-staffed or ill-staffed for their mining branches.

The reason of non-availability of qualified teaching staff for mining is that the pay of a First Class Colliery Manager even without any experience whatsoever is more than Rs. 1,100 per month while the pay offered by the Government is nearly half of that amount. For this reason a number of part-time lecturers for mining subjects have to be appointed at the Indian School of Mines and Applied Geology, Dhanbad.

The Bihar Institute of Technology, is situated in the heart of the Jharia Coalfield where a very large number of highly qualified Mining Engineers, some with vast foreign experience are working as managers of collieries. So services of highly qualified and experienced mine managers can be available for taking classes at mining branches of the institute on part-time basis on a monthly allowance of Rs. 200. A number of such highly qualified part-time lecturers besides a permanent Professor and an Associate Professor of Mining will provide a very high standard of teaching at a much lower cost for the mining section which is proposed to be attached to the Bihar Institute of Technology.

(viii) Thus it will be seen that instead of increasing the intake capacity of the existing institutions, at the cost of efficiency, it would be far more profitable if the Ministry of Scientific Research and Cultural Affairs approve of the scheme of adding a five-year degree course of mining in the Bihar Institute of Technology, Sindri.

The cost involved will not be much and the efficiency of the graduates would be much higher than that of most other institutions. The first two years of engineering and allied training, in common with the other engineering graduates, will give them a very sound basic knowledge and the next three years of theoretical training mainly on mining and allied subjects sandwiched with extensive practical training will complete their knowledge in mining. Also just after obtaining their degree they will be eligible for appearing at the First Class Colliery Managers Examination, which is not possible for graduates from any other institution.

An Associate of the Indian School of Mines & Applied Geology after his four years theoretical training at the school would require two years and four months of further practical training before he is eligible to appear at the First Class Colliery Managers Examination, whereas a Mining graduate of Bihar Institute of Technology at the completion of his course will be eligible for appearing at the First Class Colliery Managers Examination without any further practical training.

Financial Implication*Recurring**Staff*

	Average annual salary Rs.
1. One Professor of Mining (800-1300) (also Head of the Department)	13,680
2. One Associate Professor of Mining (600-1000)	10,800
3. One Assistant Professor of Mining (350-850)	8,700
4. Four part-time Mining Engineers @ Rs. 200 per month	9,600
5. Two Instructors (200-400)	8,400
6. Four Demonstrators (150-300)	12,960
7. Four Laboratory Attendants @ Rs. 22½-45	2,400
8. Two Sweepers @ Rs. 17½-22½	1,150
9. One Clerk (80-120)	} } }
10. One Steno typist (50-90)	
11. One Clerk (50-90)	
Pay—Rs. 75,000	74,690

Other Expenses

Tours and Miscellaneous	Rs. 15,000
Maintenance	Rs. 8,000
Office Contingencies	Rs. 5,000

Total : Rs. 28,000

Total : Rs. 1,02,690

Non-recurring

Buildings	Rs. 2,00,000
Equipment	Rs. 3,50,000
Staff Quarters	Rs. 2,30,000

Total : Rs. 7,80,000

(b) Introduction of Degree Course in Metallurgy at the Bihar Institute of Technology Sinari

D. O. letter No. 1773/D5(4)-03/59 dated 19-3-1959 to Prof. M. S. Thacker, Secretary, Ministry of Scientific Research and Cultural Affairs, explaining the full position is reproduced below :—

"I am desired to invite a reference to item No. 26 of the agenda papers of the 27th meeting of the Coordinating Committee of the All India Council for Technical Education held at New Delhi on the 18th October, 1958.

It appears that the Committee has recommended that the degree course in Metallurgical Engineering started at the Bihar Institute of Technology, Sindri, should be shifted to the proposed Engineering College at Jamshedpur. This recommendation is apparently based on a misunderstanding that the State Government had gone ahead with this scheme without obtaining prior sanction of the Government of India. Unfortunately we had not received the agenda papers in time for the meeting of the Co-ordinating Committee with the result that the representative of the State Government who attended this meeting was not fully briefed on this subject. Consequently the actual position in this regard could not be fully explained to the members of the Committee. I am giving below a brief description of the circumstances under which this degree course was started at the Bihar Institute of Technology, Sindri.

At a meeting with the Chief Minister of Bihar in May, 1955, Shri Jehangir Ghandy, Chairman of the Eastern Regional Committee impressed upon the Chief Minister the necessity of starting a degree course in Metallurgical Engineering at the Bihar Institute of Technology, Sindri. The State Government accepted his advice and an *ad hoc* Committee of the following experts was appointed to advise the State Government on the proposal for introduction of this course at the Bihar Institute of Technology, Sindri :—

1. Dr. D. Swaroon, Principal, College of Mining and Metallurgy, Banaras Hindu University.
2. Dr. U. V. Bhatt, Banaras Hindu University.
3. Dr. Vishwanathan, TISCO, Jamshedpur.
4. Dr. J. P. Chaudhury, Head of the Department of Mechanical Engineering, Bihar Institute of Technology, Sindri.
5. Mr. N. Briggs, Superintendent, Bhowra Coke Plant.
6. Dr. Bucknall, Director, Metallurgical Laboratory, Jamshedpur.

On the advice of this Expert Committee, a scheme was prepared and submitted on the 19th July, 1955 to the State Government. This scheme was approved by the State Government and admissions to the degree course in Metallurgical Engineering were taken at the Bihar Institute of Technology, Sindri, in August, 1955. The State Government sent copies of the scheme to the Ministry of Education for their approval and for grant of necessary financial assistance. After many reminders, a reply was sent by the Ministry saying that the matter was receiving their attention. The Ministry was fully aware of the introduction of this degree course at the Bihar Institute of Technology, and at no time the State Government were

told that the Ministry would not give financial assistance for this scheme. The scheme was included in our Second Five-Year Plan for Technical Education and approved by the various working groups from year to year. The Ministry of Education were represented on these Working Groups. In all the periodical survey reports submitted by the Director, Bihar Institute of Technology, Sindri, to the Ministry it has been stated that the degree course in Metallurgical Engineering had been conducted at this Institute.

The State Government are already committed to an expenditure of about Rs. 19.94 lakhs on this scheme, out of which about Rs. 12.07 lakhs are for buildings. If it is decided at this stage to shift the course to Jamshedpur Engineering College, the expenditure already incurred on buildings for the Metallurgical course would become infructuous.

Though the Metallurgical course was started in August, 1955 the Coordinating Committee did not approve of it till 1958. The question of introducing Metallurgical course on an all-India basis was taken up by the Ministry at a much later date, and an Expert Committee was appointed for this purpose. The report of this Committee was published only recently after nearly three years.

I may also mention that a Visiting Committee was appointed by the Eastern Regional Committee to examine this scheme. The Committee visited Sindri on the 25th August, 1955 and the Chairman of the Eastern Regional Committee communicated the approval of the Eastern Regional Committee to the Coordinating Committee. It will be seen that the course was started by the State Government at the most opportune time under the advice of the Chairman of the Eastern Regional Committee. Our only mistake seems to be that we did not wait for three years until the scheme was formally approved by the Coordinating Committee. We understand that the report of the Visiting Committee was placed before the Coordinating Committee even before the report of the Expert Committee on Metallurgical Engineering.

In view of the large-scale of expansion of steel production taking place in the country there is scope for metallurgical courses to be run both at Sindri and Jamshedpur. Even considering the requirement of Bihar, we have at present one large Steel Plant and a big Foundry at Jamshedpur. Burnpur is only 50 miles from Sindri. There will be another Steel Plant at Bokaro and a big Foundry-Forge Plant at Ranchi. They will all require metallurgists. The intake at Sindri is only 30, while the proposed intake at Jamshedpur is 40 per year. The field of Metallurgical Engineering provides excellent opportunities for employment.

I hope that I have explained the circumstances in which the metallurgical course was started at Sindri in anticipation of formal sanction of the Government of India. There was no question of the State Government going ahead in order to precipitate a decision in their favour. The Government of India were kept informed at every stage of the progress of this scheme. I am, therefore, to request you kindly to put up this matter again before the next meeting of the Coordinating Committee for their reconsideration and approval of the continuance of this course at the Bihar Institute of Technology, Sindri.

(c) *Grant of additional financial assistance to Engineering Colleges as a result of the introduction of five-year integrated course in Engineering*

With the abolition of I.Sc. course, the Degree course in Engineering is going to become one of five years' duration.

If the existing intake to the engineering colleges in the State is maintained, then the strength of the staff and other items like hostels, class rooms, laboratories and workshop space etc. will have to be correspondingly increased by at least 25%. Some additional laboratory and workshop equipment also will have to be provided. This will involve heavy expenditure, and for Bihar State alone come to about Rs. 50 lakhs non-recurring and Rs. 12 lakhs recurring. Unless the Government of India give necessary aid to the State Government it would be indeed very difficult for the latter to maintain the existing intake.

This is an all-India problem and the matter must be under consideration of the Government.

(d) *Grant of assistance for building Staff quarters*

The Government of India are not giving any assistance for building staff quarters in the various engineering colleges and schools either in the form of loans or in the form of grant.

A rough calculation, even if quarters are provided for 25% of the staff for institutions like M.I.T. and engineering schools and 100 per cent for an Institution like Bihar institute of Technology, Sindri—where no private quarters of any sort are available on rent—the financial implications would be as follows :—

(i) Muzaffarpur Institute of Technology, Muzaffarpur	5 lakhs
(ii) Engineering Schools	15 lakhs
(iii) Bihar Institute of Technology (including the quarters already constructed worth about Rs. 2½ lakhs)	60 lakhs
Total :	Rs. 80 lakhs

For this, the enormous magnitude of the problem of providing quarters even on a minimum scale could be seen.

The Government of India must provide some aid either in the form of grant or loan for this purpose.

(e) Issue of import licences

The restriction on import and difficulty in getting import licence is quite well known. Large amounts of money remain un-utilised because the import licences are not received. Some time the Ministry advise to get the equipment from established importers. Invariably this is not possible. Actual users' licence must be provided expeditiously and a more simplified machinery is desirable.

ANNEXURE I

Item No. 11 (ii)

Extracts from the Report of the Second Deshmukh Committee

The Committee is of the opinion that the vital part of the proposed scheme is that it should offer integrated courses of study over a period of three years. In order to find out the nature and scope of the proposed integrated course, two sub-committees were appointed, one for arts and the other for science. The Science Sub-Committee was also asked on a reference from the Central Advisory Board of Education to examine the question in respect of pre-professional courses, *i.e.* pre-medical and pre-engineering courses, which are at present conducted by the basic colleges and which should, as recommended by the Secondary Education Commission and already accepted by the All India Council for Technical Education at their last meeting held in March, 1958, be the concern of the professional colleges themselves in accordance with their special requirements. The findings of the two sub-committees will be seen in their reports at Appendices II & III.

ANNEXURE II

Item No. 11 (ii)

Extracts from the Report of the Science Sub-Committee of the Second Deshmukh Committee

The Committee spent considerable time in discussing the place of Pre-Engineering and Pre-Medical courses in the scheme of three-year degree course. In this connection the committee noted that the First Deshmukh Committee had made the following recommendations :—

“The Committee is also of the opinion that admission of students to Pre-Professional courses should be regulated so that only those students are admitted to these courses who will ultimately be able to find seats in professional colleges. For this purpose, it is necessary that professional colleges should select candidates on the basis of Higher Secondary/Pre-University Examination results. The Establishment of junior colleges, which might provide centralised Pre-Professional courses or instructions in some only of the professional colleges, as is done by the Madras University, is another possibility. This would also obviate the necessity of Intermediate

colleges continuing to provide Inter Science courses for selection to professional colleges.”

Later this question was discussed by the Joint Committee of the All India Council for Technical Education and the Inter-University Board and it was decided to recommend that admission to the Engineering Courses should take place directly after the Secondary Examination so that the Pre-Professional course should form a part of the Engineering Course. This would enable the Engineering Colleges to reorientate their courses so as to have a five-year course in Engineering in place of the present four-year course. Similar views are reported to be held by the Medical authorities regarding the Pre-Medical Course.

The question of the desirability or otherwise of the continuance of I.Sc. course also received attention at the 25th meeting of the Central Board of Education held on 6th and 7th February 1958. The consensus of opinion amongst the members of the Board appears to be that the pre-professional courses should be integrated with the courses in professional institutions. The Committee has, however, taken note of the various points of view expressed for and against the integration of the pre-professional courses with the professional courses.

In view of the committee, the arguments in favour of the integration of Pre-professional courses with the professional studies far outweigh those cited against it. The Committee is of the definite view that the old conception of the I.Sc. serving as the entrance qualification, to the professional colleges should hold no more. The Higher Secondary Examination or the Pre-university examination should be taken as a natural ‘bifurcation stage’ in the educational ladder. At this stage, the students should decide which profession they wish to follow. The committee is not in favour of a large number of students joining the B.Sc. classes with the hope that after a year of the course, they would be able to join professional institutions. This means a large wastage of seats which could otherwise be offered to those students who would have stayed on to complete the three-year degree course. Further, the students who have completed the first year of the B.Sc. course do not stand to gain much academically, because in the first year of the three-year degree course relatively minor subjects are done. It only means that a student has put in one extra year in the college, but how far this course can help in the professional education, is very uncertain. The Committee is of the view that when the Intermediate examination is abolished, it will be artificial to adopt the first year of the B.Sc. course as equivalent to the Intermediate which actually it is not. In one way, the Intermediate Examination was better as it followed an integrated course of two years. However, in the

present set up, Intermediate Examination does not fit in because those candidates who pass the Intermediate and are not taken in the professional course will join the second year class of the B.A., B.Sc. course and thus will not have the advantage of a full three-year integrated course. In the new scheme of the three-year degree course, therefore, it is obvious that neither the Intermediate examination nor the Ist Year B.Sc. examination can be a qualification for admission to the professional colleges. The natural stage at which students should be diverted to the professional colleges should be the Higher Secondary level or the Pre-university course.

The Committee has given careful thought to the question of adding one more year to the professional courses. The Committee, is of the view that it should not merely be an addition of one year, but it should be integrated with the professional course. For example, in the case of Engineering, the study of Chemistry, Physics and Mathematics should not end at the end of the first year, but should continue for a longer period. Similar scheme would apply also to medical studies. Some of the allied subjects in the professional course could also be started in the first year, thus admitting the students in the professional course at an earlier stage. The extended integrated course in the professional college will certainly give a better training, more confidence to the candidate and better opportunities to the teacher for longer contact with his students. The only difficulty, which the committee visualises, will be the finding of additional staff for the professional colleges and also providing more funds for extra buildings and equipment. The Committee is in favour of this extra expenditure for the special reason that the Engineering and Medical Colleges do need specialists like Chemists, Physicists, Mathematicians etc. In an Engineering College, departments of Chemistry and Physics are as important as the departments of Biology and Bio-Chemistry in Medical Colleges. In the case of a Medical College, a Chemist plays an important part in broadening the boundaries of knowledge especially in the field of medicine. He can help the advancement of knowledge in the broader fields of Bio-Chemistry and Nutrition. Similarly a Physicist plays no less an important part in an engineering course. The committee emphatically recommends that every encouragement should be given to the professional colleges to have full-fledged departments of Applied Mathematics, Applied Chemistry, Applied Physics, as well as Geophysics in Engineering Institutions.

ANNEXURE III

Item No. 11 (ii)

Statement Showing the up-to-date position regarding Introduction of three-year degree course in all the Indian Universities

A. UNIVERSITIES WHICH HAD THE THREE-YEAR DEGREE COURSE BEFORE THE FRAMING OF THE PRESENT SCHEME

Name of the University	Year of introducing the Three-Year Degree Course
Delhi	1943-44
Jadavpur	1956-57

B. Universities which have Introduced the three-year degree course by 1958-59

Sagar	1956-57
Baroda	1957-58
Karnatak	1957-58
Kerala	1957-58
Madras	1957-58
Marathwada	1957-58
Osmania	1957-58
Viswa Bharati	1957-58
Andhra	1958-59
Annamalai	1958-59
Aligarh	1958-59
Mysore	1958-59
Nagpur	1958-59
Poona	1958-59
Rajasthan	1958-59
Sardar Vallabhabhai Vidyapeeth	1958-59
Sri Venkateswara	1958-59
Vikram	1958-59

C. Universities which have decided to Introduce the three-year degree course from a definite year

Bihar	1959-60
Jabalpur	1959-60
Patna	1959-60
S.N.D.T. Women's	1959-60
Utkal	1960-61
Calcutta	1960-61
Banaras	1961-62
Panjab	1961-62
Gauhati	1962-63

D. Universities which have agreed in Principle to Introduce the three-year degree course but have not yet decided the year of Introduction

Agra
Allahabad
Gujrat
Jammu & Kashmir
Kurukshetra
Lucknow

E. Other Universities

Bombay	It has rejected the scheme on academic grounds.
Gorakhpur	It is still considering the scheme.
Roorkee	It is an Engineering University and the scheme is not applicable to it.

ANNEXURE IV

Item No. 11 (v)

Statement showing the recurring contingencies expenditure on the training on one student per annum

	Expenditure on training of a student per annum	
	Existing expenditure in Diploma Institute in the Industrial Department Institutes in U P.	Break up of expenditure based on Rs. 100/- originally approved by Govt. of India
	Rs.	Rs.
Purchase of Tools and apparatus	12/-	6/-
Raw Materials	42/-	35/-
Workshop Contingencies	15/-	8/-
Repair and Replacement of Tools	10/-	10/-
Repairs and Replacement of Furniture	6/-	6/-
Class Room Contingencies	15/-	5/-
Cost of Fuel, Oil and Electricity	25/-	20/-
Cost of Medicine	3/-	2/-
Hostel Contingencies	10/-	8/-
Total	138/-	100/-

ANNEXURE I

*Item No. 11 (vii)***Items of recurring expenditure not included as admissible items
by the Government of India***Establishment charges*

- (a) Visiting Lecturers' Fees, if any
- (b) External Examiners' Fees
- (c) Travelling Allowances

Laboratories & Workshop

Repairs of equipment

Motor Vehicles

- (i) Maintenance charges
- (ii) Licence fees
- (iii) Sundry Automobile stores

Buildings & Grounds

- (i) Repairs
- (ii) Maintenance

Office Expenditure

- (i) Postage and Telegrams
- (ii) Telephones
- (iii) Stationery and Printing
- (iv) Advertising expenses
- (v) Miscellaneous office expenditure
 - Sundry stores
 - Electric charges
 - Reading Room expenses
 - Miscellaneous contingencies

ANNEXURE II

Item No. 11 (vii)

Government of India

Ministry of Scientific Research & Cultural Affairs

New Delhi-2, the 12th February, 1959.

Dear Shri Advani,

Kindly refer to your D.O. letter No. RMI/58/466, dated the 5th February, 1959, to Shri M.V.D. Nair, regarding list of permissible items of recurring expenditure.

As desired a copy of the said list is enclosed.

With regards,

Yours sincerely,
Sd/- S. Subramaniah.

Prof. R.M. Advani,
Professor of Civil Engineering,
M.B.M. Engineering College,
Jodhpur.

List of admissible items of recurring expenditure

Establishment Charges

- (i) Salaries, Allowances and wages of staff
- (ii) Visiting Lecturers' Fees, if any
- (iii) External Examiners' Fees
- (iv) Travelling allowances

Laboratories & Workshops

- (i) Maintenance charges
- (ii) Repairs of equipment

Motor Vehicles

- (i) Maintenance charges
- (ii) Licence fees
- (iii) Sundry Automobile stores

Buildings & Grounds

- (i) Repairs
- (ii) Maintenance

Office expenditure

- (i) Postage & Telegrams
- (ii) Telephones
- (iii) Stationery and Printing
- (iv) Advertising expenses
- (v) Miscellaneous office expenditure
- (vi) Audit fees
 - Sundry stores
 - Electric charges
 - Provident fund
 - Insurance expenses on institute buildings and other property
 - etc.
 - Reading Room expenses
 - Miscellaneous contingencies

Item No. 12—To consider the recommendation of the Expert Committee regarding Condensed Overseer Courses

An Inter-Departmental meeting was held recently of the Ministries of Community Development, Home Affairs and the Scientific Research & Cultural Affairs and the Planning Commission, to consider the question of reorganisation of Diploma Course in Civil Engineering so as to provide for a two-year condensed course with I.Sc. as admission qualification. On the recommendations made at the meeting the Chairman of the All India Council for Technical Education set up an Expert Committee with the following personnel and terms of reference :—

Members of the Expert Committee

Shri J.M. Rijhwani, Chief Engineer C.P.W.D., New Delhi.	Chairman
Shri V.G. Garde, Principal, M.B.M. College of Engineering, Jodhpur.	Member
Shri V.H. Acharya, Principal, G.S. Technical Institute, Indore.	„
Shri V.V.L. Rao, Principal, Engineering College, Kakinanda.	„
Chief Engineer, P.W.D., Government of Bihar.	„
Shri M.V.D. Nair, Assistant Educational Adviser (Tech), Ministry of Scientific Research & Cultural Affairs, New Delhi.	Secretary

Terms of reference

- (i) To examine the question whether the organisation of condensed courses of two years' duration for Diploma in Engineering for students who have passed I. Sc. examination is desirable and feasible having regard to the standards laid down by the All India Council for Technical Education ;
- (ii) whether such courses, if found feasible and desirable, should be adopted as the general pattern for the training of Overseers or whether the pattern should remain as it is at present, namely, three years' duration with Matriculation as the admission qualification and that the door be left open for the admission of I.Sc. passed student to the 2nd year of the normal three-year course.

The Expert Committee held its first meeting on the 27th February, 1959 and thereafter visited certain institutions in Bihar which were conducting two-year courses as also some of the projects in Bihar where technical personnel so trained had been employed. A copy of the report of the Committee is given at Annexure-I. The main recommendations of the Committee are as follows :—

- (i) The general pattern for the training of Overseers should remain the same as at present *viz.* three years with Matriculation as the admission qualification.
- (ii) It is not necessary to organise condensed courses of two years' duration for students who have passed I.Sc. in view of the large scale expansion that has taken place in respect of training facilities in the subject. However, if at any time in future a shortage is felt in a State or for a particular Project, the course may be organised for Intermediates provided the total amount of instructional work done in the course is not less than the equivalent of 2,850 hours.
- (iii) The admission of the I.Sc's. to the second year of the normal three years' course is impracticable and should not be countenanced in any circumstances.

ANNEXURE I

(Item No. 12)

Report of the Committee set up by the All India Council for Technical Education to examine the question of duration of the Diploma course in Civil Engineering for students who have passed the Intermediate Examination in Science with Physics, Chemistry and Mathematics.

The first meeting of the Committee was held at New Delhi at 3 p.m. on the 27th February, 1959, in Room No. 85, 'M' Block. The following were present :—

- | | |
|--|------------|
| 1. Shri J. M. Rijhwani, Chief Engineer, C.P.W.D. | (Chairman) |
| 2. Shri V. G. Garde, Principal, M.B.M. College of Engineering, Jodhpur. | Member |
| 3. Shri V. H. Acharya, Principal, Govindram Sakseria Technological Institute, Indore. | Member |
| 4. Shri V. V. L. Rao, Principal, Engineering College, Kakinada. | Member |
| 5. Shri M. V. D. Nair, Assistant Educational Adviser (Technical), Ministry of Scientific Research & Cultural Affairs, New Delhi. | Secretary |

Shri R. Prasad, Director, Manpower Directorate, Ministry of Home Affairs, Shri G. K. Chandiramani, Joint Educational Adviser (Technical), Ministry of Scientific Research and Cultural Affairs and Shri L. S. Chandrakant, Deputy Educational Adviser (Technical), Ministry of Scientific Research and Cultural Affairs attended by special invitation.

The Committee discussed in great detail its terms of reference viz.,

- (i) To examine the question whether the organisation of condensed courses of two years' duration for diploma in Civil Engineering for students who have passed the Intermediate Science Examination is desirable and feasible having regard to the standards laid down by the All India Council for Technical Education.
- (ii) Whether such courses, if found feasible and desirable, should be adopted as the general pattern for the training of overseers or whether the pattern should remain as it is at present, namely, three years' duration with Matriculation as the admission qualification and that the door be left open for the admission of Intermediate Science passed students to the 2nd year of the normal three-year course.

After a general discussion on the subject the Committee considered the various points having a bearing on the terms of references. These were :—

- (i) Availability of Civil overseers in the country at present, during the remaining period of the Second Plan and the Third Plan period.
- (ii) The changing pattern of Secondary Education and the position regarding the continuance of the Intermediate stage of University education.
- (iii) Content of the I.Sc. course in Mathematics, Physics and Chemistry vis-a-vis that of the National Certificate course in Civil Engineering.
- (iv) The number of weeks in a year that education can be imparted to students in technical institutions and the number of hours per week.
- (v) Receptivity of an Intermediate of the age group of 18-19 and a Matriculate in the age group 16-17.

Availability of Civil Engineering Personnel

The Secretary placed before the Committee a comparative statement showing the intake into the Civil Engineering courses in the country from the last year of the first Plan and thereafter till 1959. The statement which may be seen at Appendix-I gives also an indication of the anticipated intake at the end of the Second Plan.

The view of the Manpower Directorate regarding the adequacy of Civil Overseers at present and during the remaining years of the Second Plan and also for the Third Plan projects was elucidated by Shri R. Prasad. According to the information available to the Directorate from returns received from employment Exchanges and employing agencies, there is no serious dearth of Civil overseers at present. On the assumption that the Third Plan may be of the order of Rs. 9,900 crores as suggested by the Perspective Planning Division of the Planning Commission we did not anticipate a shortage of overseers for the country as a whole. In a State-wide analysis the view held was there might be some pockets where difficulties may arise in the 2nd and 3rd years of the Third Plan. As this type of personnel usually sought employment in their home towns, districts or States, and as further sudden and excessive requirements may have to be met due to an undertaking of a major project, the need may arise for special action.

Change of pattern of Secondary and University Education

The present position is that the Southern States of Andhra, Kerala,

Madras, Mysore and Rajasthan have changed over to the higher secondary pattern. Some of the other States have accepted the change-over in principle and both systems are current. A few States are unable to accept the new pattern due to financial stringency. It is understood that the Intermediate stage of education may exist side by side with Higher Secondary system for about 15 years.

Content of the I.Sc. Course etc.

An examination of the syllabus prescribed for the Physics, Chemistry and Mathematics courses of the National Certificate in Civil Engineering showed that the bias is towards the applied side of the subjects. In the Intermediate syllabus the stress is on the pure side.

An Intermediate passed student undergoing the National Certificate course in Civil Engineering will need only instruction for a few hours to re-orient his knowledge to the pattern required for the National Certificate course.

Working Weeks and Hours

The unanimous view regarding working hours per week was that 36 hours as prescribed by the Council is about the maximum that a student can be called upon to undergo. In regard to working weeks in a year the present figure of 32 was held inadequate by most of the members. On an examination of what should be the number of working days in a year it was found that 34 weeks per year is easily possible but the figure can be raised to 36 weeks. It is elucidated below :—

Number of days in a year	365
Less (number of Sundays)	52
Number of days for summer vacation, Puja holidays and Christmas holidays (13 weeks less Sundays)	78
Public holidays	20
	<hr/>
	150
	<hr/>

Number of days therefore possible $365 - 150 = 215$ or 36 weeks.

Receptivity and adaptability

The three principals serving on the Committee held the considered view that a first class Matriculate is far better than a second or third division Intermediate even with the factors such as better knowledge of English, better understanding capacity due to being in the higher age group are taken into consideration.

Another point which emerged from the discussion on this topic was that vocational training should start as early as possible and that the

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|----|-----------------------|--|
| 2. | Mr. Das Gupta | Personal Assistant (Technical) to the Chief Engineer |
| 3. | Mr. Sinha | Executive Engineer |
| 4. | Mr. A. Parsad | Additional Director of Industries |
| 5. | Mr. B.R. Gaurishanker | Deputy Director of Industries |

The overseers' course for I.Sc. was organised by the Bihar Government on the basis of instruction for 37 weeks in a year and weekly instruction in the first year being 38 hours and in the second year 39 hours. In each of these years, 24 days were devoted to survey field work. A comparative statement of the number of hours spent by the I.Sc. students for the various subjects and the number of hours prescribed for the National Certificate courses may be seen at Appendix II. The following points emerged out of the discussions :—

- (i) Only students who are unable to get admission in an Engineering College applied for this overseers' training and in general they were second class and third class students.
- (ii) First Class Matriculates were found much better material for training as overseers.
- (iii) The Superintending Engineers gave their view that these Intermediates in Science generally had better supervising capacity and were comparable in the matter of preparation of estimates with an average overseer who has passed out of a course of three years but they were definitely inferior in survey work and capacity to read drawings. The Committee interviewed five overseers working in or near Patna who had undergone training in a condensed course organised by Bihar Government with a view to finding out their capacity to read drawings, and their general understanding of technical subjects. Their performance more or less corroborated the statements made by the Superintending Engineers in as much as their sketches were below par and the replies to technical questions other than the most routine ones would not at all suggest that they were better than the matriculates trained under the three-year course. The representatives of the Bihar Government, though they agreed with the view that the three-year pattern is more suitable for the training of overseers, desired that the State Government should be permitted to have recourse to this short-term training programme should an emergency arise in future.

The Committee thereafter examined the National Certificate course

curricula with a view to finding out whether any reduction in the number of hours prescribed for each subject could be effected for students who have passed Intermediate in Science with Physics, Chemistry and Mathematics. A comparative statement showing the number of hours in the National Certificate course and the number of hours deemed necessary by the Committee for Intermediates in Science may be seen at Appendix II. It will be observed that as against 3456 working hours prescribed for the National Certificate course the Committee considers 2862 hours adequate for Intermediates in Science the reduction being 432 hours in the first year as no instruction need be imparted in Physics, Chemistry and Mathematics. The further reduction proposed in the first year is in Mechanics as on a study of the syllabus it was observed that a fair portion of the subject is covered in the I.Sc. Physics Syllabus. The reductions proposed in the second and third years are 102 hours and 72 hours. Excepting for 48 hours deleted from the curriculum in the third year which is intended to impart instruction in the overseers' duties and accounts the other deduction proposed is due to the better understanding capacity of the descriptive part of the subjects taught in the course as these students have a better knowledge of English.

On an examination of the working hours of an institution conducting a three-year course for Matriculates it is found that it will not be possible for the institution to conduct a two-year course also without duplicating the staff and substantially increasing buildings and equipment. In the circumstances the Committee came to the conclusion that if at any time it becomes necessary to organise such a course it should not be organised in the same institution as a three-year course. The final examination should be common for two-year course and three-year course if an occasion arises to organise two-year course for Intermediate in Science.

From a perusal of the curriculum of studies prescribed by some of the State Boards of Technical Education it is observed that though the All India Council for Technical Education has prescribed a model syllabus for the National Certificate Course there are alarming variations in the syllabus followed by certain State Boards of Technical Education and it would be in the national interest to examine this problem and persuade the States concerned to conform to the pattern laid down by the All India Council for Technical Education.

The following are the recommendations of the Committee :—

- (i) The general pattern for the training of overseers should remain as at present viz., three years' duration with Matriculation as the admission qualification.

- (ii) It is not necessary to organise condensed courses of two years' duration for overseers' course for students who have passed the Intermediate in Science in view of the large scale expansion of training facilities in the subject but in special circumstances if at any time in future a shortage is felt in a part of the State or for a particular Project the course may be organised for Intermediates provided the total number of instructional hours is not less than 2,850 and provided it is organised as an independent course and the final examinations are common to both this type of trainees and the trainees belonging to a three-year course.
- (iii) The admission of Intermediates in Science passed students to the second year of the normal three-year course is impracticable and should not be countenanced in any circumstances.

APPENDIX I

ANNEXURE I

*(Item No. 12)***Statement showing intake to Civil Engineering Courses at Diploma level**

Year	Intake
1955	3871
1956	5388
1957	8136
1958	9469
By the end of the Second Plan period	12,000 (approx.)

APPENDIX II

ANNEXURE I

Item No. 12

Comparative Statement showing number of hours in various subjects in the National Certificate Course, number of hours in the Condensed Course conducted by the Government of Bihar and number of hours considered essential if at a future date a course of Civil Diploma holders has to be organised

Subject	3 year National Certificate Course No. of Hours	2 year course by the Govern- ment of Bihar No. of Hours	2 year course by the Expert Committee No. of Hours
(1)	(2)	(3)	(4)
1. Mathematics	120	—	—
2. General Sciences	216	—	—
3. Mechanics	408	370	360
4. Drawing	624	492	624
5. Language	96	—	—
6. Workshops	624	185	576
7. Hydraulics	72	62	72
8. Mechanical Engineering	48	31	48
9. Electrical Engineering	48	31	48
10. Civil Engineering	48	—	48
11. Surveying	144 (Theory) 408 (Practical)	154 288	96 408
12. Engineering Materials	72	—	66
13. Labour Relations	24	—	24
14. Details of construction	48	277*	48
15. Estimating & Costing	120	308	120
16. Public Health & Drainage	72	—	72
17. Roads, Railways and Bridges	72	246*	72
18. Overseers' Duties	48	—	48
19. Erection of small construc- tional Plant and machinery	144	—	120
Total :	3456	2444	2850

* Includes Engineering materials.

Item No. 13—To report the progress of technical education Schemes under the Second Five-Year Plan.

A. State Government Plans

It was reported to the All India Council at the meeting held on 24th March, 1958 that the Second Five-Year Plans of State Governments had included the establishment of eight new engineering colleges and 36 polytechnics during the plan period. The plans have since been revised in respect of polytechnics as shown below :

- (a) The Governments of Andhra Pradesh, West Bengal and Bihar have each included one additional polytechnic in their respective plans. The State Government of Uttar Pradesh has also included provision for five more polytechnics of which four have started functioning at different centres in the State.
- (b) The Government of Orissa has included the Bhadrak Polytechnic in the plan.
- (c) The Centrally-administered area of Himachal Pradesh has provided for one polytechnic to be established either at Simla or at Kasauli.
- (d) The Government of Bombay had included originally in the plan six polytechnics at Sholapur, Aurangabad, Karad, Amravati, Dohad and Nasik. Polytechnics at the first four centres have started functioning. The State Government has decided to establish either the Dohad Polytechnic or the Nasik Polytechnic and not both, by the end of the plan period.

With the above changes the number of polytechnics provided for in the revised plans of the States is 45. The number of colleges remains unaltered. The State-wise distribution of the institutions and the position regarding the allocation etc. are given in the statement at Annexure I.

The scheme of Junior Technical Schools has been finalised and sent to the State Governments. The State Governments have revised their plans and have now provided for 66 schools. The State-wise distribution of the schools is indicated in the statement at Annexure I. The Central Government have agreed to give 60% of the non-recurring and 60% of the recurring expenditure up to the end of the current plan period as grant-in-aid to the schools.

Seven Colleges and 34 polytechnics have started functioning as indicated in the statement at Annexure I.

During 1958-59, the Central Government have given Rs. 75.87 lacs to State Governments as grant-in-aid for various schemes of Technical

Education. A provision of Rs. 108 lacs has been made in the budget estimates for 1959-60 for the same purpose.

The Working Group discussions on State plan budget for 1959-60 were held in December-January last. The revised plan outlay on technical education schemes and plan budget 1959-60 as recommended by the Working Group are given in the statement at Annexure II. The allocation agreed to by the Planning Commission tentatively is also given in the same statement.

B. Central Government Plans

(a) Higher Technological Institutes

(i) Western Higher Technological Institute

The Indian Institute of Technology, Bombay started its first academic session in July, 1958 when 100 students were admitted to the following undergraduate courses :—

- (i) Chemical Engineering
- (ii) Mechanical Engineering
- (iii) Electrical Engineering
- (iv) Civil Engineering
- (v) Metallurgy.

Post-graduate courses in Industrial Electronics and Electro-vacuum Technology have also been organised and 13 students have been admitted to them. Six research students are working at the institute—three in Chemical Engineering, one in Physical Chemistry and two in Electro-Chemistry.

The Institute proposes to admit 195 students to under-graduate courses, 45 to the post-graduate courses and 25 for research work during 1959-60.

Brigadier S. K. Bose has been appointed as the Director of the Institute.

The foundation-stone of the main building of the Institute was laid by the Prime Minister on the 10th March, 1959. The workshops, storage-cum-teaching accommodation and students' hostels which are under construction at Powai, are expected to be ready by June, 1959. It is proposed to shift the Institute to Powai before the next academic session.

Equipment worth Rs. 32.20 lakhs has been received from the U.S.S.R. up to the end of January, 1959. Fifteen Unesco experts are working at the Institute at present. A batch of four teachers was sent for training to U. S. S. R. in October, 1958. It is proposed to select another batch of six teachers and send them for training to the U. S. S. R. during 1959.

A bilateral agreement has been concluded between the Government of India and the Government of the U. S. S. R. under which the latter will provide direct assistance to the Institute in addition to the assistance promised under the Unesco programme. The direct assistance consists *inter alia* of equipment worth Rs. 36 lacs. The assistance promised under the Unesco programme consists of equipment worth Rs. 120 lacs.

(ii) *Southern Higher Technological Institute*

The Indian Institute of Technology, Madras, has been registered as a Society under the Societies Registration Act. A Board of Governors under the chairmanship of Dr. A.L. Mudaliar has been set up. It has been decided that the Institute should start the first academic session in July, 1959 with about 100 students admitted to the following first degree courses. The courses will be five-year integrated courses as recommended by the All India Council for Technical Education with H.S.S.C. or equivalent as the minimum admission qualifications. Candidates who have passed Intermediate in Science or possess higher qualifications are also eligible but no preference will be given to them, nor exemption from any part of the course.

Civil Engineering
 Mechanical Engineering
 Electrical Engineering
 Chemical Engineering
 Metallurgy

Pending the construction of the Institute buildings at Guindy, the courses will be conducted at certain neighbouring institutions viz., College of Engineering, Guindy, A.C. College of Technology and the Central Leather Research Institute where the necessary facilities are being organised.

According to the agreement concluded between India and West Germany, the latter will provide the following assistance in the establishment of the Institute :

(a) Equipment & Library	Rs. 170 lacs (Approx.)
(b) Expert Professors	20
Technicians	4
(c) Facilities for the training of Indian teachers in West Germany	For 20 persons.

The first batch of three German professors and two technicians are expected to come to India in April 1959. The entire workshop equipment and half the library promised by West Germany are also expected to be received in the course of April, 1959.

Arrangements are in progress for the recruitment of staff for the Institute.

(iii) *The Northern Higher Technological Institute*

In order to expedite the establishment of the Northern Higher Technological Institute at Kanpur, a Planning Committee has been set up under the chairmanship of Lala Shri Ram to prepare the detailed plans, estimates and courses of study for the Institute. A site of about 1200 acres near the Kalyanpur Railway station has been selected. Steps have been taken by the Government of Uttar Pradesh to acquire about 500 acres of the site for the first phase of the Institute. Assistance has been sought from the U.S.A. in the establishment of the Institute. A U.S. survey team consisting of the following experts visited India recently.

Dr. Stirton, University of Michigan	(Leader)
Dean N. W. Dougherty, University of Tennessee	
Professor D.G. Carter, University of Illinois	
Professor W.C. Huntington, University of Illinois	
Professor R.W. Sorensen, California Institute of Technology.	
Professor John C. Georgian, Washington University	
Mr. Leslie Mayberry	(Secretary)

The Survey team has submitted a preliminary report regarding the academic and organisational aspects of the Institute. A further report regarding buildings, equipment, staff etc. is being prepared by the team.

(a) **Indian Institute of Technology, Kharagpur**

The Institute offers the following courses leading to Bachelor of Technology (B. Tech), Bachelor of Architecture (B. Arch) and Bachelor of Science (B. Sc.) and M. Tech. Degree.

B. (Tech)	<i>Intake capacity</i>
(i) Agricultural Engineering	30
(ii) Chemical Engineering	15
(iii) Civil Engineering	100
(iv) Electrical Engineering (Power)	75

(v)	Metallurgical Engineering	25
(vi)	Mechanical Engineering	75
(vii)	Mining Engineering	25
(viii)	Naval Architecture & Marine Engineering	12

B. Arch

(ix)	Architecture	30
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B. Sc.

(x)	Geology & Geophysics	20
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M. Tech. (Normal intake capacity 8)

1. Applied Botany
2. Farm Power and Machinery
3. Soil and Water Conservation Engineering
4. Technical Gas Reaction & High Pressure Technology
5. Synthetic Drugs and Fine Chemicals
6. High Polymer and Rubber Technology
7. Regional Planning (Degree)
8. Regional Planning (Diploma)
9. Combustion Engineering and Fuel Economy
10. Chemical Plant Design and Fabrication
11. Harbour Engineering
12. Highway Engineering
13. Municipal Engineering
14. Soil Mechanics and Foundation Engineering
15. Structural Engineering
16. Dam Construction and Water Power Engineering
17. Electrical Machine Design
18. Control System Engineering
19. Industrial Electronics
20. Radio Broadcast Engineering
21. Ultra High Frequency and Microwave Engineering
22. Applied Geology
23. Exploration Geophysics
24. Geochemistry
25. Non-Linear Mechanics
26. Foundry Engineering
27. Industrial Engineering
28. Machine Design
29. Mechanical Handling

30. Production Technology
31. Refrigeration and Air-Conditioning Plant
32. Turbo-Machinery/Design of Internal Combustion Engine
33. Mechanisms and Vibration
34. Ferrous Metallurgy
35. Industrial Physics
36. Meteorology
37. Industrial Psychology and Industrial Relations (Diploma)

At present there are 1446 under-graduate students and 175 Post-graduate students in the Institute. The Institute have so far trained the following technical personnel :

Graduates	944
Post-Graduates	242
Trade Apprentices	30
Research Workers	207
Post-Doctorate Fellows	7

A provision for Rs. 300 lakhs has been made for the development of the Institute in the current Plan Period.

In accordance with sub-section 2 of Section 9 of the Indian Institute of Technology (Kharagpur) Act, 1956 the President of India, who is the Visitor of the Institute, appointed a Committee to review the work and progress of the Institute since the inception in 1951 and make recommendations in regard to further development of the Institute ;

Sir Willis Jackson, F.R.S., Director of Research and Education, Metropolitan Vickers, Manchester, United Kingdom	(Chairman)
Shri D.L. Deshpande, Director, Bihar Institute of Technology, Sindri, Bihar	(Member)
Dr. Atma Ram, Director, Central Glass and Ceramic Research Institute, Calcutta.	(Member)
Prof. M. Mujeeb, Vice-Chancellor, Jamia Millia Islamia, Okhla, New Delhi.	(Member)
Shri S. Ratnam, Former Finance Secretary to the Government of India	(Member)

Shri G.N. Vaswani,

Assistant Educational Adviser (Tech)

(Secretary)

The Committee submitted its report to the Visitor in the first week of February, 1959.

(b) Indian Institute of Science, Bangalore

It was reported to the Council at its last meeting held on the 24th March, 1958 that Indian Institute of Science, Bangalore had been declared as an Institution of Higher Learning with powers to confer degrees and that the annual block grant for the quinquennium 1958-63 had been fixed at Rs. 37 lakhs.

In pursuance of the recommendations of the Reviewing Committee, provision has been made in the block grant for awarding scholarships of the value of Rs. 200 p. m. to 80% of the research students in the science and engineering faculties and studentships of the value of Rs. 150 p. m. to 60% of post-graduate students, 15% of the students studying in the first degree courses in Metallurgy, Electrical Technology and Electrical Communication Engineering will also receive scholarships of the value of Rs. 75 p. m. Post-Doctoral Fellowships of the value of Rs. 350 p.m. have been awarded to two students during the current year. The fellowships will be increased to six by 1960-61.

From 1960-61 onwards, grants to the Institute will be paid by the University Grants Commission as the Institute is deemed to be a University under the University Grants Commission Act, 1956.

The Institute celebrated its Golden Jubilee in February, 1959.

(c) College of Engineering and Technology, Delhi

A site of about 143 acres has been secured near Hauz Khas for the college. The foundation stone of the College was laid by H.R.H. the Duke of Edinburgh on the 27th January, 1959. The British Government and the Federation of British Industries have agreed to assist in the establishment of the College with (a) equipment worth £ 2,50,000 and (b) services of eight expert Professors for a period of five years. Detailed plans, estimates etc. are being worked out.

The College will conduct degree courses in Civil, Mechanical, Electrical and Chemical Engineering and Textile Technology with an annual admission of 250 students as shown below :

(i) Civil Engineering	60
(ii) Mechanical Engineering	60
(iii) Electrical Engineering (Heavy) & Electronics	60
(iv) Chemical Engineering	40
(v) Textile Engineering	30

Facilities for post-graduate studies and research will also be developed in important fields as and when the required staff are available.

(d) Expansion of Existing Technical Institutions

The scheme of expansion of the training capacity of selected engineering colleges and polytechnics has made satisfactory progress during the period under review. The total number of additional seats secured in 1957 and 1958 is as shown below :—

	1957	1958
Degree Courses :	2096	2372
Diploma Courses :	3399	3974

One of the Engineering Colleges selected for expansion is expected to implement the scheme during next academic session. With that the target of 2568 seats for degree courses will be reached. The target of 4410 seats for diploma courses is also expected to be reached during 1959-60 when the rest of the Polytechnics selected for expansion implement the scheme.

(e) The Administrative Staff College

The Administrative Staff College, started functioning in December, 1957. The College has conducted so far three courses, each of three months' duration, as shown below :—

<i>Session</i>	<i>From</i>	<i>To</i>	<i>No. of trainees admitted</i>
I.	6th Dec. 57	28th Feb. 58	30
II.	15th June 58	5th Sept. 58	36
III.	26th Sept. 58	19th Dec. 58	37

The fourth course started on the 9th January, 1959.

The non-recurring grant of Rs. 7 lacs promised by the Central Government has been paid in full. Of Rs. 9 lacs promised as interest-free-loan, a sum of Rs. 6.5 lacs has been given. The recurring grant of Rs. 3 lakhs a year has also been paid for 1957-58 and 1958-59.

(f) Training of Foremen & Supervisors

In pursuance of the recommendations of the All India Council for Technical Education for training of Foremen and Supervisors, two schemes have been finalised one by the Government of West Bengal and another by the Government of Madras for conducting four-year Sandwich Courses in Mechanical Engineering of the National Certificate standard. While the scheme of the Government of West Bengal envisages the establishment of a new institution at Calcutta, that of the Government of Madras aims at organising the Courses at the Central Polytechnic,

Madras. The cost of the schemes as approved by the Central Government is as shown below :—

Calcutta Scheme

I. Non-recurring

(a) Building	Rs. 4.45 lakhs.
Equipment	Rs. 4.60 lakhs.

Rs. 9.05 lakhs.

(b) Cost of land	Rs. 6.30 lakhs.
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(c) Students' hostel	Rs. 6.20 lakhs.
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II. Recurring

Rs. 2.22 lakhs.

Madras Scheme

Non-Recurring

(a) Buildings	Rs. 1.225 lakhs.
Equipment	Rs. 0.200 lakhs.

Total : Rs. 1.325 lakhs.

(b) Hostel	Rs. 5.50 lakhs.
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<i>Recurring</i>	Rs. 1.09 lakhs.
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The Central Government has agreed to provide 66-2/5% of the non-recurring expenditure on instructional buildings and equipment and 50% of the recurring expenditure. The balance of the non-recurring and recurring expenditure will be met by the respective State Governments in association with industry. The Central Government will also give loans for the construction of the hostels.

(g) Loans for Construction of Students' Hostels

In the first three years of the Second plan period, the Central Government have given loans amounting to Rs. 150.28 lacs to various technical institutions for the construction of hostels. Hostel accommodation for about 4,900 students has been or is in the process of being provided out of the loans.

(h) Grant-in-aid to Non-Government Institutions

For the various schemes of establishment of non-government institutions and improvement and development of existing non-government institutions as recommended by the All India Council for Technical Education and its Coordinating Committee, the Central Government have sanctioned during 1958-59 grants totalling Rs. 98.60 lakhs. The total amount of grants paid by the Central Government in the first three years of the current plan period is of the order of Rs. 231.50 lakhs.

A provision of Rs. 145.39 lakhs has been made in the budget estimates for 1959-60 for the same purpose.

(i) Establishment of Technical Institutions by Private Enterprise

The All India Council for Technical Education at its meeting held on the 22nd February, 1957 laid down the following criteria for approving the assistance to be given by the Central Government in the establishment of Technical Institutions by private agencies :

- (a) The private agency by itself or in association with the State Government concerned should meet at least 50% of the non-recurring expenditure. Wherever a State Government makes a contribution that amount should be provided in its Second Five-Year Plan. The Central Government will bear 50% of the non-recurring expenditure.
- (b) The private agency should have adequate resources including income from tuition fees to meet at least 50% of the approved recurring expenditure up to the end of the current plan period. The balance will be provided by the Central Government and the State Government concerned in agreed proportions subject to the condition that the State Government and/or the private agency shall assume responsibility for the entire recurring expenditure after the plan period.

Subsequently the Central Government revised its pattern of assistance to non-Government institutions in so far as recurring expenditure is concerned and decided to meet 50% of the approved recurring expenditure up to the end of the current plan period. The balance of the recurring expenditure during the plan period and the entire recurring expenditure after the plan period will be the responsibility of the private agency and/or the State Government concerned.

In pursuance of the above decision and on the recommendations of the All India Council for Technical Education/Coordinating Committee, Central Government have approved the establishment of eight engineering colleges and 18 polytechnics upto the current plan period, at the following places :

<i>State</i>	<i>Engineering Colleges</i>	<i>Polytechnics</i>
Madras	2—Coimbatore, Madurai	7—Avadi, Pollachi, Salem, Tanjore, Annamalainagar, Virudunagar, Talaiyuthu.

Kerala	1—Quilon	4—Quilon, Pandalam, Alleppey, Vallapad
Andhra	1—Thirupathi (Under Shri Venkateswara University).	3—Hyderabad, Tanuku, Wanaparthy
Punjab	1—Ludhiana	Nil
Madhya Pradesh	1—Gwalior	1—Bhilsa
Mysore	1—Gulbarga	3—Balgalkot, 2 at Bangalore
	<hr/> 7 <hr/>	<hr/> 18 <hr/>

All the above institutions except those at Thirupathi and Wanaparthy have started functioning. The All India Council for Technical Education has also recommended the establishment of an engineering college at Bombay by the Bharatiya Vidya Bhawan Society. The financial aspects of the scheme including the question of the resources of the society to meet its own share is under consideration.

ANNEXURE I

(Item No 13)

Engineering Colleges, Polytechnics and Junior Technical Schools included in the State Plans

State	Number of Engineering Colleges	Number of Polytechnics	Number of Junior Technical Schools
1	2	3	4
1. Mysore	...	6 (*Gulbarga, *Karwar, *Tumkur, *Belgaum, *Chickmagalur and *Chennapatna)	...
2. Andhra	1 (*Waltair)	4 (*Thirupathi, *Vizagapatnam, *Warangal and *Mahboobnagar)	...
3. Kerala	1 (*Trichur)	2 (*Trivandrum and *Cannanore)	18
4. Pondicherry	...	1 (Pondicherry)	...
5. Bombay	1 (*Nagpur)	5 (*Sholapur, *Aurangabad, *Karnal, *Amravati, Dohad or Nasik)	...
6. Madhya Pradesh	2 (*Raipur)	4 (*Jaora, *Nowgaon, *Ujjain and *Raigarh)	13
7. Punjab	1 (*Patiala)	2 (Chandigarh and Rohtak)	6
8. Rajasthan	...	2 (*Ajmer and *Udaipur)	4
9. Uttar Pradesh	...	7 (Bareilly, Jhansi, *Chandauli, *Handia, Khurja, *Nainital and *Hathras)	8
10. Jammu & Kashmir	...	2 (*Srinagar and Jammu)	...
11. West Bengal	...	4 (*Jhargram, *Murshidabad, *Purulia, *Belghuria)	9
12. Bihar	...	2 (*Patna and Gaya)	6
13. Orissa	1 (*Burla)	1 (*Bhadrak)	2
14. Tripura	...	1 (*Agartala)	...
15. Assam	2 (*Gauhati & Jorhat)	1 (Nowgong)	...
16. Himachal Pradesh	...	1 (Simla or Kasauli)	...
Total :	8	45	66

*(Indicates institutions which have started functioning)

ANNEXURE II

(Item No. 13)

State Plans—Technical Education

(Figures in lacs of rupees)

S. No.	Name of State	As recommended by the Working Group		Plan Budget for 1959-60 as accepted by the Planning Commission tenta- tively
		Revised plan provision 1956-61	Plan Budget 1959-60	
1	2	3	4	5
1.	Andhra Pradesh	218.44	45.84	38.70
2.	Assam	136.25	26.65	33.22
3.	Bihar	240.76	59.99	59.40
4.	Bombay	387.48	130.12	130.00
5.	Jammu & Kashmir	25.93	15.00	12.36
6.	Kerala	194.90	75.01	73.51
7.	Madhya Pradesh	287.50	90.45	60.00
8.	Madras	198.55	89.97	89.97
9.	Mysore	287.06	402.20	98.01
10.	Orissa	70.88	16.39	16.39
11.	Punjab	243.30	61.50	58.56
12.	Rajasthan	131.98	21.17	21.14
13.	Uttar Pradesh	351.38	72.61	72.61
14.	West Bengal	342.29	110.00	111.60
Union Territories				
	(i) Himachal Pradesh		1.00	1.00
	(ii) Tripura		6.77	6.77
	(iii) Pondicherry		1.11	1.11
	Total :		925.78	883.75

Item No. 14. To consider the measures to be taken for the formulation of the Third Five-Year Plan of Technical Education

The Planning Commission is now engaged in the formulation of the third five-year plan. The Council may consider the question of the lines on which development of Technical Education should proceed in the third plan period and decide the measures that should be taken to prepare the necessary schemes.

Item No. 15 To consider a proposal for the establishment of a Foundry and Forging Training Centre at Ranchi

To meet the requirements of the third and subsequent Five-Year Plans for Technical personnel, vigorous efforts are being made to expand quantitatively facilities for degree and diploma courses in the basic branches of engineering and technology—Civil, Mechanical, Electrical Engineering; Chemical Engineering, Mining and Metallurgy. Efforts have also been made to qualitatively improve Technical Education.

The various schemes approved so far for a qualitative improvement consist primarily of improvement in the instructional facilities—buildings, equipment and staff—and improvement of the standard of existing courses of study. There is, however, another aspect of qualitative improvement viz., diversification of fields of study in relation to our requirements for different categories of technical personnel for various development projects. Although some work has been done in the direction, the problems have not been identified and evaluated on a long-range basis, nor have we undertaken a technical study of the matter in relation to specific development schemes in the industrial and other sectors. It is considered important and urgent to examine on a priority basis the requirements for specialist technical personnel in various fields for different projects and formulate schemes for their training at selected centres.

Foundry Engineering and Forging are among those fields which are immediately concerned with the problem of diversification of technical education facilities. The importance of these two fields in relation to the development of engineering industry in the country needs hardly to be emphasised. On the recommendations of the All India Council for Technical Education some facilities for post-graduate training in Foundry Engineering have been organised at the Indian Institute of Science, Bangalore and Indian Institute of Technology, Kharagpur. The Kharagpur Institute also conducted some time back short-term courses for Foundrymen. The facilities available at these two institutions are, however, inadequate in relation to the future relation to the industry. The industry requires supervisory personnel and technicians in large numbers

but the institutions are not training them. The industry also requires technologists of the right type for design and development work and for executive positions. Such persons are best trained in close association with a large foundry and forging plant. Neither the Kharagpur Institute nor the Bangalore Institute has the advantage of association with industry in its training programme.

The Central Government have decided to establish a large foundry and forging plant at Ranchi with assistance provided by the U.S.S.R. It is considered desirable to set up at Ranchi a foundry and forging institution on the lines of the National Foundry College in the United Kingdom, for the training of technical personnel required for the development of the industry as a whole. Facilities for inplant training, design, office training and other aspects of work will be readily available at Ranchi. In addition, the advice and guidance and possible part-time service of experts in the industry will be available in the conduct of the training programmes. Any external assistance that is required in the establishment of the training centre can be sought under the the United Nations Special Projects Fund.

The Ministry of Commerce and Industry who were consulted in the matter have strongly supported it. In view of the fact that there is an acute shortage of properly trained personnel in foundry and forging technology required to man the existing and future foundries and forgings, the Ministry of Commerce and Industry consider it extremely essential to start a training centre for the purpose preferably at Ranchi which place is well suited in this regard due to its unique position in relation to different engineering units planned in its vicinity. Both the public and the private enterprise are likely to derive benefit from this scheme by helping in turning out the much-needed skilled workers and specialists, absolutely necessary for the development of industry.

It is suggested that a small Committee consisting of experts in the field and representatives of the Planning Commission and the Central Ministries concerned may be appointed to work out details for implementing the project outlined above.

The advice of the All India Council is sought.

Item No. 16 To elect representative from amongst the non-official members of the All India Council for Technical Education resident in the respective regions on the Eastern, Western, Northern and Southern Regional Committees of the Council

The constitution of the Regional Committee of the All India Council for Technical Education provides, *inter alia*, for the election of represen-

tative from amongst the non-official members of the Council resident in the Region on the respective Regional Committees. The terms of the office of the respective Regional Committees expired on the dates noted below :—

Eastern Regional Committee	9th April, 1958
Western Regional Committee	12th October, 1958.
Northern Regional Committee	14th February, 1959.
Southern Regional Committee	29th October, 1958.

The election of the Council's representatives on the Regional Committees would not be held earlier as the constitution of the Council itself was not complete.

The All India Council may now elect their representatives on the Regional Committee. A list of the non-official members of the Council resident in Eastern, Western, Northern and Southern Regions is given at Annexure-I.

The list does not include the representative of the Institute of Chartered Accountants who has recently resigned his membership.

ANNEXURE I

Item No. 16

List of the non-official members of the All India Council resident in the Eastern Region

Shri J. J. Ghandy, Jamshedpur.
Shri N. K. Mitra, Calcutta.
Shri B. F. Goodchild, Calcutta.
Shri T. R. Gupta, Calcutta.
Shri G. Y. Mangrulkar, Jamshedpur.
Shri Michael John, Jamshedpur.
Dr. T. Sen, Jadavpur, Calcutta-32.
Prof. S. K. Mitra, Calcutta.
Dr. S. R. Sen Gupta, Kharagpur.

N.B. 1. Shri J. J. Ghandy, Dr. S. R. Sen Gupta and Dr. T. Sen are already members of the Eastern Regional Committee.

2. Shri B. Maitra represented the Council on the last constituted Eastern Regional Committee.

List of non-official members of the All India Council for Technical Education resident in the Western Region

Shri Kasturbhai Lalbhai, Ahmedabad.
Shri Nand Kishore Sakarlal, Ahmedabad.
Prof. G. M. Nabar, Bombay.
Prof. M. P. Gandhi, Bombay.
Shri Shanta Ram S. Tawde, Bombay.
Shri D. P. R. Cassad, Nagpur.
Shri S. H. Parelkar, Bombay.
Shri Fazal I. Rahimtoola, Bombay.

N.B. 1. Shri Kasturbhai Lalbhai and Prof. G. M. Nabar are already members of the Western Regional Committee.

2. Prof. M. P. Gandhi represented the Council on the last constituted Western Regional Committee.

List of non-official members of the All India Council for Technical Education resident in the Northern Region

Lala Shri Ram, New Delhi.
Dr. V. K. R. V. Rao, Delhi.
Shri Ganpati Ram, M. P., Varanasi.
Shri Jaspat Roy Kapoor, M. P., Agra.
Shri Bharat Ram, Delhi.

Col. B. H. Zaidi, Aligarh.

Shri V. Lakshminarayanan, Pilani (Rajasthan)

The Chairman, University Grants Commission, New Delhi.

N.B. Shri J. K. Srivastava represented the Council on the last constituted Northern Regional Committee.

List of non-official members of the All India Council for Technical Education resident in the Southern Region

Dr. A. L. Mudaliar, Madras.

Shri P. R. Ramakrishnan, M. P., Coimbatore.

Shri A. M. M. Murugappa Chettiar, Madras.

Shri B. K. Nair, Ernakulam (Kerala).

Shri P. Subbramaniah, Vijayawada.

Shri T. S. Avinashilingam, Coimbatore.

N.B. 1. Dr. A. L. Mudaliar is already a member of the Regional Committee.

2. Shri C. R. Narasimham, M. P., represented the Council on the last constituted Southern Regional Committee.

Item No. 17. To nominate a representative of the All India Council for Technical Education on the Merchant Navy Training Board under Ministry of Transport and Communications (Department of Transport.)

Ministry of Transport and Communications have decided to set up a Merchant Navy Training Board comprising representatives of the Government, Merchant Navy Officers and ratings etc. to advise the Government on all training problems and to supervise the training imparted in the various Merchant Navy Establishments.

The Constitution of the Board *inter alia* includes a representative of the All India Council for Technical Education. The Ministry of Transport and Communications have therefore requested the Council to nominate their representative on the Board.

The All India Council for Technical Education may accordingly nominate its representative on the Merchant Navy Training Board.

Item No. 18. Proposal to establish a training centre in Foremanship and Supervision at Jamshedpur by the Tata Iron and Steel Company

The All India Council for Technical Education at its meeting held on 22nd February, 1957 approved a scheme of training in Foremanship and Supervision on part-time basis formulated by the All India Board of Technical Studies in Management. The aim and objects of the Course are as follows :

- (a) To train persons who are holding or may hold supervisory positions in industry in the general principles of work and labour management as well as to develop their capacity to work through the problems they meet with from day to day ; and
- (b) To give an introduction to the techniques of management so that those already in supervisory grades may, if they so desire, prepare themselves for further advancement.

The Council recommended that the scheme be implemented in consultation with industrial concerns, Government Departments and Technical institutions. The estimated cost of running the Course at a Centre was Rs. 8,000/- per year, (recurring expenditure). The Scheme envisaged that at least half the expenditure should be met from fees and/or contribution from industry.

The scheme was circulated to various industrial concerns, technical institutions, Government Departments etc. The Tata Iron & Steel Co., has submitted a proposal for the establishment of a training centre, at

Jamshedpur, where there is a great need for the course. About 320 persons with good educational attainments and industrial experience are available to take advantage of the Course. As the Course has to be conducted with emphasis laid on group discussions, techniques etc. and not on formal teaching the Tata Iron & Steel Co., suggests that the number of candidates in a class should not exceed 20 students.

In view of the large number of candidates desirous of doing the course, the Company proposes to organise two classes of 20 persons each running simultaneously. On the basis of the above estimate, the expenditure on running two classes simultaneously is Rs. 16,000/- per year. The Company has requested that 50% of this expenditure may be borne by the Central Government. The remaining part will be met by the Company from its own sources, including income from fees. The Company proposes to start the Course in June, 1959.

Item No. 19 : Establishment of Centrally sponsored Engineering colleges under the special expansion of Technical Education in the Second Five-Year Plan

The Minister for Education and Cooperation, Kerala State wrote a letter on 13. 3. 1959 to Dr. A. L. Mudaliar, Chairman of the Southern Regional Committee of the All India Council for Technical Education requesting the Regional Committee to consider starting of the Centrally sponsored engineering colleges at Cannanore or Kasaragode in Kerala instead of at Mangalore in Mysore State. The letter may be seen at Annexure I. The Director of Technical Education of the Kerala State has now informed the Council that the Minister for Education and Cooperation of his State has directed him to withdraw the letter in question to Dr. Mudaliar and to move the following resolution in its place in the Council :

“The All India Council for Technical Education recommends that a degree college imparting instruction in Civil, Electrical and Mechanical Engineering and other suitable subjects may be established one each in the States of Kerala, Orissa, Punjab, Assam and Rajasthan on the same lines as the eight engineering colleges proposed to be established in other States.”

The matter is placed before the Council for its consideration.

ANNEXURE I

(Item No. 19)

Copy of letter dated 13-3-1959 from Shri Joseph Mundassery, Minister for Education and Cooperation, Trivandrum to Shri Mudaliar, Chairman, Southern Regional Committee, Madras.

Subject :—Expansion of Technical Education in Second Five-Year Plan.

Ref. :—Letter No. F. 11-5/58-T. 5. dated 30-1-1959 from the Government of India.

I am given to understand that Regional Engineering Colleges with an intake of 250 students to be established entirely at Central expense are to be located at Mangalore and Warrangal in Mysore State. Now Mysore has already one Engineering College at Manipal in the private sector at a short distance from Mangalore. The location of another Regional College also at Mangalore, with no provision for a similar Centrally sponsored College for Kerala is grossly unjust. Kerala State with 13 million literate population compares very favourably with Mysore with considerably smaller percentage of literate population. Hence the location of the Centrally sponsored Regional College at Cannanore will do bare justice to Kerala. This College, if situated at Cannanore, being a Regional College will meet the demands of Mysore also. Geographically Cannanore and Mangalore are only 82 miles apart. If even this distance is considered too much, we have no objection to locate the Regional College at Kasaragode which is only 29 miles away from Mangalore.

It is understood that when Mangalore was considered for locating the College by Central Government one of the main considerations was that the second ship-building yard was expected to be started there. That position is incorrect at the present moment and Kerala's claim should not go by default. So I request that the claims of Kerala for another Engineering College—a Regional College sponsored by the Government of India—may be duly recognised and the College started in Cannanore or Kasaragode. I request your whole hearted support in the matter.

With best regards,

APPENDIX A

*Item No. 6(c) of Agenda***Scheme for the training of Chemical Operators and Supervisors for Chemical Industry****Importance of Training**

Under the Five-Year Plans great emphasis has been laid on industrial development. The various industrial projects undertaken by the public and private sectors include schemes for the establishment and development of chemical industry on a large scale. Fertilisers, acids, alkalis, dye stuffs, intermediates and drugs etc. are some of the important lines of chemical manufacture now in the process of development on a large scale. In the Third Five-Year Plan also chemical industry covering the whole range of products of importance is likely to receive considerable importance. New factories for the utilisation of the natural resources of the country for the production of various chemical products will be established. The existing concerns will also be developed on a large scale.

The question of training of technical personnel for the development of chemical industry both at present and in the Third Five-Year Plan period is urgent and important. Due to the vast changes that are taking place in the engineering and technology of chemical manufacture the technical personnel required is both large and diverse. In addition to chemical engineers and chemical technologists trained at university level for execution, design and development and research, the industry requires a large body of supervisory personnel and technical operators. The present methods of training supervisors and technical operators for the industry are, however, not only unsatisfactory but inadequate quantitatively. The modern methods of chemical manufacture which involve the use and operation of complicated engineering equipment, instrumentation, quality control, etc. do require that the supervisory personnel and technical operators should be trained on proper basis. For that purpose, separate institutions should be established or developed in close association with chemical industry.

Integrated Course

The training of supervisors and technical operators for chemical industry should be conceived of as an integrated course consisting of academic and technical instruction in an institution and apprenticeship in the factory. The integration of the two components should be in the form of a sandwich so that at a certain point in the course, a student should spend part of the time in institution and part of the time in factory. Instruction in the institution and practical training in the

factory should be provided in alternate layers so that the candidate when he passes out of the institution is fully equipped both on the theoretical and on the practical sides and is fit for ready employment.

It is not suggested that an individual trained in the above process will become fit to hold a supervisory post in chemical industry as soon as he has completed the course. As in other branches of industry he can only start as a qualified operator and after gaining sufficient experience in his technical work and in the control of men, he can develop himself into a Supervisor. The course will only prepare him in such a manner that he may become a successful supervisor eventually.

Structure of the Course

The structure of the course of training, its contents, organisational aspects etc. should be decided in relation not only to the requirements of the industry but also in relation to the general educational pattern in the country. It is accepted on all hands that boys up to the age of 14+ should receive broad-based general education and after that, they should be provided with opportunities of diversified courses of education and training to condition them for general employment in life. In accordance with this general concept, training courses for supervisors and technical operators for chemical industry should represent a diversified opportunity of education and training for boys who have completed compulsory education up to the age of 14+. That means the age of entry to the courses should primarily be 15.

A four-year course (starting from the age of 15 of the entrants) should be envisaged so that the candidates completing it at the age of 18 are fit to enter the industry. As the course has necessarily to include apprenticeship in industry on a sandwich basis and as boys below the age of 16 are not accepted in industry for apprenticeship training, the first two years of the course should be devoted primarily to general education; basic sciences; engineering subjects; drawing and workshop practice. The last two years should provide for integrated system of education and the principles of chemical operation and chemical processes and factory training on a sandwich basis.

In accordance with the general principles as laid down in the preceding paras the curriculum of a four-year sandwich course may be constructed as shown below:—

CURRICULUM

Chemical Operators' Course

Hours of work/week and hours of work/year

<i>1st Year</i>	40 weeks per year and 34 hours per week	...	...	1,360 hours
<i>2nd Year</i>	40 weeks per year and 40 hours per week	...	...	1,600 ,,
<i>3rd Year</i>	640 hours plus 20 full weeks of factory training			
<i>4th Year</i>	240 hours plus 30 full weeks of factory training			

Subject	1st Year	2nd Year	3rd Year	4th Year	Total working hours
(1)	(2)	(3)	(4)	(5)	(6)
Humanities and Languages	4—160	4—160	2—80	....	400
Science and Mathematics	9—360	9—360	3—120	.....	840
Elementary Mechanical and Electrical Engineering	1—40	8—240	3—120	.....	400
Engineering Drawing	4—160	4—160	3—120	.....	440
Workshop Training	16—640	16—640	.....	.....	1280
Chemical Operations and Chemical Processes	.....	1—40	5—200	300	540
Factory Training	.....	.....	20 full weeks (3 days/ week)	30 full weeks (4 days/per week)	50 full weeks
Foremanship and Supervision	.....	.....	.....	240	240
Total :	34—1360	40—1600	16—640 hours plus 20 weeks of training.	540 hours plus 30 weeks of factory training	4140 hours plus 50 weeks of factory training

It will be observed from the above that factory training forms a major part of the third and fourth years of the course. It has been so arranged that the factory-training is imparted when the students are getting familiar with the fundamentals of chemical engineering operations and chemical processes. General Science and Mathematics included in

the first two years will equip the boys with the scientific principles underlying engineering and technology and their application to day-to-day problems in industry. The study of languages will increase their power of understanding and expression both of which are essential to them when they occupy supervisory positions later on. English is indispensable for the study of modern sciences and engineering and for effective communication in these fields. It has, therefore, been made compulsory for all students undergoing the course. Humanities include descriptive study of the history of India and the world; Indian administration; civics and geography and principles of economics. It is hardly necessary to emphasise the importance of these subjects in educational programmes intended for preparing boys to enter life at the age of 18. Their function is to make the boys aware of the world in which they have to live and work and the community to which they belong.

A model syllabus for the various subjects covered in the four-year curriculum is given at Annexure I. The syllabus is capable of modification for individual institutions according to their local situation, but without any fundamental changes in the form and standard of the subjects.

Although the course is designed for boys who have completed general education up to the age of 14+ and extends over a period of four years for them it may also be offered as a three-year course for those boys who have passed Matriculation or S.L.C. Examination. In that case the last two years of the course will generally be the same as the last two years of the four-year course. The first year should be devoted to elementary mechanical and electrical engineering, engineering drawing and workshop practice. Short courses in Humanities and languages and Science and Mathematics will also be necessary in the first year in order to bring up the boys to the desired level in these subjects. Workshop training has to be restricted somewhat as compared to boys doing the four-year course.

The curriculum of the three-year course will be as shown below:—

Subjects	1st Year	2nd year	3rd year	Total Working Hours.
(a) Humanities & Languages.	3—120	—	—	120
(b) Science & Mathematics.	4—160	—	—	160
(c) Elementary Mechanical & Electrical Engg.	5—200	5—200	—	400

Subjects	1st Year	2nd Year	3rd Year	Total Working Hours
(d) Engineering Drawing.	6—240	5—200	—	440
(c) Workshop Training.	20—800	—	—	800
(f) Chemical Operation & Chemical Processes.	1—40	5—200	300	540
(g) Factory Training.		20 full weeks (3 days/week)	30 full weeks (4 days/week)	50 full weeks.
(h) Foremanship & Supervision.	—	—	240	—
	40—1600	15—600 hrs.	540 hrs.	2460 hrs.
		plus 20 weeks of factory Training.	plus 30 weeks of factory Training.	plus 50 weeks of factory Training.

The curriculum for a four-year/three-year course as shown above indicates in broad outline the manner in which the various subjects in which instruction has to be given in the institution and training in industry can be best integrated. It also suggests the total amount of time that has to be given to each component of the course and the standard of instruction/training that has to be attained.

The last two years of the course are most important since it is at that stage that factory training has to be brought in and integrated with the rest of the components of the course. The minimum period of factory training required to produce a good chemical operator, who is readily acceptable to industry is one full year of 50 working weeks. That period is proposed to be covered in the course 20 weeks in the third year and 30 weeks in the fourth year (or in the Second and Third years of the three-year course). In order to facilitate Sandwich training, it is proposed that the boys should work in the factory for 3 days/week in the third year and 4 days/week in the final year. Other alternative arrangements also are possible. As for instance, boys to work in the factory and to study in the institution every alternate week in the third year or in the first half of the year one group of boys to work in the factory and another study in the institution and in the latter half, the two groups to switch their places.

Organisational Aspects

Each Institute for the training of Chemical Operators and Supervisors should be established very near to the Chemical industry and should work

in close association with it. There may be one institute established for a large factory or for a group of small factories. Whether one large factory or a group of small factories, the industry which extends cooperation to an institute should be in a position to provide adequate practical training facilities to all the students concerned. The optimum size of an institute is for an admission of 40—50 students per year and has a total student enrolment of about 160—200 for a four-year course.

The practical training should be as broad-based as possible and should be so designed that a student gains a complete working knowledge of chemical Engineering Operations, processes, instrumentation and control in all their diverse aspects. Plant operation and maintenance should be emphasised. To ensure fulfilment of these objectives industry should assume full responsibility for the practical training of the students under its own supervision. There should, however, be frequent consultations between the institute and industry in the formulation and conduct of the training programme. Each factory should have a well-qualified and experienced technical person to organise and supervise the training programme. Students should not be left to fend for themselves in the factory or become mere Shop-Walkers. The superintendent of the institute should keep himself in constant touch with industry and ensure that the students are receiving the required training along right lines.

At the end of the course there should be a passing out examination held by the State Board of Technical Education and successful candidates should be awarded State Diploma or Certificate for Chemical Operators. The fact that the students have completed satisfactorily industrial apprenticeship for one full year should also be stated in the Diploma Certificate.

No fee should be charged from the boys at least for 10 years. Small stipends should be given to all and the value should be Rs. 20 per month in the first two years and Rs. 30 per month in the last two years of the course. Hostel accommodation of the dormitory type should be provided to all boys who require it.

The head of the institute should be a technical person with experience in Chemical Industry. He should be a graduate in Chemical Engineering with about 3 years' industrial experience.

Estimates of Cost

Detailed estimates of cost of buildings, equipment, staff and maintenance etc. for a typical institute having an admission capacity

of 40—50 students/year is given at Annexure II. The estimates are as shown below:—

Non-recurring

(a) Buildings	Rs. 3.511 lakhs.
(b) Equipment	Rs. 4.530 lakhs.

Recurring Rs. 1.85 lakhs.

Hostels Rs. 2.5 lakhs.

As in the case of Junior Technical Schools the Central Government may provide 60% of the approved expenditure on buildings, equipment, staff and maintenance and hostels as grant-in-aid. The rest of the expenditure should be borne by State Governments or other agencies which will come forward to establish the institutions. The Central Government's share of the recurring expenditure should, however, be for a minimum period of five years for each institution.

As Chemical industry is well developed only in certain parts of the country, and as such only those parts can have the institutions, some arrangements should be made whereby students from other parts will also have the benefit of those facilities. It is suggested that at each institution which receives grant-in-aid from the Central Government at least 25% of the seats should be reserved for students belonging to other States.

Total Estimated Cost for Establishing a Model Chemical Operators' School

Intake	40-50 students/year
Total student enrolment	160-200

Summary

I. *Non-Recurring*

A. Buildings (including fixture & services)	3.511 lacs.
B. Equipment	4.530 lacs
Total :-	<u>3.041 lacs.</u>

II. *Recurring*

	Rs.
A. Pay & allowances for Staff	0.95 lacs.
B. Stipends for students	0.60 „
C. Annual Working Expenses	0.30 „
Total :-	<u>1.85 lacs.</u>

III. *Hostel* (for 100 students)

Rs. 2.5 lacs

Non-Recurring Expenditure*A. Buildings*

	Approx. plinth area (sq. ft.)	Approx. cost (Rs.)	Total Cost Rs.
School Buildings	20,300		
Cost of construction @ Rs. 12.00 per sq. ft.		2,43,600	
Workshops	7,245		
Cost of constructions @ Rs. 10.000 per sq. ft.		72,450	
Fittings, Fixtures & Services		35,000	3,51,050
Equipment, Furniture, Library etc.			
Equipment		3,93,000	
Library, Museum etc.		25,000	
Furniture, Office equipment etc.		25,000	
Cost of erection, Miscellaneous etc.		10,000	4,53,000
		Grand Total :-	8,04,050

Recurring Expenditure*A. Pay and allowances for staff*

Sl. No.	Post	Number	Scale of Pay	Average yearly expenditure including D. A. & other incidentals.
1.	Superintendent of Training.	1	350-850	8,970
2.	Instructors (Chemical Operations ; Chemical Tech. and Engineering)	3	200-500	16,380
3.	Instructors (Workshop Foreman and Drawing).	2	200-300	8,190
4.	Instructors (Phy. Chemistry Math. & Humanities)	5	150-250	13,780
5.	Workshop Instructors	5	120-200	14,300
6.	Engineering Draughtsman	1	120-200	2,000
7.	Head Clerk	1	80-220	2,730
8.	Clerks	4	55-130	7,644
9.	Laboratory & Workshop Attendants	8	35-50	8,528
10.	Peons, Watchmen, Sweepers Malis etc.	8	30-40	7,800
			approx.	9,1200

A. Pay, allowances, T. A. etc.	Rs. 95,000
***B. Stipends for students	Rs. 60,000
C. Working expenses per year	Rs. 30,000
Grand Total :	<u>Rs. 1,85,000</u>

***Stipend for first and second year @ Rs. 20/- per student (100x20x12)	Rs. 24,000
Stipend for third and fourth year @ Rs. 30 per student (100x30x12)	Rs. 36,000
Total :-	<u>Rs. 60,000</u>

Buildings

A. General

	Area in sq. ft.	Approx. Total area in sq. ft.
Office & Superintendent's room.	1400	
Library, reading room and students Common room.	1500	
Teacher's room	600	
Museum room	600	
Stores	600	4,700
B. Class rooms 4x450		1,800
C. Drawing Halls 2x750		15,00
D. Laboratories		
Science Laboratory	2000	
Engineering Laboratory	1500	
Chemical Engineering, Operations Laboratory	3000	6,500
Total floor area :		<u>14,500</u>
Add 40% for walls, passages etc.		5,800
Total plinth area.		<u>20,300</u>

E. *Workshops*

Carpentry shop	800	
Pattern Making shop	500	
Foundry shop	1000	
Smithy shop	1000	
Machining and Turning shop	2000	
Fitting shop	500	
Welding shop	500	6,300

Add 15% for walls, passages etc. 945

Total Plinth area : 7,245

F. *Hostels (Dormitory Type)*

For 100 students Approx. Cost Rs. 2.5. lacs.

Equipment**A. Equipment**

	Approx. Cost Rs.	Approx. Total Cost (Rs.)
I. Science Laboratory	30,000	
II. Engineering Laboratory	35,000	
III. Chemical Operation Laboratory	1,25,000	
IV. Drawing Hall Equipment	3,000	
V. Workshops		
Carpentry shop Rs.	10,000	
Pattern Making shop Rs.	5,000	
Foundry shop Rs.	5,000	
Smithy shop Rs.	6,000	
Machining & Turning Rs.	1,50,000	
Fitting shop Rs.	8,000	
Sheet & Plate Metal shop Rs.	8,000	2,00,000
B. Furniture & Office Equipment		3,93,000
C. Library, Museum & Audio-Visual Aids		25,000
Library	15,000	
Museum	5,000	
Audio Visual Aids	5,000	25,000
D. Cost of Erection, Misc. etc.		10,000
Grand Total		4,53,000

Staff**A. Teaching Staff**

Sl. No.	Post	Number	Scale of Pay Rs.
1.	Superintendent	1	350-850
2.	Instructors in Chemical Operations and Chemical Technology	2	200-500
3.	Instructor in Engineering	1	200-500
4.	Instructors in Physics, Chemistry and Mathematics	3	150-250
5.	Instructor in Humanities and Languages	1	150-250
6.	Instructor in Engineering Drawing	1	200-300
7.	Workshop Foreman	1	200-300
8.	Workshop Instructors	5	120-200
9.	Engineering Draughtsman	1	120-200
10.	Laboratory & Workshop attendants	8	35-50

B. Office Staff

1.	Head Clerk	1	80-220
2.	Clerks	4	55-130
3.	Peons, Watchmen, Sweepers, Malis etc.	8	30-40

Working Expenses per Year

Chemicals, glassware, hardware, workshop Stores, library books and journals, water gas, electricity etc.	Rs. 25,000
Contingencies, office expenses, student's tour etc.	Rs. 5,000
	Rs. 30,000

SYLLABUS FOR CHEMICAL OPERATORS' COURSE**Humanities and Languages**

History Physical features of India and their historical importance ; nature and types of the source material of Indian History ; Early Aryan settlements in India ; Indo-Aryan Civilization in the Vedic Age ; Social, economic, political and religious life of people as revealed in the Vedic and Epic literature ; Life and teachings of Maha Vira and Buddha ; Rise of Magadha ; Persian and Greek invasion ; the Maurya Empire ; Society and Culture in the Maurya age ; The Golden Age of Ancient India—Spread of Buddhism, Gandhara Art and foreign trade, the Gupta Empire ; Harshavar-

dhana and his times; The rise of Rajputs; The South Indian Kingdoms and their civilization; Indian colonial enterprise. The characteristic feature of the Middle ages in Europe and India; Rise of Islam; The effects of Muslim impact on (a) Europe—The Crusades, The Renaissance and the Reformation (b) India—the rise of the Bhakti Cult—Sikhism; The Cultural Legacy of Islam in India—The Sultanate of Delhi, Bengal, Vijayanagar and the Bahmani Kingdoms; coming of the Mughals, Sher Shah. The Mughal Empire from Akbar to Aurangzeb, political unification and administrative system, Society, art and literature in the Mughal Period, attempts at cultural synthesis; Rise and expansion of Maratha power up to 1761; Age of European colonial expansion, establishment and consolidation of the British rule in India—Clive, Warren Hastings; Cornwallis to Lord Hastings; Tipu and the fall of Mysore; Decline and fall of the Marathas; expansion of British power after 1818. The Sikh power and its downfall, Administrative Reforms—Bentinck and Dalhousie. The Revolt of 1857, transfer of power to the Crown; Impact of the West on Education, Society, religion and literature Growth of Indian Nationalism up to 1909—Inspiration from the West (i) England—Magna Charta—Habeas Corpus—Revolution of 1688; Reform Movements (1822—1928) (ii) The War of American Independence, (iii) French Revolution; Relations of British India with Afghanistan and the N.W.F., Nepal, Tibet and Burma; Progress of Nationalism and Constitutional changes from 1909—1950—Foundation of the Republic, impact of International events on the Freedom Movement in India (a) Russo-Japanese War, (b) The First World War (c) The Second World War; Imperialism and the two World Wars; The problems of the modern world; struggle between communism and democracy—The Doctrine of Sarvodaya; The ideal of one world and one stage; U.N.O., its achievements and future possibilities: India's contribution to World Welfare through U.N.O.

Citizenship and Government

Indian Administration and Civics Rights and Duties of the citizen; Organs of Government—Executive, Legislature, Judiciary; different forms of Government.

Functions of Government

Protection of life and property (i) internal—The Police Force (ii) External—The army, The Air Force, The Navy; Communications; Roads, Railways, Airways, Posts and Telegraphs, Telephones,

Wireless and Broadcasting. Promotion of Public Welfare ; Education, Health, Recreation ;

Finance Taxation ; Trade and Industries ; Currency.

The Union Government—The President—The Council of Ministers—Parliament ; The Government of the States ; Governors—The Council of Ministers—The Legislatures—Classification of the States ; Voters and Constituencies ; The Judiciary—Public Service Commission, Comptroller and Auditor General—District Administration—Local Self-Governing Bodies.

Geography The size and shape of the earth, Rotation and revolution of the earth and their effects, Latitude and Longitude, International Date, Time Weathering ; Erosion and Deposition—their causes and effects of topography ; Detailed study of Rivers and Glaciers and their work ; Mountains—their types, structure and distribution. Volcanoes, Earthquakes—their origin and distribution. Types of Plains, Oceans, their extent, characteristics of oceanic waters such as salinity, temperature and density. Ocean currents. Tides and their causes. Atmosphere—Pressure belts and planetary winds. Periodic and Variable winds. Rainfall—Types and their causes. Weather and climate: Factors determining climate ; Natural regions of the world as determined by climatic and natural vegetation—Their characteristics and distribution. Life and activities of man in different natural regions. World distribution of Rice, Wheat, Sugar, Cotton, Coal, Iron Ores, Wool, Jute, Tea. Major International Routes—Air ways, Water ways ; Regional Study of Asia and a detailed treatment of India and Pakistan under the following heads ; Location and size, Physiographic Divisions, Rivers Systems, climate and natural vegetation, Irrigation and Agriculture, Water power, Minerals, Industries Distribution of population. Transport system ; Roads, Railways, Water Ways. Air ways, Ports and Harbours, Chief towns and their functions. Imports and Exports. Map reading and map drawing. Tracing and drawing of outline maps of India and the world and insertion thereon of the important physical features, types of vegetation, crops, towns and industries.

English

Texts for intensive study.

Prose selection—about 200 pages.

Poetical selection—about 500 lines—students are expected to commit to memory at least 150 lines.

Rapid readers for general reading—two books of 110 pages each

Grammar Parts of Speech—detailed study; The simple sentence; Statement—affirmative, negative etc. Subject and the Predicate, Object, Rules of Syntax.

Word building and Word formation—Nouns, adjectives, verbs and adverbs.

Phrases—as noun, adjective, adverb.

Apposition, uses of infinitives.

Clauses—Coordinative and sub-ordinative, Clauses as subjects and objects. Noun Clauses, Adjective and Adverb clauses; Direct and Indirect speech; The clause equivalent—Nominative absolute.

Punctuation—Chief stops and their uses. General rules relating to orthography—correct use of capitals.

Elements of Rhetoric—as exemplified in text books and applied in composition.

Composition Use of phrases, Idioms with reference to text only. Use of Prepositions. Paragraphs—Descriptive, Narrative, Reflective Extension.

Simple summaries and precis writing. Letter writing—personal and business letters. Story writing.

Translation—Exercises from the Mother tongue into English and vice-versa.

N.B., There shall be two question papers in English Language, the duration of each paper being three hours. Paper I—(a) Text, (b) Grammar and Idioms as applied to the texts.

Paper II—(a) Precis writing, (b) Letter writing
(c) Essay writing, (d) Story writing
(e) Narration, (f) Translation.

II. Science and Mathematics

Physics

Mechanics: C. G. S. and F. P.S. Units of measurement, Conversion of one set of units to the other. Motion, speed, velocity, acceleration, composition and resolution of velocities, rectilinear motion with uniform acceleration, motion under gravity, along with inclined plane; Mass, inertia, Momentum, Newton's Laws of motion, motion in a circle, simple Harmonic motion, Simple pendulum.

Force: Units of force relation between mass and weight Composition and resolution of forces, Parallelogram and triangle of forces; Moments and couple; Equilibrium of three co-planer forces including parallel forces. Centre of gravity and its experimental

determination, C. G. of uniform rod, triangular lamina, circular disc, ring etc. States of Equilibrium—Static and Dynamic equilibrium. Friction—Coeff. of friction and laws of friction. Simple machines - Levers. Balance, Pulley, inclined plane, Jack screw, wheel and axle, Mechanical advantage, velocity ratio, efficiency. Ideal and Real machines. Work, Energy and Power—Potential and Kinetic energy, conservation of energy, transformation of energy. Simple ideas about surface tension.

Units and Measurement - Units of Length, Mass and time F.P.S. & C.G.S. units, Fundamental and derived units. Measurement of length—Straight and curved lines; foot rule, Metre rod. Vernier Calliper, Screw gauge, spherometer and their uses. Measurement of area, Volume—different methods. Graduated Jars and burettes or measuring Vols, The pipette, measurement of time, instruments for measuring time—the pendulum.

Relation between Mass & Volume — Density and its measurements — Density of regular and irregular solids — determination of Density of liquids and its determination; Relative Density or Specific gravity and its determination for solids, sand and shots; Specific gravity bottle.

Mass and Weight The common Balance and the Spring Balance and their uses; Gravity, variation of weight from place to place.

The three states of matter and their general properties distinctive properties of solids, liquids and gases; Elasticity, Hooke's Law, Young's Modulus; Water level, spirit Level; Capillarity, constitution of matter; cohesion; Kinetic theory of gases.

Pressure in liquid — Pressure and Thrust, Pressure at a point within a liquid, Pascal's Law of transmission of pressure, the Hydraulic press or Bramah's Press, Up-pressure and down-pressure, Hydraulic lift, Hydrostatic Paradox.

Buoyancy of Liquids. Archimedes Principle — Floating bodies; Specific gravity determination by Archimedes Principle; Hydrometers, Lactometers, Nicholson's Hydrometer and its use, Standard Hydrometers, Swimming, Submarine.

Pressure of the atmosphere — Air has weight, up-pressure and down pressure, Air presses in all direction — Megdeburg Hemispheres, Measurement of atmospheric pressure, Barometer Common type, Cistern, Siphon and aneroid barometer, Fortin's Barometer, Change of pressure with heights, variation of atmospheric pressure, Barometric pressure and weather changes; Boyle's Law, Specific

gravity of a liquid by Hare's apparatus, Buoyancy of air Balloons and air-ships vacuum pumps.

Heat Sources and effects of Heat — The sun, Electricity, chemical and Mechanical energy, Nature of heat, heat and temperature, Effects of Heat, Measurement of temperature, Pyrometer. Liquid in glass thermometers, mercury thermometer, the fixed points, Thermometric scales and conversion of scales, Alcohol Thermometers, Maximum and Minimum thermometers, Clinical Thermometer.

Expansion of solids, liquids and gases - Gravesand's ball & ring apparatus. Different solids expand differently, Linear, surface and cubical expansion, Co-eff. of expansion and relation between compensation of clocks and watches, Balance wheel of a watch. Force exerted during contraction, common examples of application, measurement of expansion of solids - Pullinger's apparatus; Expansion of liquids - real and apparent expansion; Anomalous expansion of water - Hope's experiment; Expansion of gases, Gas Thermometer, absolute temperature. Relation between the pressure, Temperature and volume of a gas, Gas Laws and Gas constant, $PV=RT$ and simple calculation.

Heat and its measurement - Units of heat. Thermal capacity, Specific heat. Water equivalent, Mixing of Hot and Cold Water. Calorimeter. Determination of specific heat of solids and liquids by the method of mixtures; Specific heat and climate.

Change of state; Fusion, Melting point of a solid and its determination (for ice, sulphur and Wax) latent heat of fusion determination of latent heat of water, sulphur cooling, effect of impurities on freezing point, freezing mixture. Expansion of water on freezing, Regulation. Boiling or ebullition. Determination of causes of enormous latent heats of ice and steam. Application of latent heat of steam—Newcomen's Engine, Effect of pressure on Boiling point. Evaporation and Boiling. Ammonia ice plant. Saturated and unsaturated vapours. Vapour pressure and boiling point for liquid. Water in atmosphere—Mist, Fog, Cloud, Hail, Snow, Rain, Dewpoint, Raingauge.

Transmission of heat—conduction of heat in solids, liquids and gases. Action of wire gauze on flame. Devy's Safety Lamp. Good and Bad conductors. Deppretz's experiment, some uses of bad conductors. Different solids conduct heat differently. Conductivity of solids and its determination—Searle's method. Convection in liquids and gases, Ocean currents, Gulf stream. Ventilation in

rooms and mines. Winds—Trades, Land and sea breeze, Radiation, sources of Radiant heat. Transmission, emission and absorption of Radiation; Reflection of heat radiation. Application—Thermos Flask.

Light Propagation of light—Nature of light, Luminous and non-Luminous bodies. Rectilinear propagation of light, ray of light, pencil of rays, Pin-hole camera, Shadows and eclipse, Umbra and penumbra.

Reflection at plane and spherical surfaces—Laws of reflection and their verification, Regular and irregular reflection, Image of a point and an object, Real and Virtual images, multiple reflections from two plane mirrors, Rotating mirrors, Illusions due to reflection—Parer Ghosht: Kaleidoscope, Concave and convex mirrors. — Pole, ax's. Radius of curvature, Principal focus etc. $f = r/2$ —Position and nature of image of an object by reflection from a spherical mirror, Geometrical construction of image, uses of mirrors.

Refraction of light—Refraction at a plane surface. Laws of refraction and their verification. Tracing the rays geometrically, effects of refraction, Refractive index of water, air; Total reflection and its effects. Critical angle—Refraction through a Prism. Path of ray through prism, total reflection of prism. Deviation. Minimum deviation, The Lens Image formed by lenses, graphical construction, convex and concave lenses, changes in the size, position of image of an object after refraction through lenses. Application of convex-lenses, Burning Glass, Magnifying glass. The Bull's Eye, Lantern. The light house lantern, the camera, magu lantern, Simple Microscope, Compound Microscope, Astronomical telescope. The eye as an optical instrument, Defects of vision and their correction by lenses, Foser of the eye.

Dispersion—Formation of spectrum, pure spectrum, composition of white light, Newton's colour Disc, Spectrometer, Rainbow, Colour of bodies, Pigment colours, Colours of the sky.

Sound Causes of sound, material medium necessary for propagation of Wave motion. Transmission of sound through air, solids and liquids, Velocity of sound in air and its determination, Reflection of sound, Echoes, How we hear, the human voice, Phonograph, Tele-phone, Conversion of electric energy into sound.

Magnetism : Natural and artificial magnets, properties of magnets, Laws of magnetic attraction and repulsion, magnetic pole, force, strength; Methods of magnetisation, induction, consequent poles. Test of a magnet, demagnetisation, Breaking a magnet. Magnetic substance and a magnet. Magnetic compass Magnetic needle, magnetic be-

haviour of soft iron and steel. Magnetic screening, Earth as a magnet, magnetic axes, Meridian Declination and Dip. Gravity and Magnetism, Marinor's compass. Navigation on the sea and in the air.

Electricity Frictional—Production of electricity by friction, two kinds, Electroscopes, Laws of attraction and repulsion. Induction, conductors and insulators. Proof plane, Electricity resides on the outer surface of a conductor, Faraday's Ice-pail butterfly-net experiments, Distribution of charge over a conductor. Electrophones, Atmospheric Electricity, Lightning and thunder, Lightning conductors, Leyden Jars. Current—Voltaic Cell, Collatic Pile, contact theory E. M. F. and P. D. Local action and polarisation, types of cells, Drycell, Storage cells, arrangement of cells, Strength of current, Resistance, Ohm's Law, Effects of electric currents—heating, magnetic and chemical. Oersted's experiment. Ampere's Rule, Galvanoscope, Galvanometers, Ammeters, Voltmeter, Electromagnet, Electric bell, Relays, Telegraphy, Interaction between currents and magnets Electromagnetic induction, Faraday's and Lenz's Laws. Electrolysis—Water Voltmeter, Copper Voltmeter, Electroplating, Heating effects and applications, Houles Law Fuse, Electric Lighting, efficiency of electric bulbs, Arc lamp, Alternating currents properties as compared with those of direct currents, Intensity, tension Power work. Self induction, capacity, condensers, Alternators, transformers. Telephony high frequency currents, units and measurements,

Chemistry Scope of Chemistry, changes—Physical and Chemical. Simple Physical processes. Mechanical mixture and Chemical compounds. Air—a mixture, burning of candle, rusting. Lavoisier's experiment, oxygen for breathing, composition of air by volume (burning of candle and phosphorous in a Bell Jar). Atmosphere and plants and animals.

Oxygen :—Preparation and properties and uses, Heating of metals in air, Catalysis,

Water :—Sources, common impurities, water as a solvent, Purification of water, Distillation, water for drinking purposes, Hard and Soft Waters,—Chemical compounds, Action of Sodium and Potassium on water, Electrolysis of water, composition of water by volume and weight.

Hydrogen Preparation (from acids and metals), properties and uses.

Nitrogen From air, properties and uses, Nitrogen and Manures.

Carbon Different forms of carbon, natural sources, allotropes, Graphite and Diamond, their uses. Carbon monoxide Fuels, Calorific value, watergas. Carbon dioxide—preparation, properties and uses; Action of heat on limestone, quicklime and lime water, assimilation of atmospheric carbon dioxide.

Sulphur Heating of sulphur, Burning of sulphur in air. Natural sulphur, Sulphur dioxide, properties and uses of Sulphuric Acid, Preparation of Sulphuric acid—contact processes.

Chlorine Common salt, Preparation, Properties and uses of Chlorine and Hydrochloric Acid.

Ammonia Preparation, Properties and uses of ammonia and Nitric Acid; Nitrates.

Phosphorus Allotropes, Matches. Common Disinfectants and Fertilisers—uses of lime, bleaching powder, boric acid, Carbolic acid, Hydrogen peroxide, Iodine, Potassium Permanganate; Farmyard manures, Sulphate of ammonia and potash, bone meal and Superphosphate. General properties of acids, bases and salts. Common metals—Study of Iron, Magnesium, Lime, Lead, Aluminium, Copper, Tin, Nickel, Mercury. Mercury-Cu alloys—brass, bronze, solder German silver, Bell, Bell Metal, type metal, Duralumin.

Elements of Organic Chemistry, Hydrocarbons.

Science Practical (Not for examination)

Chemistry Glass cutting, bending, Cork boring, fitting a wash bottle. Separation of the constituents of a mixture (a) salt and sand, (b) Ammonium chloride and sand (c) salt and camphor; Preparation of crystal of nitre, alum, sulphur; Purification of water by distillation, Show the presence of Carbon dioxide and moisture in (a) exhaled air (b) products of burning of a candle. Preparation and properties of oxygen, hydrogen, carbon dioxide, ammonia, hydrochloric acid; Effect of heat on blue vitriol, alum, borax, potassium permanganate-iodine sugar, ammonium chloride, Effects of dilute acids on Calcium carbonate, iron sulphide, Zinc; Neutralisation of an acid by a base.

Physics: Measurement of the length of (i) a straight line (ii) a curved line—use both the systems of units; To measure the volume of a cube, cuboid, sphere, cylinder. To measure the volume of regular solids by displacement of water; To weigh a solid in air and in water and to find the specific gravity of an insoluble solid heavier or lighter than water; Use of a spring balance; Determination of (i) melting point of a wax or naphthalene and (ii) boiling of water and

salt solution. To verify the laws of reflection using a plane mirror and to obtain the position of the image. To trace the rays through a rectangular block of glass and verify the laws of refraction. To determine the focal length of a convex lens. To trace the path of a ray through a prism. Plotting of lines of force due to a bar magnet. Gold leaf electroscope—charging by conduction and induction and study of natural electrical charges. To determine the direction and flow of electric current by magnetic needle. Arrange an electric bell, study of electrolysis of water.

Mechanics To verify the law of parallelogram of forces. To verify the law of moments with metre rod. To determine the relation between load and power for a single light movable pulley. To determine the C.G. of card board pieces of regular and irregular shapes. To find 'g' of simple pendulum. To find the Co-eff. of friction (Horizontal plane) To show that for an inclined plane the product of mean power and the length of the plane equals the product of the load and height of the plane.

Mathematics

Arithmetic Factors and Prime numbers, fractions, H. C. F. and L. C. M. Decimals, Metric System—Significant figures, approximation, Averages and percentages, Practice—Simple and Compound, Interest Simple and Compound ; Ratio and Proportion, Profit and Loss.

Division into proportional parts, partnership ; Square root, time and distance, Mensuration—surface area of walls, floor, ceilings, etc., area of rectangle, triangle, parallelogram, circle, volume of a cube, rectangular solid, surface and volume of cylinders, cones pyramids and Spheres.

Algebra Factors and formulae, H.C.F. & L.C.M. Fractions, Simple equation and simultaneous equation of the first degree involving unknown, problems leading to simple and simultaneous equations, Square root, Surds, Indices, simple quadratic equation, Ratio & Proportion. The remainder theorem-Divisibility. Graphs of simple equations and simultaneous equation of the first degree ; A.F. & G.P. (finite) Logarithm and Logarithmic Calculation, Graphs-Practical Application.

Schedule 'A'

Geometry. Constructions :

- Bisection of angles, of straight lines and of area of circles.
- Construction of perpendicular to straight lines.
- Construction of angle equal to a given angle.
- Construction of parallels to a given straight line.

- Simple cases of constructions of triangles from sufficient data.
- Division of straight lines into a given number of equal parts.
- Division of a straight line into two parts in a given ratio.
- Construction of a parallelogram equal to a given triangle and having one of its angles equal to a given angle.
- Construction of a triangle equal in area to given rectilinear figure.
- Construction of a tangent to a circle.
- Construction of common tangents to two circles.
- Construction of regular figures of 3, 4, 6, 8, sides in or about a given circle.
- Description of a circle in or about (i) a triangle (ii) a square.
- Description of a segment of a circle on a given straight line containing a given angle.
- Sample cases of the construction of a circle satisfying given conditions.
- Construction of a square equal in area to given rectangle.

Schedule B

Theoretical Angles at a point : If a straight line stands on another straight line, the sum of the two angles so formed is equal to two right angles, and the converse.

If two straight lines intersect, the vertically opposite angles are equal.

Parallel Straight line : When a straight line cuts two other straight lines if i) a pair of alternate angles are equal or ii) a pair of corresponding angles are equal, or iii) a pair of interior angles on the same side of the cutting line are together equal to two right angles, then the two straight lines are parallel, and the converse. Straight lines which are parallel to the same straight line are parallel to one another.

Triangles and Rectilinear figure : The sum of the angles of a triangle is equal to two right angles. If the sides of a convex polygon are produced in order, the sum of the angles so formed is equal to four right angles. If two triangles have two sides of the one equal to two sides of the other, each to each, and also the angles contained by those sides equal, the triangles are congruent. If two triangles have two angles of the one equal to two angles of the other, each to each, and also one side of the one equal to the corresponding side of the other, the triangles are congruent.

If two sides of a triangle are equal, the angles opposite to those sides are also equal, and the converse. If two triangles have the three sides of the one equal to three sides of the other, each to each, the triangles are congruent,

If two right angle triangles have their hypotenuses equal and one side of the one equal to one side of the other, the triangles are congruent.

If two sides of a triangle are unequal, the greater side has the greater angle opposite to it, and the converse.

Any two sides of a triangle are together greater than the third. Of all the straight lines that can be drawn to a given straight line from a given point outside it, the perpendicular is the shortest. The opposite sides and angles of a parallelogram are equal and each diagonal bisects the parallelogram, and their converse.

If there are three or more parallel straight lines and the intercepts made by them on any straight line that cuts them are equal, then the corresponding intercepts on any other straight line that cuts them are also equal.

Areas : Parallelograms on the same or equal bases and of the same altitude are equal in area. Triangles on the same or equal basis and of the same altitude are equal in area. Equal triangles on the same or equal basis are of equal altitude.

The square on a side of a triangle is greater than, equal to, or less than the sum of the squares on the other two sides according as the angle contained by these sides is obtuse, right or acute. The difference in the case of inequality is twice the rectangle contained by one of two sides and the projection on it of the other. If the sum of the squares on any two sides of a triangle is equal to the square on the third side, the triangle is right angled. In any triangle, the sum of the squares on the two sides is equal to twice the square on half the base together with twice the square on the median which bisects the base.

Circle : A straight line, drawn from the centre of a circle bisects a chord which is not a diameter, is at right angles to the chord; conversely the perpendicular to a chord from the centre bisects the chord.

There is one circle and only one, which passes through three given points not in a straight line. In equal circles or in the same circles (i) if two arcs subtend equal angles at the centre, they are equal (ii) conversely, if two arcs are equal, they subtend equal angles at the centre.

In equal circles or in the same circle (i) if two chords are equal, they cut off equal arcs; (ii) conversely, if two arcs are equal the chord of the arcs are equal.

Equal chords of a circle are equidistant from the centre, and the converse.

The tangent at any point of a circle and the radius through the point are perpendicular to one another.

If two circles touch, the point of contact lies on the straight line through the centres. The angle which an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.

Angles in the same segment of a circle are equal; and if the line joining two points subtends equal angles at two other points on the same side of it, the four points lie on a circle. The angle in a semi-circle is a right angle; the angle in a segment greater than a semi-circle is less than a right angle and the angle in a segment greater than a semi-circle is less than a right angle. The opposite angles of a quadrilateral inscribed in a circle are supplementary, and the converse. If a straight line touches a circle, and from the point of contact a chord be drawn, the angles which this chord makes with the tangent are equal to the angles in the alternate segments. If two chords of a circle intersect either inside or outside the circle, the rectangle contained by the parts of the one is equal to the rectangle contained by the part of the other; and the converse.

Proposition Similar triangles. If a straight line is drawn parallel to one side of a triangle, the other two sides are divided proportionally, and the converse. If two triangles are equiangular, their corresponding sides are proportional; and the converse. If two triangles have one angle of the one equal to one angle of the other, and the sides about these equal angles proportional, the triangles are similar.

The internal bisector of angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle, and likewise the external bisector externally. The ratio of the areas of similar triangles is equal to the ratio of the squares on corresponding sides.

The medians of a triangle are concurrent (centroid).
The internal bisectors of the angles of a triangle are concurrent (Incentre) The right bisectors of the sides of a triangle are concurrent (circumcentre).

The altitudes of a triangle are concurrent (orthocentre)

Trigonometry Definition of sine, cosine, tangent of an acute angle.
 $\sin^2 A + \cos^2 A = 1$. Trigonometric ratios of 30° , 45° , 60° , 90°
Solution of right angled triangle by using $a = c \sin A$, $b = a \cos A$
 $\angle c = 90$. Relation between trigonometric ratios of complementary & Supplementary angles.

N. B. Question on Practical Geometry shall be set on the constructions contained in Schedule A together with easy extensions of them as riders. The candidates should provide themselves with a ruler graduated in inches, a tenth of an inch and in centimeters and millimeters, set-squares, a protractor and a pair of compasses. Questions on Theoretical Geometry shall consist of theorems contained in schedule B together with easy deductions from them. The order in which the theorems are stated in schedule B is not imposed as the sequence of treatment.

III. Elementary Mechanical & Electrical Engineering :

Mechanical Engineering

1. Units and conversion of units; Engineer's. Unit of mass, force, work and power, Units of distance.
2. Conservation of mass & energy; Mechanical equivalent of heat, Calorific value of fuels.
3. Force, graphical composition & resolution; triangle, Parallelogram & Polygon of forces and applications.
4. Parallel forces, centre of gravity.
5. Moments, Principle of moments, Friction, Co-efficient of friction, laws of friction, Friction saving devices — simple bearings, ball and roller bearings, Lubrication.
6. Simple machines — Simple Pulley, wheel & axle, Screw Jack, etc.
7. Velocity ratio, Mechanical advantage, efficiency power, B. H. P. and I. H. P.
8. Laws of motion, Linear velocity and acceleration, motion under gravity.
9. Transmission of motion and Power — belts, gears, etc.
10. Temperature, Specific heat, latent heat, total heat units.
11. Steam and its properties — sensible heat, latent heat, Super heat and dryness fraction of steam.
12. Description and elementary principle of working of a simple steam engine and small boiler
13. Conception of two and four stroke internal combustion engines, Petrol & Diesel engines. Fuels used in I. C. E.

Practical Determination of velocity ratio, friction, Mechanical advantage and efficiency in simple machines such as (i) Simple wheel and axle, (ii) Differential wheel & axle, (iii) Screw Jack, (iv) Worm and Worm wheel, (v) Winch crab, (vi) Inclined plane, (vii) Rope pulleys; Bent levers; composition of forces; Coeff. of friction,

Moment of forces ; Starting, running and stopping of (a) Steam Engine, (b) Diesel Engine ; Oiling, Overhauling, maintenance and petty repairs to household appliances like bicycles, pressure stoves, water taps.

Electrical Engineering. Electric circuits, e. m. f., electric current, Insulators and conductors ; Magnetic phenomenon, permanent magnets, Polarity, Field of force, Magnetic properties of Iron, electromagnet ; Ampere, Volt, Ohm, resistance in series and parallel; Effects of electric current — Heating — Power energy relations in simple circuits, Units watts—kilowatt etc ; Force between current carrying conductor, Motors ; Induction of E. M. F. in a conductor, Generators ; Elementary ideas of A. C. Voltage, Power ; Primary & Secondary cells, Charging ; Simple description and operations of D. C. generators & motors, alternators, Squirrel cage motors, meters, Voltmeters, Wattmeters, energy meters ; House-hold appliances like stoves, heaters, irons, fans, toasters, bells, etc ; Rules and principles of indoor wiring ; Illumination — Candle power, Lumen, different sources of light, comparison.

Practical : Distribution of magnetism along bar magnet ; Mapping lines of force of a magnet, Building up an electromagnet or electric bell ; Introduction of insulators, conductors, wires, fuses, etc ; Starting & running Generators, alternators & motors ; Overhauling and repairing various domestic appliances like a switch and table lamp, fan, regulator, electric iron and electric stove ; Connecting up a lamp and a switch and other 10-12 wiring up exercises like staircase, circuit, etc. Measurement of resistance.

General Engineering Knowledge : What is engineering — its contribution to civilization ; mechanical Prime movers ; application of electricity ; manufacture of Chemical products, Mining, Agriculture, etc ; Materials in common engineering use — Timber, Metals and alloys, Building material — Bricks and tiles, limes and concrete ; other materials in common use—Asbestos and galvanised iron sheets, plain and corrugated, paints and varnishes, bitumen, asphalt, etc ; Main sources of mechanical power — Heat, springs, falling bodies, falling of water, moving bodies, Electricity.

IV. Engineering Drawing

Drawing instruments, their uses, setting of drawing ; Letterins—plain, block and italics in freehand, block printing ; Definition of points, lines, angles, triangles, quadrilaterals, polygons, circles, arcs, radius, chord, segments, sectors, tangents etc ; Geometrical constructions :

(a) Lines and angles, triangles, quadrilaterals, circles and tangents,

Proportionals, Regular polygons, circles touching lines and circles.

- (b) Inscription and circumscription of rectilinear figures.
- (c) Construction of Ellipse—(i) by a piece of thread, (ii) by intersecting lines (iii) by intersecting arcs, (iv) by auxiliary circle method.

Scales, drawing to a scale, construction of simple diagonal scales, Engineers Scale, R. F. of the scale ; Projection of Points, lines and plane geometrical figures—Sections of cones and cylinders on different planes ; Simple plans and elevations of the following in position of rest : cube, prisms, pyramid, sphere, cone, cylinder ; Dimensioning ; lines and their conventions as used in Engineering Drawing—Working lines, dimension lines, centre lines, section lines, broken line, etc. ; Dimensional drawing of simple machine parts from models—important conventions for machine drawing ; First angle and third angle projections, representation of object in the orthographic projections, principles of projections, horizontal and vertical plans, plan, elevation and end-view of simple machine components and simple objects such as :—“V” block, Spanner, Simple Bracket, book shelf, office table, stool, tray, box etc. ; Screws and Screw threads—various forms, pitch, conventional representation of screw threads, Hexagon and square bolt head and nut, set screws and studs. British standard whit-worth bolt, nut, locknut, Split pins and washer, bolts and nuts (hexagon & square head)—their proportions ; Various types of keys and key ways. Types of fastenings ; rivets and rivetted joints ; Simple bearings, shaft and flange couplings, Lathe catch plate, pulleys, phimmer block ; Inking, tracing and printing.

V. Workshop Training

Carpentry : Description of important kinds of wood used by carpenters, pattern makers and their special uses. Tools—Saws, Chisels, planes, Hammers & Millets, Gauges, screw drivers, carpenter's rules, marking gauges, try square, etc, description, use, care, materials made of correct grinding and sharpening and their methods. Safety precautions to be taken in handling the tools. Advanced hand tools—gimlets, bracer, spokes, sliding level pincers, pliers, etc., and their uses, care and maintenance of tools.

Simple wood joints—butt joint, mitre joint, half lap joint. Other joints—Mortise and Tenon, tongue and groove joint and common dovetail joint.

Elementary forms of accessories used by the carpenter—wrenches, screws of various kinds, butt hinges, strap hinges, rising butt hinges, tower bolts, flush bolts, rim locks, cupboard locks, padlocks, sash cramp, preparation of french polish and glues.

Practice : Sawing to a line along and across the grain, planing Chiselling, Seantilings and flarks to size. Making of simple joints, more advanced joints—keyed joint, housing joint, ratchet joint, rabbled joint etc. Making of picture frames, tray, letter box, inkstand, low stools, etc.

Pattern Making : Elementary principles of pattern making, various allowances to be given on patterns—taper construction—allowance and machining allowance, contraction rule. Practice—Making of simple patterns and core boxes.

Foundry : Elementary principles of moulding, moulds, moulding tools such as square and heart shaped trowels, cleaner, ventwire pegging, flat rammers, brushes and bellows and their uses. Moulding boxes, cope, drag and middle. Different kinds of sands used in moulding such as green sand, dry sand, loam, facing sand and parting sand. Plumbage Powder, Meaning of terms such as risers, runners, gates, vents, feeding cores.

Practice—Practice on preparation and mixing moulding sands, making of simple moulds & cores.

Smithy : Smith's forge and blower, Description of Smith's tools such as anvil, swage, block, hand hammer, sledge hammer, flat-nosed tongs and their uses, Simple forging operations such as jumping up, drawing down, cutting out, bending, etc.

Practice—Simple exercise involving the use of Smith's tools—hammering—drawing and upsetting, making of rings, Fork, angle, bends, Floor and bench tools—swage block—log and Bench vices—Callipers, compasses, Marking and measuring materials and tools. Scribers—Marking punches Blacksmiths Rule.

Machining : Explanation of the parts and functions of a lathe. A practical demonstration of what a lathe can do with explanation at every stage ; Checking work in a lathe. Plain and taper turning of rods and squares. Right and left V-thread (standard Whitworth) with explanations for the different sizes and number of threads for different sections of rods.

Fitting : Hand tools used in fitting such as hacksaw, hand hammers flat chisel and cross-cut chisel, important forms of rough and smooth files, such as flat, square, round, half-round and triangular files and their uses. Care and maintenance of tools. Safety precautions to be taken in handling tools. Making tools such as scribe centre and dotting punches, try-squares, dividers, outside and inside callipers, steel rule, Vee blocks, parallel vices and their uses. Care and maintenance.

Practice : Simple exercises involving the use of fitters tools such as chipping & filling flat surfaces.

Turning : Description of a screw cutting lathe. Driving plate and carrier and their functions. Independent four Jaw Chuck and self centering chuck. Function of lathes. Care and maintenance.

Safety precautions to be taken in working a lathe. Descriptions of turning tools such as roughing tool, round-nosed tool, Knife tool, parting tool, internal and boring tool and their uses. Care and maintenance of tools. Different operations in turning such as centering, plain turning, taper form turning, facing and parting.

Practice—Simple turning exercise involving the use of V tools.

Welding : General description of Oxyacetylene and electric arc welding plants, Gas cylinders, regulation valves, welding and cutting blow pipes, welding rods. Description of soldering, sweating, tinning and brazing and use of fluxes. Soft-soldering—copper rivetting in joining two pieces of sheet metal.

VI. Chemical Operation and Industrial Chemical Processes

Principles of Chemical Operations

The subject of Chemical Operations should be taught in a descriptive manner. Mathematical deduction of the various formulac and the solution of problems involving complicated mathematical calculations should be avoided as far as possible. More emphasis should be given on **the practical aspects of the subject**. It will be more effective if this **subject is taught in a sandwich system i. e.**, class room instruction and factory training are given alternatively.

Theory

Stoichiometry Stoichiometric principles and composition relations. Simple problems on heat and material balances.

Flow of Fluids Various heads, Type of flow. Viscosity. Flow measurement, Pumping. Pipe-size determination. Water hammer, Continuous separators.

Heat Transfer Transformation of energy, Methods of heat transfer. Heat transfer by conduction, convection and radiation. Heat transfer by combinations of methods.

Evaporation Methods of heat supply. Types of equipment—direct fired pans, spray-type evaporators, jacketed vessels, tabulator evaporators. Operating factors for tabular evaporators—heat transfer,

crystal formation, entrainment and foaming, decomposition of products and corrosion. Auxiliary equipment—condensers, pumps. Heat recovery—multiple effect evaporation. Limitation of effects, re-compression, self evaporation, operating difficulties in multiple effect systems.

Distillation Types of distillation. Vapour-pressure relationship. Immiscible and miscible liquid. Enrichment of vapours. Equipment vaporization—still, pots, pipe stills; fractionation—partial condensers, sieve—plate columns, bubble—plate columns, cascade trays, packed columns; condensation—coil, tubular condensers. Accessories.

Drying Drying by hot surfaces and hot gases. Equipment—drying by hot surfaces—pan driers, rotary driers, drum driers, self driers; drying by hot gases—rotary driers, spray driers, self driers.

Absorption Principles. Factors influencing rate of absorption—temperature, pressure and velocity. Equipment—spray chambers, surface contractors, gas—bubbling units.

Mechanical Separation—Filtration: Purpose of filtration. Effect of pressure, cake thickness, particle size and filter medium on filtration. Types of filter mediums and their selection. Common types of filter. Sedimentation. Various methods of sizing and concentration of materials—screening, jigging, tabling, magnetic separation, froth flotation, electrostatic methods of concentration and sink and float concentration. Crystallization—commercial importance of crystal size and shape, crystal formation, crystallization apparatus. Centrifuges. Separation of dusts and mists.

Mixing—Practical objective of mixing. Physical factors in mixing, common types of mixers. Crushing and grinding—common types of crushers and grinders. Humidification and dehumidification—humidity controlling devices, maintenance of constant humidity. Cooling towers and spray ponds. Storage of solid liquids and gases. Common measuring and controlling instruments. Materials of Construction—material used in Chemical plant, corrosion.

Practical Measurement of flow fluids through flow meters; Determination of efficiency of a pump; Determination of rate of heat transfer for a given rate of liquid flow with steam at different pressures; Determination of rate of heat transfer for a given steam pressure with different rates of liquid flow; Study of effect of lagging on loss of heat from steam pipes; Determination of relationship between

energy consumption and screen analysis; Concentration of minerals by froth flotation; Study of rate of heating of a liquid with a stirrer in a jacketted vessel; Filtration at a constant pressure and constant rates; Determination of rate of evaporation at different steam pressures from a boiling liquid; Study of strength of distillate with time by batch distillation; Determination of the ratio of mols of products per mol of steam in steam distillation; Determination of rate of drying in a tray drier under atmospheric pressure and vacuum.

Fuels, Furnaces and Refractories

Fuels Industrial fuels. Coal—composition, types, main uses, characteristics of coal of industrial importance. Coke—production and uses. Petroleum—Composition, refining, industrial products and their uses. Gases—coal gas, producer gas and water gas—their production and uses.

Furnaces Common types of furnaces, their strength and durability. Temperature control. Waste heat recovery. Pyrometry.

Refractory and Insulating materials Common types of refractories—silica brick, Silicious brick, fire brick, aluminous brick etc. Raw materials, manufacture, properties and uses. Action of slag, gases and vapours on refractories. Insulating materials—classification according to their uses, insulating fire bricks. Lagging.

Industrial Chemical Processes

The subject of Industrial Chemical Processes should be taught briefly to give the students a general idea of the important industries based on inorganic and organic chemistry. The detailed flow sheet of each industry and the mechanism of reactions involved in various chemical processes should be avoided.

Water: Source. Mineral matter in water. Causes of scale formation and their removal. Treatment of water for industrial uses.

Industrial gases Hydrogen and oxygen—manufacture and their industrial uses. (Other important gases have been included under fuels).

Acids Sulphuric, nitric and hydrochloric—important manufacturing processes and their industrial uses.

Alkalis Chlorine, Soda ash and caustic soda— manufacture and their uses.

Fertilizer Ammonia—manufacture and uses. Ammonium Sulphate—raw material, manufacture and uses. Superphosphates, raw material and manufacture.

Cement Raw material and manufacture. Setting or hardening of cement.

Sugar Manufacture of cane sugar. Alcohol from molasses.

Paper Raw materials. Manufacture of pulp and paper.

Oils and Soaps Vegetable oils. Hydrogenation of vegetable oils for edible purposes. Manufacture of soap and recovery of glycerine as by-product.

Insecticides Common insecticides. Manufacture of D. D. T.

Paints and Varnishes White lead, zinc oxide, lithophone, titanium dioxide, chromes—raw materials, manufacture and their uses. Varnishes—raw materials and uses.

Practical Water analysis; Proximate analysis of coal; Gas analysis by Orsat apparatus; Determination of flash point and viscosity of mineral oils; Determination of calorific value of fuels.

VII. Foremanship and Supervisors

Principles of supervision. Transition from worker to supervisor. New responsibilities.

Industrial Relations Place of Industry in Indian economy. Brief study of labour legislation. Indian Factories Act. Payment of wages Act. Worker's compensation. Employees' state insurance. Provident fund. Trade unionism. Collective bargaining. Welfare of workers. International labour organization.

Industrial Management Employees and the ownership. Coordination, planning and control. Personnel functions. Selection of candidates. Industrial training. Handling of workers' grievances.

Principles of Foremanship Status of a foreman and his responsibilities. Duty towards management and workers. Foreman as a trainer. Importance of higher production and quality control. Time and motion study. General economy and time saving devices. Price structure, control and reduction.

Safety Practices Common causes of accidents and their prevention. Causes of accidents in chemical industries. First aid of chemical accidents. Receiving and transporting of chemicals. Storage of chemicals. Educating the workers in safety practices.

VIII. Factory Training**Model List of Building equipment, Staff etc. for Chemical Operators' School**

N.B. The Model list has been prepared with due regard to the standard and content of the courses to be organised in Chemical Operators' School and the degree of competence which the students should attain during the course.

The list is only a model for the guidance of the schools. There is no rigidity either in respect of the particular manufacturers of the various items of equipment or of their exact specifications in all respects. The list can be altered or changed to suit the conditions of individual institutions provided that such changes or alterations are not of a major kind and the total estimates of cost remain the same.

I. Science Laboratory**Approximate Cost**

Rs. 30,000

A. Physics**Approximate Cost**

Rs. 10,000

(a) Equipment

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Approximate Cost

Rs. 9,000

Sl. No.	Equipment	Number required
1	2	3
1.	Laboratory supports and Clamps (various types)	15
2.	Pulleys	6
3.	Balance	4
4.	Weight box	4
5.	Spring balance	4
6.	Set of rough Weights	4
7.	Metre rods of other scales	20
8.	Measuring tape	2
9.	Micrometer screw gauge	4
10.	Vernier calliper	4
11.	Spherometer	4
12.	Stop watch	2
13.	Spirit level	4
14.	Graduated cylinders, Burettes, pipettes, and stands	15

1	2	3
15.	Apparatus for composition of forces	2
16.	Inclined plane	2
17.	Simple pendulum	4
18.	Apparatus for demonstrating parabolic law of motion under gravity	1
19.	Spherical Spring for demonstrating the properties of S.H.M.	1
20.	Apparatus for demonstrating the 2nd Law of motion	1
21.	Specific gravity bottles	6
22.	Nicholson Hydrometer	2
23.	Lactometer	1
24.	Standard Hydrometer for heavy liquids and light liquids	2
25.	Hare's Apparatus	2
26.	U-tube Manometer	2
27.	Cartesian Diver	1
28.	Model Hydraulic Press	1
29.	Hero's Fountain	1
30.	Automatic Siphon	2
31.	Boyle's Law apparatus	1
32.	Vacuum pump with accessories	1
33.	Aneroid Barometer	1
34.	Fortin's barometer	1
35.	Rain gauge	1
36.	Max. and Min. Thermometer	1
37.	Wet and Dry Bulb hygrometer	1
38.	Thermometer (different types)	6
39.	Linear expansion apparatus	1
40.	Constant Volume Air Thermometer	1
41.	Searle's thermal conductivity apparatus	1
42.	Apparatus for demonstrating properties of heat radiation	1
43.	Thermos flask	1
44.	Davy's safety lamp	1
45.	Mech. equivalent of heat apparatus	1
46.	Calorimeter and Stirrer	6
47.	Apparatus for determining Sp. heat of solids	1
48.	Apparatus for determination of Latent heat of steam	1

1	2	3
49.	Model steam engine	1
50.	Hartle's optical disc.	1
51.	Mirrors and Lenses (different types)	15
52.	Prisms (also hollow prisms)	6
53.	Glass plates, slabs	4
54.	Magnifying glass	4
55.	Optical bench with accessories	2
56.	Spectrometer	1
57.	Photometer	1
58.	Colour slides for showing the effect of mixing colours and pigments	1
59.	Newton's Disc.	1
60.	Eye-Test chart	1
61.	Eye Model	1
62.	Reading Telescope	1
63.	Tuning fork	6
64.	Resonance tube apparatus	1
65.	Sonometer	1
66.	Demonstration apparatus for wave motions	1
67.	Organ pipe	1
68.	Magnet of different types	15
69.	Floating magnet	1
70.	Magnetic needle	4
71.	Magnetic compass (small)	6
72.	Dip circle	1
73.	Mariners' compass	1
74.	Rods of various materials for generating frictional electricity and rubbers, cats skin, silk	4
75.	Electroscope	2
76.	Electrophones	1
77.	Electrostatic machine	1
78.	Leyden jars	2
79.	Electric chimes, whirl, Icepail, Butterfly net etc.	1
80.	Cells of various types including accumulators	15
81.	Apparatus for demonstrating magnetic effect of current	1
82.	Tangent galvanometer	1
83.	Moving Coil galvanometer	1
84.	Metre bridge	2

1	2	3
85.	Resistance box	1
86.	Post-Office Box	1
87.	Rheostat	4
88.	Ammeter	2
89.	Voltmeter	2
90.	Copper Voltmeter, water-Voltmeter	2
91.	Plug-keys and commutator	10
92.	Electromagnet	1
93.	Demonstration—Dynamo, Motor	1
94.	Induction coil	1
95.	Crystal receiver	1
96.	Miscellaneous :	
	(b) Chemicals, glassware, hardware and tools etc.	Approximate Cost Rs. 1,000
B.	Chemistry	Approximate Cost Rs. 10,000
	(a) Equipment	Approximate Cost Rs. 8,000
1.	Analytical balance with wt. box	1
2.	Crystallising basins & dishes	15
3.	Enamelled trays	6
4.	Sand baths	15
5.	Water baths	15
6.	Beakers	160
7.	Bee-Hives shelves	15
8.	Bell jars	2
9.	Foot Clows	2
10.	Blow pipes & Mouthblow pipes	4
11.	Reagent bottles	5000
12.	Brushes	20
13.	Spirit lamps	20
14.	Bunsen Burner, fishtail, Ring	2
15.	Ca Cl ₂ -tubes	2
16.	Asbestos sheets	15
17.	Apirators	2
18.	Evaporating porcelain basin	40
19.	Iron stand with clamps and rings	30
20.	Porcelain boats	1
21.	Combustion tubes	2

1	2	3
22.	Condensers	6
23.	Cork borers	10
24.	Cork press	4
25.	Cork (assorted)	4 gross
26.	Corks (rubber)	4 dozens
27.	Cork boring machine	1
28.	Crucible	20
29.	Glass models of crystals	1 set
30.	Dessicator	2
31.	Deflagrating spoon	4
32.	Crucible tongs	6
33.	Diffusion apparatus	1
34.	Distillation apparatus	1
35.	Drying Ovens	1
36.	Voltameter	1
37.	Fudimeter	2
38.	Files	15
39.	Filter paper packet	1 gross
40.	Filter paper case	1
41.	Filter pumps apparatus	1
42.	First aid cabinet	1
43.	Flasks F.B., R.B., conical, Distillation	300
44.	Funnels-Separating	2
	Thistle	20
45.	Kipp's apparatus	1
46.	Gas holder	1
47.	Gas jars	300
48.	Wire gauge	40
49.	Burettes	4
50.	Graduated cylinders	20
51.	Measuring flasks	6
52.	Pipettes	15
53.	Hydrogen trough	1
54.	Mineral collection	1 set
55.	Mortor & pestle	15
56.	Koh-bulb	2
57.	Retorts	4
58.	Spatulas	30

1	2	3
59. Wooden supports		1 set
60. Burette stands		4
61. Clay triangles		15
62. Funnel stands		30
63. Tripod stands		30
64. Test tube racks		30
65. Test papers		2 gross
66. Test tubes		6 gross
67. Test tube holders		15
68. Thermometer		4
69. Troughs		16
70. Glass tubing		40 lbs
71. Glass rod		20 lbs
72. Rubber tubing		40
73. Gas washing bottles		6
74. Watch glass		30
75. Lantern slides		700
76. Weighing bottles		
77. Chemical Charts		1 set
78. Atomic models		1
79. Woulfe's bottles		30
80. Portraits of Scientists (Chemists)		1 set
(b) Chemicals :		Approximate Cost
		Rs. 2,000
C. Chemical Technology		Rs. 10,000
1. Bomb Colorimeter		1
2. Muffle Furnace		1
3. Flash point Apparatus		1
4. Redwood Viscometer		1
5. Orsat Gas Analyser Apparatus		2
II. Engineering Laboratory		Approximate Cost
		Rs. 35,000
A. Mechanical Engineering		
1. Bottle lifting Jack.		1
2. Lifting tackle : wrought iron pulley blocks		
(a) One sheave $3\frac{1}{2}'' \times \frac{1}{2}''$	}	One of each
(b) Two sheaves $3\frac{1}{2}'' \times \frac{1}{2}''$		
(c) Three sheaves $3\frac{1}{2}'' \times \frac{1}{2}''$		
3. Weston differential pulley block		2
4. Worm geared pulley block		2

1	2	3
5.	Winch Cral (single & double purchase)	3
6.	Bell Crank lever	2
7.	Adjustable inclined plane 30" × 8" with glass top	4
8.	Friction apparatus adjustable for inclination 30" × 8"	4
9.	Jip crane Model	4
10.	Simple wheel and axle	4
11.	Differential wheel and axle	4
12.	Worm and Worm wheel model	2
13.	Model of roof trusses	3
14.	Boards for parallelogram and polygon of forces	6
15.	Single purchase crab 150 lb. capacity.	3
16.	Model steam Engine	2
17.	Petrol Engine	2
18.	Diesel Engine	2
19.	Screw Jack	3
20.	Law of moments apparatus	2
21.	Bicycle	1
22.	Pressure stove store	2
20.	Water tap	2

B. Electrical Engineering

1.	Switches single way	40
2.	Switches two way	40
3.	Switches two way off	40
4.	Switches twin knob	20
5.	Switches intermediate	20
6.	Switches series, parallel and off	20
7.	Ceiling rose two plate	20
8.	Ceiling rose three plate	20
9.	Ceiling rose four plate	10
10.	Holder brass	20
11.	Holder battan, brass	40
12.	Cleats two way	60
13.	Cleats three way	60
14.	Wooden blocks diameter 3"	60
15.	Wooden blocks 6" × 3"	40
16.	Various electric accessories like adapters, T. holders etc.	2 each

1	2	3
17.	Iron clad switches with fuse 220-V-5A	3
18.	K't kat fuse 5A	30
19.	Wiring boards 3'×3'×1"	20
20.	V.I.R. Wires 1/18	4
21.	Bare wire No. 10 and 20	2 each
22.	Conduit ½" with accessories	15 ft.
23.	Fuse wires 5, 10 and 20 A	2 lb. each
24.	Hard drills with cut gears and 3 Jaw chuck with capacity 0	2 each
25.	Small gimlet 6"	20 each
26.	Screw drivers 4", 6" and 8"	20
27.	Electrician's insulated pliers 6½"	30
28.	Knives 6"	30
29.	Pipe vice	1
30.	Hand saws 12"	2
31.	Bell indicator	2
32.	Electric bell 220-250 V, AC/DC type ¾ gong	2
33.	Tachometer	1
34.	Stop watch	2
35.	Hydrometer for battery testing	2
36.	Electric soldering iron 4500W	4
37.	Ordinary soldering iron 40Z	20
38.	Electric iron 220V, 450 watts, 3½ lb.	2
39.	Electric heater plate type 750 w, 220 V with adjustable controls and automatic resting device	2
40.	Wire gauge (B.S.) (0-36)	2
41.	Florescent lighting tube (day light) with choke and switch, 4' 40 watt, 220 V	2 dozen
42.	Carbon filament lamps 50 C. P., 220 V	2 dozen
43.	—do— 100 C. P., 220 V	2 dozen
44.	5 K.W. 230V D.C. Compound Generator coupled with 440V, 4ph. 50 cycles motor with starter complete with ammeter field regulator suitable off/on (field terminers to be brought out on a terming board)	2
45.	½ to 1 H.P. compound wound, shunt wound and series wound 220V D.C. motor with starters	4 each
46.	Spare starters for above motors one for each	4

1	2	3
47. 1 to 3 HP A.C. Squirrel cage motor 230V 3 PH with star delta starter		2
48. Transformer $\frac{1}{2}$ KVM, 250 V-25V		2
49. Rectifier for battery charging		2
50. Generator DC. 25V-10A completed to a suitable Single phase A.C. Motor		2
51. Ceiling fan 48" A.C. 50 cycles, motor induction self starting, regulators choke coil type		2
52. Ceiling fan 48" D. C. with regulator		2
53. Table fan A.C. 50 cycles 12"-14" sweep oscillating type motor induction type regulator choke type fitted in base with off position and three speeds		2
54. Megger Range 0 to infinity		1
55. Voltmeter (moving iron) 0-50V		15
56. M.C. Voltmeter 0-300V (to be provided) with resistances to measure up to 1,000 volts)		2
57. M.I. Ammeter 0-3A		10
58. M.I. Ammeter 0-5A (to be provided with shunts to measure up to 100A)		2
59. M.I. Voltmeter 0-250V (to be provided with resistance to measure up to 1000V)		2
60. Multimeter		1
61. Energy meter D. C., 5A, 200 V dic type		2
62. Energy meter A.C. 5A, Single phase 220V, 50 cycles		2
63. Energy meter DC, 5A, 220V mercury type		1
64. Polarity tester		2
65. Galvanometer (moving coil)		4
66. Battery testing voltmeter with high discharge resistance		2
67. Variable sliding resistance 1.5A, 370 ohms		15
68. Variable sliding resistance 2.6A 160 ohms		10
69. Variable sliding resistance 5A 10 ohms		6
70. Variable sliding resistance 20A 10 ohms		2
71. Wheatstone bridge meter long 20 gauge wire negligible temp. coeff.		
72. Resistance box up to 1000 ohms		10
73. Leclanche cells		30
74. Multiple plate secondary batteries 6V. 120A hrs.		3
75. Magnetic needle 4" with stand		4
76. Induction coils		3

1	2	3
77.	Frequency meter 47-53 cycle/second	2
78.	Potentiometer 4 wire 100 cm. 20 s.w.g.	4
79.	Small transformer (household) 230V-6V	3
80.	Bar magnets 8"	20
81.	Horse shoe magnets	6
82.	Die stock set for conduit with adjustable round split dies	2
83.	Condensers of assorted size	2 each
84.	Storage battery 2V	3
85.	Body of old DC Generator or motor with poles and field coils (220V).	2
86.	Wattmeters, Dynamometer type 0-75 O.W. 9-300W	2
87.	Tangent Galvanometer	2
88.	Fixed Resistances (assorted)	1 set
89.	Compass (magnetic)	15
90.	Soft iron (horse shoe) core	15
91.	Table lamp	4
92.	Electric Radiator	4

III. Chemical Operations Laboratory Approx. cost Rs. 1,25,000

Sl. No.	Equipment	Number	Approx. Price
1.	Flotation Cell	1	3,000
2.	Ball Mill	1	2,500
3.	Wilfley Table	1	4,000
4.	Jaw Crusher	1	4,000
5.	Doll Crusher	1	4,000
6.	Double Deck Vibrating Screen	1	4,000
7.	Thickener	1	3,000
8.	Filter Press	1	2,000
9.	Paddle Mixer	1	1,000
10.	Basket type Centrifuge	1	10,000
11.	Flow of fluid experiment for pressure drop through various types of pipe fittings	1 set	2,000
12.	Centrifugal Pump set up	1	3,000
13.	Rotary Pump	1	1,000
14.	Compressor	1	7,500
15.	Rotometer Orifice meter and venturimeter	1 set	3,000

1	2	3	4
16.	Vacuum Crystalliser	1	5,000
17.	Liquid-Liquid Extraction Column-Packed type	1	3,000
18.	Ion-Exchange Unit	1	7,500
19.	Shell and Tube type Heat Exchanger	1	3,000
20.	Jacketted Pan	1	2,000
21.	Boiler of adequate capacity with coal as well as oil firing arrangement	1	20,000
22-	Long Tube Evaporator	1	7,500
23.	Bubble Cap Plate	1	500
24.	Batch Distillation Unit	1	7,500
25.	Vacuum Tray Dryer	1	5,000
26.	Different types of temperature controller, pyrometers, electronic relays, thermoregulators, gas meters, liquid meters etc.	1 set	10,000
IV. Engineering Drawing		Approx. Cost : Rs. 3,600	

Sl. No.	Equipment	Number required
1.	Drawing boards half imperial size 16"x23"	20
2.	T-Squares half imperial size 24" long	20
3.	Drawing board imperial size	1
4.	T-Square for above	1
5.	Drawing instrument boxes superior quality	20
6.	Drawing instrument box for Draughtsman	1
7.	Set squares celluloid 8" or 6" size 60° and 45°	20
8.	Wooden foot rules 12" Armstrong	20
9.	Reeves set of card board scales 12"	1
10.	Board pins, superior quality	15
11.	Protractor celluloid or wooden 12"	2 sets
12.	Set square celluloid 15" size 60° and 45°	2 sets
13.	Set of drawing models	2 ,,
14.	French curves (assorted)	2 ,,
V. Workshops		Approximate cost Rs. 2,00,000
A. Carpentry		Approximate cost Rs. 10,000

Sl. No.	Equipment	Number required
1.	Iron smoothing plants-length 9" width of cutter 2", 1/2"	8 each
2.	Iron jack planes length 14" width of cutter 2"	2

1	2	3
3. Wooden smoothing plane 7" long cutter 1 $\frac{1}{4}$ "		2
3.(a) Wooden smoothing plane 8" long cutter 2"		8
4. Wooden jack plane 14" cutter 2 $\frac{1}{2}$ "		2
5. Wooden trying plane 22" cutter 2 $\frac{1}{2}$ "		2
6. Wooden rebate plane $\frac{3}{4}$ " and 1"		2
7. Wooden house plane		2
8. Plough plane		2
9. Firmer chisel $\frac{1}{4}$ ", $\frac{1}{2}$ ", 1" with handle		8 each
10. Paring chisel $\frac{1}{4}$ " and 5" 6" with handle		4
11. Mortise chisel $\frac{1}{4}$ " and 5/16" with handle		4
12. Mortise chisel $\frac{1}{4}$ ", $\frac{3}{4}$ " and 1" with handle		4
13. 1 Claw hammer with handle		2
14. Turn screw London Pattern 6", 8" 10" and 12"		4 each
15. Cabinet Turnscrew length 8"		2 "
16. Box wood rules 2' 4-fold		8
17. Iron handle try square 6"		8
18. Measuring tape leather case soft liner 60' Marked in inches and feet		1
19. Iron spoke shaves with raised handles length 10" cutter 2-1/8"		4
20. Marking gauges		8
21. Bright double twist screw anger eyed size 1/8", $\frac{1}{4}$ ", 5/8", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ "		1 each
22. Set of the following lists :		1 each
(a) Irwin pattern anger bits $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{8}$ ", $\frac{7}{8}$ ", 1"		1 each
(b) Screw driver bit $\frac{1}{2}$ "		1 "
(c) Screw driver bit $\frac{1}{2}$ "		1 "
(d) Spoon $\frac{1}{4}$ "		1 "
(e) Rincer		1 "
(f) Snail head $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ "		1 "
(g) Rose head $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ "		1 "
(h) Twist $\frac{1}{8}$ ", $\frac{1}{4}$ "		1 "
23. Cast steel twist gimlet size $\frac{1}{4}$ "		1
23a. Gimlet $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ "		8
24. Bradwals		4
25. Carpenters braces 16" sweep ratchet type		2
26. Hand drills single pinion 12" long with assorted pits capacity 0.4"		2

1	2	3
27. Breast drills capacity 0- $\frac{1}{2}$ " complete with chuck size 18"		1
28. C. I. Wood workers vices, continuous screw quick action width of jaw 7" opening 8"		7
29. Black tower pinens 8"		2
30. Nail puller		1
31. Combination pliers 8"		2
32. Hand Saw size 12"		8
33. Tennon Saws size 12"		8
34. Hand saws size 18"		2
35. Locker compass saw 12"		2
36. Handsaw set with beach wood handle		2
37. Saw set pistol grip 4-12 points per inch		1
38. Cabinet rasps 10"		4
39. Saw files 8"		4
40. Callipers inside and outside 8"		4
41. Grind stone with C.I. trough or M.S. angle frame, size, of tone 30"×5" with fast and loose pulleys for power drive, complete with tools rest		2
42. Oil cans $\frac{1}{2}$ pint with fixed spout		2
43. Bow saw 12"		1
44. Mortise gauge		2
45. Wing compass 20"		1
46. Sliding level 8"		2
47. Joiner hammer No. 4		2
48. Wood working lathes		4
49. Wood turning tools		1 set
50. Mallets		8 each
51. Oil stones		2
52. Scriber 6"		2
63. Hammer carpenter 1 $\frac{1}{2}$ lbs.		8
54. Adze		8
55. Saw Band 3/4" with meter		1
56. Blade Band saw 2/4"×12'		1
57. Saw circular 18" dia with motor		1
58. Cutter circular saw 18"		1
59. Universal wood working machine for all ordinary operation size 6" motorised complete with accessories		1

1	2	3
60.	Sharpener for burd and circular saws	1
61.	Veneer Press	1
62.	Cramp carpenter 4 ft.	1
63.	Bench working 8'×4'×2½'	2
64.	Almirah 6"×3'×15"	1
Pattern Making		Approximate cost Rs. 5,000
1.	Rule four gold wooden 24"	8
2.	Calliper inside and outside 6"	8 each
3.	Scriber C"	8
4.	Square Try 16"	8
5.	Saw, hand 16"	8
6.	Plane Smoothing ½" cutter	8
7.	Chisel Firmer 1/8", 3/4", by 1/8" set of 6	8
8.	Mallet 2 lbs. with handle	8
9.	Hammer Carpenter 1-1½ lb. with handle	8
10.	Steel rule 12"	8
11.	Adze	3
12.	Board, Shooting	1
13.	Compass wing	8
14.	Bevel T Sliding	8
15.	Gauge Marking	8
16.	Gauge Mortice	2
17.	Trammel	2
18.	Clamp	1
19.	Saw set stanley type	2
20.	Saw Compass	8
21.	Saw Tennon	8
22.	Saw pad with blades	8
23.	Saw Hand	8
24.	Saw file Paper	8
25.	Saw vice	1
26.	Tape measuring	2
27.	Fincer	8
28.	Plane Trying	2
29.	Plane Jack 17" wood 2½" cutter	8
30.	Plane smothing 8" wood 2" cutter	2
31.	Plane Rabbet adjustable ¼" to ½" cutter	2
32.	Plane rounding	2

1	2	3
33.	Plane grooving	8
34.	Plane Plough	1
35.	Sit Iron for above	2
36.	Hammer Claw	2
37.	Screw drivers 6"	2
38.	Screw driver 16" with 3/8" blade	2
39.	Screw driver 9" London Pattern	2
40.	File 3 corner	2
41.	Rasp Bastard	8
42.	Chisel pairing 1/8" to 3/4" by 1/8" set of 6	8
43.	Chisel Mortin —do—	8
44.	Bit Ratchet Brace	2
45.	Bit centre 1/4", 5/16", 3/8", 2 1/2" set of 4	1
46.	Bit Rox Head 1/4", 3/8", 1/2", 5/8" set of 4	1
47.	Bit countersink flat 1/4", 3/8", 1/2", 5/8" set of 4	1
48.	Level spirit (wood) 8" brass plated	1
49.	Rule contraction	8
50.	Auger 1/2", 5/8", 3/4", 7/4" set of 4	4
51.	Gimlet 1/4", 3/8", 1/2", 5/8" set of 4	8
52.	Mitre Box	4
53.	Gauge Firmer 1/4", 5/8", 1/2", 5/8" set of 4	8
54.	Spoke shares	8
55.	Bradwal	8
56.	Punch Nail	8
57.	Stone oil	8
58.	Pet Glue	2
59.	Augers 1/2", 3/4", 5/8", 1" each	2
60.	Bits spoon 1/4" to 1/2" by 1/16"	2
61.	Oil can	1
62.	General Installation:	
	(i) Saw Pad with motor	1
	(ii) Blade Band Saw	1
	(iii) Cutter circular saw	1
	(iv) Lathe wood working	2
	(v) Stone grinding	1
	(vi) Cramp Car enter 5 ft.	1
	(vii) Vice Bench	1
	(viii) Vice Carpenter 15" and 14" Jaw	2
	(ix) Bench working	2
	(x) Alm.rah	1

1	2	3
C. Foundry		Approximate cost Rs. 5,000
1.	Moulders' hand bellons	1
2.	Complete set of moulder's tools (1 set of 22 tools)	
3.	Sets of moulders' tools consisting of	8
	(a) Trowel combined heart and square	
	(b) Lifter	
	(c) Vammer	
	(d) Needle for venting	
	(e) Boss tool	
4.	Moulding boxes (cast iron)	10
5.	Crucibles 10 lbs. 20 lbs.	3
6.	Crucibles 40 lbs.	1
7.	Various teak wood patterns (to be made in the Carpentry shop)	
8.	Tongs for lifting crucibles	8
9.	Mirror 8" x 10"	1
10.	Oil or coke fired tilting furnace or cupolette	1
11.	Ladles 6", 8"	1 each
12.	Pattern Makers' scale	1
13.	Pit furnances lines with fire bricks and fed by a blower (to be made)	8
14.	Machine Moulding standard 12" type	1
15.	Vice Bench Jaw 6"	1
16.	Bench working	1
17.	Almirah	1
D. Smithy		Approximate Cost Rs. 6,000
1.	Rule Brass 4 fold	8
2.	Callipers outside and inside 8" firm joint	8 each
3.	Compass wing	8
4.	Square Smith	8
5.	File flat rough	8
6.	Hardis	3
7.	Tongs (assorted)	4 each
8.	Sets hot and cold	4
9.	Chisel	8
10.	Flatters	4

1	2	8
11.	Top and bottom swage different sizes	2 each
12.	Top and Bottom fullers various sizes	2 each
13.	Punches—Round, Square various sizes sets of 4	2 each
14.	Hammers (i) Smithy, (ii) Ball pein 2 lbs., (iii) sledge	4 each
15.	Snap Rivet (set of 2)	2
16.	Apron leather	2
17.	Poker, Shoal, Rakehand	2
18.	Forge	2
19.	Blower Forge, and Motor Blower and Line Air Pipe for Blower with cocks set.	1
20.	Tank water	2
21.	Anvil 1½—2 cwt.	4
22.	Block swage	1
23.	Vice Leg	2
24.	Bench working	1
25.	Almirah	1

E. Machining and Turning**Approximate cost Rs. 1.50 lacs***(a) Basic Machine Shop*

1.	Kirloskar 6½ Centre Bench Lathe	3 Nos.
2.	Cooper 12" Shaper	2
3.	Pillar Drills with 3 or 4 power feeds	2
4.	Pedestal Grinders arranged for wet grinding with drill grinding attachment	2
5.	Hack Saw machine	1
6.	Marking Table 1000 mm × 1000 mm	1
7.	Fitter Bench with vices	2
8.	Measuring Equipment	
	150 mm outside callipers	8
	150 mm Inside „	8
	150 mm Odd legs	4
	Marking Block (Universal)	2
	Try Squares (machinists) 150 mm	2
	Vernier Beval Protractors	2
	0—25 mm Screw Gauges	2
9.	Tools:	
	Carbon Steel Lathe and Shaper	40 ft.
	Tool materials in sizes	40 ft.

1	2	3
	Drill pits of sizes	8 sets
	Grinding Wheels for grinders	8 ps.
	Wheel dresser	8 ps.
	Knurling Tools	2 ps.
10.	Small Tools:	
	Files of sizes	8 sets
	Hammer	3 ps.
	Spanners, Screw drivers, Pliers, Oilcans etc.	2 sets
	(b) <i>Advanced Machine Shop</i>	
1.	Hindustan H—22, 225 mm or h. t. by 1000 mm. between centres with standard accessories	(Indigenous)
	Extras:	
	Universal face plate chuck steady and follow rests, self centering scroll chuck, coolant equipment Swarf tray, Rear tool holder and longitudinal slips splash gaurd	1
2.	Praga U-1 Universal Milling Machine with standard accessories	(Indigenous)
	Extras :	
	(i) Vertical Milling Attachment	1 No.
	(ii) Universal dividing head	1 „
	(iii) Machine Vices with swivelling Base	1 „
3.	Quenching Baths	1 set
4.	Tool and cutter grinder	1 No.
5.	Bench Carbide Tool Grinder	1 „
6.	Measuring Equipment :	
	(i) Surace Plate 300 mm x 300 mm	1 „
	(ii) Combination set	1 „
	(iii) V. Blocks with clamp	2 „
	(iv) Marking Block (Universal)	2 „
	(v) 300 mm Steel Scales	3 „
	(vi) 150 mm Steel Scales	4 „
	(vi) Vernier Bevol Protractor	1 „
	(viii) Try square (machinists) 150 mm	3 „
	(ix) 150 mm Outside Callipers	3 „
	(x) 150 mm inside Callipers	3 „
	(xi) 150 mm Spring Calliper Outside	2 „

1	2	3
(xii)	150 mm Spring Calliper Inside	2 „
(xiii)	150 mm odd legs	3 „
(xiv)	150 mm dividers	4 „
(xv)	0-25 mm, 25-50, 50-75 mm, 75-100 mm, 100-125 mm, 125-150 mm	2 sets
(xvi)	Vernier Callipers	2 ps.
(xvii)	Screw Depth Gauge	2 sets
(xviii)	Depth Gauge	2 Nos.
(xix)	Metric Plug Gauges 5 mm to 25 mm	1 set
(xx)	Metric Ring Gauges 5 mm to 25 mm	1 set
(xxi)	Morse Taper Gauges, plug and socket No. 2, 3, 4, and 5 morse	1 set
(xxii)	Metric Ship Gauges (21 ps)	1 set
(xxiii)	Sine Bar	1 set
(xxiv)	Thread Pitch Gauge	2 sets
(xxv)	Radius Gauges	2 sets
(xxvi)	Dial Gauges with stand	4 Nos.
Tools :		
Material for high speed tools :		
(i)	25 x 16 mm high speed steel for lathe tools	15 feet
(ii)	16 mm dia high speed steel for lathe tools	4 ft.
(iii)	10 mm dia high speed steel for lathe tools	4 ft.
(iv)	Tungston Carbide Tipped Tools (Steel grade) } Shank 25 mm x 16 mm, Bent and Straight ; Roughing, Finishing, Knife tools, Bent and straight Round Nose, Parting and Boring, Tools } 2 sets	
(v)	Tungston Carbide Tipped Tools (Cast iron Grade) Bent and Straight Roughing Corner Tools, Finishing and Grooving, Knife Tools } 2 sets Boring Tools, Round Nose Straight and Bent } 2 sets	
(vi)	Knurling Tools	2 Nos.
(vii)	Milling Cutters, Cylindrical end mills, side mills, single and double angle end mills, face mills. }	10 ps.
(viii)	One set of gear milling cutters metric	1 set.
(ix)	Spare grinding wheels for Universal grinder and Tool and Cutter Grinder.	32 Nos.

1	2	3
11. Small Tools		
(i) Bench Vice and Fitters Bench		1 set.
(ii) Files of sizes		16 Nos.
(iii) Drill Bit of sizes		16 „
(iv) Tap of sizes		16 „
(v) Reamers of sizes		16 „
(vi) 500 gms. B.P. hammers		2 „
(vii) Spanner Sets, Screw Drivers, Pliers, Oilcans		2 sets.
(viii) Centre Punches, Marking Hammer etc.		2 sets.
(ix) Arbor Press		2 ps.
F. Fitting		
	Approximate cost	Rs. 8,000
1. Rule Steel 6"		8
2. Square Try 6" blade		8
3. Callipers (inside and outside) firm Joint 6"		8 each
4. Divider 6"		8
5. Odd legs 6"		8
6. Scribers 6"		8
7. Runch centre 4"		8
8. Screw driver 6"		8
9. Ch'sel cold 1"		8
10. Hammer B.P.		8
11. Rule Steel 12"		2
12. Rule Steel 24"		2
13. Edge straight 18" steel		1
14. Plate surface		1
15. V. Block 2"×1"×1" with clamps		2
16. Level spint 6"		1
17. Punch letter set		1
18. Punch figure set		1
19. Punch hollow and round		2 each
20. Drill brace Hand 0" to $\frac{1}{4}$ " - $\frac{1}{4}$ " - $\frac{1}{4}$ "		2 each
21. Drill twist set of 8		2
22. Tas and dies complete set		2
23. Files:		
(a) Flat Second cut and smooth 10"		8
(b) Half round Second cut and Smooth 10"		8
(c) Triangular Second cut 8"		8
(d) Square Second cut 10"× $\frac{3}{4}$ "		8

1	2	3
24.	Stone oil 2"×2½"×1", 1"×4"×½"	2 each
25.	Canoil ½	1
26.	Plier — side cutting 6" combination 6" Round box 6", gas 6"	2 each
27.	Spanner	2
28.	Clamp toolmakers	2
29.	Reamer adjustable Tapper, Parallel	1 each
30.	Scraper 3 corner 6", half round 6"	2 each
31.	Chisel cross cut, flat round box	8 each
32.	Angle Plate 8"×4"	1
33.	O—Micrometer 0"—1", 1"—2", 2"—3"	2 each
34.	Vernier Callipers 8"	1
35.	Vernier height gauge 12"	1
36.	Vernier Bevel protractor	1
37.	Straight edge 18"	1
38.	Screw pitch gauge	1
39.	Wire gauge imperial (standard)	1
40.	Ring and Plug gauge	1
41.	Dial test indicator	1
42.	Sine bar 10"	1
43.	Combination gauge block set	1
44.	Electric oven furnace for heat treatment	1
45.	Lathe Gap 6ft. Engine	1
46.	Drill Power Pillar Tyre Max. Cap. ½"	1
47.	Adapter Drill Morse	1
48.	Drill twist T. S. ¼" by 1/16" set of 9	2
49.	Grinder, Bench High 7" fine and rough wheels	1
50.	Grinder, Piller type shaft-driven rough and fine	1
51.	Saw Power adjustable max. stroke 4"	1
52.	Forge hand 18"×24" with fan	1
53.	Anvil ½ cwt.	1
54.	Stand Anvil	1
55.	Vice 6" Jaw, 4" Jaw	6 each
56.	Vice lege 4" Jaw	1
57.	Bench working	1
58.	Almirah	1
G. Welding		Approximate cost Rs. 8,000
1.	Glores pair - Lead lines, Asbestos	8 each
2.	Apron - Lead lines, Asbestos	8 each

1	2	3
3.	Welding screen	8
4.	Rule Brass 112"	4
5.	Square Try Blade 6"	4
6.	Scriber 6"	8
7.	Tong holding	4
8.	Hammer Scaalling, B.P.	4 each
9.	Chisel cold	4
10.	File - Half round, flat	4
11.	Spanner	4
12.	Brush steel wire	4
13.	Goggle Pair welder 4"	8
14.	Vice hand-	8
15.	Chisels cross cut	8
16.	File handles	8
17.	Transformer welding set	1
18.	Oxygen cutting machine	1
19.	Quicky Arc cutting machine	1
20.	Arc welding sset motor generator	3
21.	Welding Plant acetylene	3
23.	Top table welding fire brick or stand	8
23.	Vice Bench	2
24.	Bench working	2
H. Sheet & Plate Metal Shop		
1.	Rule Brass 12"	8
2.	Compass 9"	8
3.	Scriber 6"	8
4.	Punch centre 44"	8
5.	Iron solding 8 oz.	8
6.	Mallet wooden	8
7.	Hammer B.P.	8
8.	Rule steel 12"	2
9.	Wooden 24" Flour Fold	3
10.	Surface Plate	1
11.	Square Try	4
12.	Stake - Hatchett, Round head, Half Moon, Round bottom grooving, funnel	2 each
13.	Gauge imperial	1
14.	Iron creasing, Blick	2 each

1	2	2
15.	Horx	2
16.	Anvil	2
17.	Hammer - Paning, Block, B.P., Planishing	2 each
18.	Shear Tinmans	2
19.	Snip straight, bent 8"	4 each
20.	Punch Round 3/16", 1/4"	2 each
21.	Rivet set different sizes	2 each
22.	Chisel cold flat, Half round side	2 each
23.	File Flat smooth, Rough, 2nd cut	2 each
24.	File Half round Smooth, 2nd cut	2 each
25.	File 3 square 2nd cut	2
26.	Handle file Assorted	16
27.	Saw Hack Frame	2
28.	Groover different sizes	2 each
29.	Plier - side cutting, Round nose, gas	2 each
30.	Pin tarn cenical 2"	2
31.	Pot melting	2
32.	Ladle	2
33.	Lamp blow Point	2
34.	Drill Hand Brace 0"—1/4"	2
35.	Drill Twist ss 1/8" x 1/4" set of 3	2
36.	Iron soldering 12 oz., 16 oz.	2 each
37.	Machine seaming, Beading, shearing, circular sheet cutting	1 each
38.	Forbe with hand fan	1
39.	Anvil	1
40.	Stand Do	1
41.	Grinder pillar type	1
42.	Grinder Bench Hand	2
43.	Vice Bench Jaw 3", 4"	2 each
44.	Bench working	2
45.	Almirah	1
46.	Universal swaging, jennying etc. machine motorised	1